CHALMERS

Strategic Evaluation in Biopharma

An adapted Balanced Scorecard for Late-Stage R&D Governance at AstraZeneca

Bachelor's thesis in Industrial Economy

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Strategisk projektvärdering i läkemedelsindustrin

Utveckling av ett anpassat Balanserat Styrkort för sen-fas FoU på AstraZeneca

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This thesis develops an adapted Balanced Scorecard for evaluating late-stage R&D projects at AstraZeneca.
The adapted Balanced Scorecard focuses on three categories: financial impact, strategic fit, and competition.
Its purpose is to improve project prioritization and provide more transparent decision support.

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SUMMARY

The biopharmaceutical industry is characterized by long, uncertain and expensive R&D processes. Investment decisions in late-stage R&D projects, which often involve financial projections and strategic judgments, are therefore critical for companies' success. The aim of this thesis has been to develop an adapted Balanced Scorecard specifically tailored for evaluating late-stage R&D projects at AstraZeneca, one of the largest biopharmaceutical companies in the world. The study addresses the challenge of integrating both quantitative financial parameters and qualitative parameters, such as strategic and competitive insights, into a comprehensive framework relevant for evaluating R&D projects. Through combining a theoretical framework through a systematic literature review on project evaluation methods in the biopharmaceutical industry, with a case study of AstraZeneca's R&D evaluation process in the late-stage governance, based on interviews with relevant employees at the company and quantitative data from 12 projects, the study identifies and validates important evaluation parameters essential for R&D decision making in the biopharmaceutical sector. Some example parameters include metrics such as Net Present Value (NPV), Probability of Technical and Regulatory Success (PTRS), Portfolio Gaps within Resource Capabilities, and Product Area Dominance. These evaluation parameters have been synthesized into three overarching categories - Financial Impact, Strategic Fit and Competition, which when combined result in the AstraZeneca adapted Balanced Scorecard.

The study finds that AstraZeneca in the past had difficulties integrating the Balanced Scorecard in their ways of working, due to its perceived complexity, and it was therefore phased out. To address these challenges, the adapted Balanced Scorecard presented in this thesis was developed to be simpler, more intuitive, and better aligned with AstraZeneca's existing R&D evaluation practices. The simplification of the tool was achieved by including perspectives relevant to R&D project decision making and metrics already used by AstraZeneca. The study also presents and discusses in further detail how the adapted Balanced Scorecard is designed, discusses its application and what value it provides.

Keywords: Balanced Scorecard, R&D, Project Evaluation, Project Prioritization, Biopharma, AstraZeneca, Late-Stage Governance

Note: The report is written in English

SAMMANFATTNING

Läkemedelsindustrin kännetecknas av långa, osäkra och dyra FoU-processer. Investeringsbeslut i sena faser av R&D-projekt, som ofta innefattar finansiella modeller och strategiska bedömningar, är därför avgörande för företagens framgång. Syftet med denna rapport har varit att utveckla ett anpassat Balanserat Styrkort, som är särskilt anpassat för att utvärdera FoU-projekt i sen-fas på AstraZeneca, ett av världens största läkemedelsbolag. Studien adresserar utmaningen att integrera både kvantitativa finansiella parametrar och kvalitativa parametrar, såsom strategiska och konkurrensmässiga aspekter,

till ett heltäckande verktyg som är relevant för utvärdering av FoU-projekt. Genom att kombinera ett teoretiskt ramverk uppbyggt av en systematisk litteraturgenomgång av metoder för projektutvärdering inom läkemedelsindustrin med en fallstudie av AstraZenecas sen-fas FoU-utvärderingsprocess, baserad på intervjuer med relevanta medarbetare på företaget samt kvantitativ data från 12 projekt, identifierar studien viktiga utvärderingsparametrar som är avgörande för beslutsfattande inom läkemedelsindustrins FoU. Några exempel på parametrar är nettonuvärde (NPV), sannolikhet för teknisk och regulatorisk framgång (PTRS), portföljgap inom resurser och kapabiliteter och produktområdesdominans. Dessa utvärderingsparametrar har sammanfattats i tre övergripande kategorier - Finansiell Påverkan, Strategisk Lämplighet och Konkurrens, som när de kombineras resulterar i det anpassade Balanced Scorecard.

Studien visar att AstraZeneca tidigare haft svårt att använda Balanserat Styrkort på grund av dess komplexitet, och att det därför fasades ut. För att hantera dessa utmaningar utvecklas i studien ett anpassat Balanserat Styrkort som är enklare, mer intuitivt och bättre anpassat till AstraZenecas befintliga metoder för utvärdering av FoU-projekt. Förenklingen av verktyget uppnåddes genom att inkludera perspektiv som är relevanta för beslutsfattandet inom FoU-projekt och mätetal som redan används av AstraZeneca. Studien presenterar och diskuterar också mer i detalj hur det anpassade Balanserade Styrkortet är utformat, dess tillämpning och vilket värde det ger.

Nyckelord: Balanserat Styrkort, FoU, Projekt Utvärdering, Projekt Priotisering, Läkemedelsindustrin, AstraZeneca.

Notera: Rapporten är skriven på engelska

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1. Background

1.1 Strategic Significance of R&D Valuation in Biopharma

Developing new drugs in the biopharmaceutical industry is a costly, time-consuming, and uncertain process. On average, bringing a single new drug to market costs over $2.2 billion (Deloitte, 2025) and takes more than a decade from discovery to market approval (DiMasi et al., 2016). The development process is further complicated by scientific uncertainty, regulatory hurdles, and intense competition. Investment decisions made in this sector are often a matter of survival rather than just financial optimization.

For AstraZeneca, one of the world's ten largest biopharmaceutical companies (Dunleavy, 2025), managing the risks associated with drug development projects is essential to improve long-term performance. The company's ability to maintain a strong R&D pipeline is closely tied to how well it evaluates and prioritizes projects. Good decisions can generate strong revenue streams throughout the patent period and beyond, while poor choices risk significant financial losses on one hand and missed opportunities on the other.

This makes project selection a key component of strategic and financial planning. A robust evaluation process should consider not only projected financial returns but also broader factors such as strategic alignment, organizational capabilities, and the evolving competitive landscape of each therapeutic area. The objective is to allocate resources to projects that align with the company's overall goals and offer the most promising return, financially and strategically.

However, deciding whether to advance or terminate a project is challenging. At the late governance stage, when projects have passed early clinical phases and approach commercialization, the stakes are high. Decisions made at this point involve considerable sunk costs and are directly tied to future revenue streams, patent protection, and market competitiveness. These decisions are often made under conditions of uncertainty and incomplete information. In the biopharma industry, financial tools such as Net Present Value (NPV), Risk-Adjusted NPV (rNPV), and Real Options valuation are commonly used to guide investment decisions (Chandra & Mazumdar, 2024). While valuable, these models often fail to account for non-financial factors such as strategic fit or market timing. As a result, companies like AstraZeneca frequently supplement these tools with qualitative assessments.

1.2 Challenges in Merging Quantitative Tools with Qualitative Insights

AstraZeneca combines financial models with management judgment when evaluating R&D projects, which will be further explained in the case study (see chapter 7). Decision makers often rely on qualitative assessments to capture factors such as strategic alignment and competitive positioning. While this blended approach is common, it is not always formally standardized.

Without a structured framework to systematically integrate qualitative and quantitative factors, the evaluation process can become inconsistent, subjective, and difficult to compare across projects and over time. This concern was raised in interviews with a Project Finance Director at AstraZeneca. While the expertise of decision makers was highlighted as a strength, the lack of standardized treatment of non-financial factors was seen as a potential risk to decision quality.

This challenge indicates a need for a more holistic and consistent evaluation approach. A structured tool could serve multiple purposes: summarizing existing analyses, offering a standardized view of each project, and clarifying investment decisions at key governance stages. In doing so, it could strengthen decision quality, improve internal communication, and enhance traceability across AstraZeneca's R&D portfolio.

AstraZeneca has previously used a tool known as the Balanced Scorecard in its R&D governance to support project prioritization. Introduced by Kaplan and Norton (1992), the original Balanced Scorecard was designed to combine financial and non-financial measures in a structured framework. In biopharma, where projects involve both commercial and strategic considerations, such tools can help align decisions with broader company goals. This was also the aim behind AstraZeneca's initial introduction of the scorecard, but it was eventually phased out due to perceived complexity and limited adaptability to existing decision making processes.

By including new and different categories compared to the original Balanced Scorecard, such as strategic fit and competitive analysis, an adapted version of the original tool could offer a clear, simple and consistent basis for evaluation. It could also serve as a summary of evaluations already performed, providing a structured overview that complements current practices.

2. Purpose

The purpose of this report is to develop an adapted Balanced Scorecard specifically tailored for the evaluation of R&D projects at AstraZeneca within the late governance stage. By identifying relevant categories, we want to help provide insights that could support a potential implementation of an adapted Balanced Scorecard, enabling more accurate, objective and strategic prioritization within the company's R&D portfolio.

3. Problem Analysis

One fundamental challenge to achieve the purpose is to identify what parts the adapted Balanced Scorecard should consist of. As explained in 6.1, the original Balanced Scorecard is built on 4 perspectives that can be considered high-level “categories”, and these are in turn built up by concrete metrics or “parameters”. Thus, we need to address the right questions in order to define and explore what similar categories and parameters can be for the adapted Balanced Scorecard. This chapter aims to break down the purpose by segmenting it into four main parts.

The problem analysis has been divided into four sections to clearly formulate the problems that need to be addressed in order to achieve the purpose.

3.1 Investment Decisions within R&D at AstraZeneca

To achieve the purpose of the thesis, internal information from AstraZeneca regarding which factors are relevant for investment decisions is needed. These could be both quantitative and qualitative. Moreover, it is beneficial to understand how important stakeholders within the organization reason regarding investment decisions, what they perceive important and effective, as well as areas needing improvement. Related to this, to meet the stakeholders’ need, ensuring that the adapted Balanced Scorecard aligns with their working methodologies is critical. Therefore, investigating what characteristics AstraZeneca would value in a tool such as an adapted Balanced Scorecard is needed. It is also valuable to understand how AstraZeneca uses different evaluation parameters and the underlying reasons. Given these considerations, this section seeks to answer the following key questions:

- Which evaluation parameters are currently used within R&D-projects at AstraZeneca?
- Which evaluation parameters are considered to be the most important for investment decisions?
- What expectations and requirements do important stakeholders have for a practical evaluation tool?

3.2 Investment Decisions within R&D in Biopharma

To fulfill the purpose, it is important to investigate different factors, both qualitative and quantitative, that impact R&D project investments decision making. It is necessary to identify the most commonly used evaluation parameters in the biopharma industry as a whole. Also, it will be useful to understand

what best practices exist regarding the application of these evaluation parameters to evaluate R&D-projects. With these factors in mind, this section aims to address the following questions:

- Which qualitative and quantitative aspects are involved in R&D project investment decisions?
- Which evaluation parameters are used in R&D-projects within the biopharmaceutical industry as a whole?
- Which evaluation parameters are considered to be the most important for investment decisions within R&D in the biopharma industry?

3.3 Identifying Possible Categories for the Adapted Balanced Scorecard

To build the adapted Balanced Scorecard, it is necessary to determine which overarching categories should structure the evaluation. These should reflect the main dimensions that guide investment decisions in biopharmaceutical R&D and be supported by both literature and AstraZeneca's internal perspectives. Also, they should together embrace all relevant evaluation parameters. Considering these aspects, this section aims to address the following question:

- What overarching evaluation categories are relevant for biopharmaceutical R&D decision making?
- What overarching evaluation categories embrace all relevant evaluation parameters?

3.4 Understanding and Adapting the Balanced Scorecard

An important objective of this thesis is to develop a clear understanding of what a Balanced Scorecard (BSC) is and explore how it can be modified or adapted to suit specific organizational needs, particularly within the context of AstraZeneca's R&D project evaluation. Meanwhile, it is also essential to understand typical challenges associated with the original Balanced Scorecard, to be able to make an adapted version. Therefore, the following questions will be addressed:

- What is a Balanced Scorecard, and how can it be modified and adapted for use in AstraZeneca's R&D project evaluation?
- What common challenges should be considered when designing an adapted version of the Balanced Scorecard?

4. Delimitations

The Project Finance Director, our primary contact person at AstraZeneca, currently works within the CVRM (Cardiovascular, Renal and Metabolism) therapy area. As most information from AstraZeneca is collected from interviewing the Project Finance Director, insights regarding project valuation mostly derive from projects within this therapy area. At the same time, other people from different parts of the organization provided information, but contact with these people was less frequent.

5. Method

The thesis is based on a case study utilizing interview and project data. In addition, a theoretical framework was developed through a review of relevant literature. A comparative analysis between the theoretical framework and the case study was conducted to explore how the Balanced Scorecard can be applied and adapted to AstraZeneca, particularly for evaluating R&D activities.

5.1 Methodological Approach

This report performs a case study on investment decisions of R&D projects at AstraZeneca, specifically examining the feasibility of implementing an adapted Balanced Scorecard. A qualitative method was used through a combination of inductive and deductive approaches. While a theoretical framework provides a strong foundation for the analysis, it is complemented by empirical data which has been collected from AstraZeneca. These two components, theory and empirical insights, have been developed in parallel. This allows for a dynamic interaction between conceptual understanding and empirics. Thus, the methodological approach can be described as a mix of inductive and deductive reasoning. An inductive approach is based on the idea that theories and concepts emerge from empirical data, while a deductive approach is centered on testing hypotheses derived from existing theory. Positioned between these two is the abductive approach, which views the research process as an interplay between data-driven interpretations and theoretical concept development (Klingberg & Hallberg, 2021). Therefore, one could say that the report uses an abductive method. This abductive approach has guided the structure and analysis of the report, where clearly defined theoretical foundations are complemented with empiric data and findings from AstraZeneca.

5.2 Interviewing at AstraZeneca

Information was collected from AstraZeneca through interviews. After thorough research and by leveraging the study's contact person's network within the organization, three relevant respondents were identified, each offering different expertise and perspectives on how the company evaluates R&D projects. To maintain anonymity, the respondents will be referred to by their job titles throughout this thesis. Anonymity was chosen to encourage more honest responses without fear of repercussions.

The first respondent is working as a "Project Finance Director", meaning that this person is the economic manager of one specific project. This person delivered insights on how a project is valued, which methods are used and how to create a pitch for a project when entering the late-stage of

development. This gave the study an economic operational perspective regarding developing an investment case which is eventually going to face a decision making unit. Additionally, this employee was the project groups' contact person, meaning several meetings and general guidance was received from the respondent.

The second respondent works as a "Senior Director in Late-Stage Governance" at AstraZeneca. The respondent is a part of a Late-Stage decision making body responsible for reviewing all investment decisions related to R&D projects. Moreover, this includes determining how to allocate the company's total R&D budget across different therapy areas. Being the head secretary of this committee, the respondent has seen several investment cases and knows what the decisive unit is looking for in a project. This gave the study a valuable insight in how decisions are made, what the committee desires, and why projects usually win investments.

The third respondent has the role "Head of R&D Finance" at AstraZeneca. This means that the respondent leads the R&D portfolio management work, which includes initiating projects at the right time to make sure the company has a stable revenue growth. Interviewing this respondent gave the study a significant strategic picture on how the portfolio is managed and eventually which parameters are important.

Together, these three respondents provided us with a holistic view of AstraZeneca's entire R&D investment operations, from the micro-level, examining specific projects, to the macro-level, encompassing the entire portfolio.

Each of the interviews had a semi-structured form using both fixed questions and follow-up questions. Fixed questions allowed us to steer the interview in a certain direction and simplify comparison between answers of different respondents. On the other hand, follow-up questions deepened the understanding of interesting topics that emerged during the interview by allowing the respondents to answer questions more freely.

According to Dalen (2015), it is important to carefully consider the formulation of interview questions. The key criteria to assess include:

- Is the question clear and unambiguous?
- Is the question leading?
- Does the question require specific knowledge or information that the respondent may not possess?

- Does the question address highly sensitive topics that the respondent may be unwilling to discuss?

In order to minimize ambiguity, questions were clearly formulated through preparation, which included developing an understanding of both the respondents' work tasks and AstraZeneca's business, particularly their work on R&D investment.

The questions asked to the interviewees differed between open and leading questions, depending on the purpose of the specific question. In some cases, the questions asked were steering the conversation in a certain direction in order to receive information about specific areas. For example, to obtain information about what qualitative parameters are important when making an investment decision in late-stage governance, leading questions were sometimes asked. An example of a leading question that was used is: "What would you say are the top three most important factors, excluding financial factors, when deciding if a project is worth investing in or not?".

On the other hand, while asking about the Balanced Scorecard, the questions were more openly formulated. A question of this type was for example: "Tell me about your experiences of using the Balanced Scorecard", instead of asking "What improvements were needed for the use of Balanced Scorecards?", which implies that there was a need for improvements. Information regarding employees' experiences from the Balanced Scorecard were from both leading questions asking it directly and open questions about improvements, which led to advantages and disadvantages.

Prior to interviewing, the project group was clear that the interview material will be used in a report published externally, ensuring that the respondents do not share sensitive information. The interviews were audio recorded, with prior consent to ensure the interviewees felt comfortable throughout the process. Recorded interviews were then transcribed using an AI-tool for easier access to the interview material. At least three members of the study were present during the interviews to secure a comprehensive and accurate data collection process, leading to a more dynamic and thorough discussion while also minimizing the risk of misinterpretation or information loss.

5.3 Project Data and Information from AstraZeneca

This subchapter explains project data and information received from AstraZeneca and how the data has been analyzed.

5.3.1 Financial Metrics and Balanced Scorecard Information

Information regarding project evaluation at AstraZeneca was needed to give the study a foundation for the development of an adapted Balanced Scorecard, especially when looking to find relevant parameters for the framework. This information was collected from the Project Finance Director at AstraZeneca. The information contained examples of financial measures provided by a specific project group when pitching a late-stage development project for the investment committee. Since the financial measures are standardized for each project, this gave the project group an insight into what financial metrics AstraZeneca monitors before investing in a late-stage R&D project. The specific metrics will be presented in chapter 7.2.

Information from the company's previous use of a Balanced Scorecard was also obtained from the Project Finance Director at AstraZeneca. According to this person, the framework hasn't been used for several years, and no useful records of its previous implementation could be found, meaning the project group relied on the Project Finance Director's memory of the use of this tool. As the information was from a person who's worked at AstraZeneca for over 20 years, and the information was quite general, its reliability was seen as high and could be used for the purpose of this report, especially when researching why the framework had stopped being used previously.

5.3.2 Cash Flow Data from Twelve Projects and Grading Interval Creation

As a tool for the project group to understand AstraZeneca's ways of working, masked cash flow data from twelve different R&D projects was received. The data includes profits and losses (P&L) statements for twelve projects spanning different therapy areas. The projects have been anonymized, meaning there is no information about which specific drug or therapy area each project belongs to, only that there is a mix of random projects. The P&L statements contain revenue and cost data from 2012 to 2025, as well as projected figures from 2026 to 2055. Revenue items are detailed and include product sales, collaboration revenue, royalty revenue, and externalisation revenue, among others. Cost items cover everything from different phases of R&D to amortisation and depreciation. These revenue and cost items result in calculated cash flow and cumulative cash flow at the end of each P&L statement.

In addition, each project's data also includes Peak Year Sales (PYS), Probability of Technical Success (PTS), Probability of Regulatory Success (PRS), and the combined Probability of Technical & Regulatory Success (PTRS). These concepts are explained in more detail in chapters 6 and 7.

The cash flow data made it possible for the project group to create financial measures for each project (similar to those used by AstraZeneca), which eventually allowed us to develop intervals for each figure used in the creation of the adapted Balanced Scorecard. The intervals are showcased in chapter 7.2, while the process of turning the cash flow data to financial metrics and eventually into intervals is explained below.

The project group performed calculations on the received cash flow data for each project, and sorted the outcomes for each figure by size. An example of a calculation is how the NPV for each project was calculated; first, the cash flows were discounted by conducting a Discounted Cash Flow Analysis in accordance to chapter 6.5.3. The discounted cash flows were then summed up to give each project a Net Present Value (see 6.5.4). Calculations with the respective method for each of the following financial measures were done: Max Exposure, Bang for Buck, Break Even Year, NPV. Furthermore, PTRS and Peak Year Sales were given as well. Every projects' financial measure was sorted by size, meaning there were for instance twelve NPVs calculated and ranked.

To enable consistent comparison between the twelve projects, a relative scoring approach was used. This approach is suitable to grade projects in a portfolio in a relative manner which avoids unreasonable intervals. Metrics such as NPV were ranked and divided into five equal-sized intervals, with grades from 1 to 5 assigned accordingly. This approach helps differentiate projects based on their expected relative performance within the portfolio, without setting intervals that might not reflect AstraZeneca's actual data. When each project is graded, the intervals are made clear by determining points that put future projects at a certain grade. For instance, an NPV over 4bUSD gives a project a 5 out of 5 on that specific parameter.

In an ideal relative scoring method, the amount of projects would be the same for each grade (meaning for 10 projects, each grade would include 2 projects). However, since 12 projects were obtained and 12 divided by 5 equals 2.4, some projects had to be placed within the same score. This could be seen as a limitation, but in such cases, a project was assigned the score of the closest project within an interval, for example, if a project fell between scores 2 and 3 but was numerically closer to grade 3, it was assigned a score of 3.

5.4 Literature Review

To understand how the Balanced Scorecard can be used, how it may be applied in R&D-projects and what parameters are relevant, data is collected from relevant literature and research. To ensure accurate and reliable data, the main sources for gathering data were Google Scholar and Scopus, along

with similar databases to ensure a comprehensive review. A theoretical framework compiled from the literature review is presented in chapter 6.

According to L.T Eriksson & Wiedersheim Paul (2008), source criticism is crucial in academic research to ensure the reliability and validity of the information used. It is essential that each source is evaluated to ensure its credibility and relevance to the study. When searching for relevant sources, it is checked whether it has been published in a reputable academic journal that has undergone a peer-review process, as this ensures the research has been reviewed and validated by experts in the field. Additionally, the author's credentials and academic background is considered, as this influences the quality and objectivity of the research. The content of the research is also verified to not be outdated, as relying on older studies or information may undermine the relevance and accuracy of the conclusions drawn. However, exceptions could be made given the relevancy and importance of the specific source.

Moreover, to streamline the research process, data was filtered by using specific keywords that vary depending on the subtopic of investigation, with the purpose of excluding irrelevant documents. When data regarding how the Balanced Scorecard is used in biopharma was demanded, keywords such as "Balanced Scorecard", "Finance within R&D", and "Strategic decisions within R&D" were used. Changing keywords for our needs allowed us to gather information about Balanced Scorecards and important parameters considered within R&D investments.

5.5 Quality Analysis of Methodology

The masked project data given by AstraZeneca is used to analyze the financials, focusing on applied valuation methods, existing systems, and identifying key parameters for a Balanced Scorecard. This data allows for a clearer understanding of the evaluation process and which financial parameters AstraZeneca uses, which is used as the base of the Balanced Scorecard. The variables were also isolated to facilitate comparison with industry standards, enabling key insights, such as differences and similarities, to be systematically extracted.

Interview data is gathered to gain a qualitative perspective, which complements the quantitative data in the masked project data, and is analyzed using thematic analysis. This involves identifying recurring themes and patterns within the respondents' answers. Segments of the transcribed interviews are initially grouped into categories, which are then revised and consolidated into the overarching themes: Financials, Strategy and Competition. These themes were used as the foundation for the Balanced Scorecard. Each theme is carefully reviewed to ensure a thorough and systematic

understanding of AstraZeneca's approach to project evaluation. Thematic analysis is particularly suitable for this type of qualitative data, as it helps uncover both explicit and implicit insights into evaluation practices.

The academic research is compiled in a structured literature review, focusing on relevant theories and prior empirical findings within project evaluation. A thematic approach is again applied here, particularly to assess how the Balanced Scorecard is used within R&D in the biopharmaceutical industry. The literature is organized into the same themes as the interview data: Financials, Strategy and Competition, providing a comprehensive view of industry and wide practices that may inform AstraZeneca's own methodology. The comparative analysis between the empirics at AstraZeneca and the academic data from the research was simplified by using the same themes.

The interview data and the masked project data were combined to create a case study which was then compared with the theoretical framework made through academic research, as explained in chapter 5.4. Once the interviews, case, and literature data were analyzed independently, a comparative analysis was performed. This aims to identify patterns, discrepancies, and potential gaps between AstraZeneca's current practices and theoretical best practices. This comparative analysis serves as a foundation for proposing how the adapted Balanced Scorecard could be introduced or further developed within the company.

A potential flaw with the methodological approach to this report is the relatively small number of interview respondents. Only three individuals have been interviewed, which could be seen as insufficient to capture a holistic view of a large and complex organization like AstraZeneca. Moreover, this limited sample size could hinder generalizability about findings and increase risk of bias. However it is important to note that the selected respondents all held senior roles and provided different perspectives on late-stage decision making within R&D at AstraZeneca, from operational, strategic and financial perspectives. Thus, whilst the pool of respondents is small, their unique positions offer a comprehensive view of AstraZeneca's R&D decision making. This increases the credibility and relevance of the data collected, even if the empirical scope is limited. A potential improvement here could have been that we could have interviewed additional employees at AstraZeneca to decrease the risk of biases.

Furthermore, the financial data used to derive intervals within the Financial Impact category was based on a sample of twelve anonymized projects. This limited dataset raises valid concerns regarding the reliability and generalizability of the proposed intervals. Ideally, a larger and more diverse sample would have allowed for a more robust statistical foundation and improved confidence in the scoring thresholds. However, access to additional data was restricted by AstraZeneca. As a result, while the

intervals developed in this thesis serve as illustrative examples, they should not be viewed as definitive. A potential improvement would be for AstraZeneca to refine these intervals internally, using their full repository of project data.

6. Literature Based Framework for the Adapted Balanced Scorecard

This chapter is divided into two main parts. Firstly, it introduces the Balanced Scorecard concept, including its core principles, the potential for creating an adapted version tailored to specific industry needs, and previous failures in its application (chapter 6.1-6.3). This provides the necessary theoretical context to support the purpose of this report.

Secondly, the chapter outlines a comprehensive framework of key aspects relevant to investment decisions in the biopharmaceutical industry (chapter 6.4-6.7). This framework serves as a foundation for identifying categories and parameters suitable for inclusion in an adapted Balanced Scorecard.

6.1 Balanced Scorecard

Bain & Company (2023) explains that the Balanced Scorecard is a tool used by management to measure an organization's performance and evaluate whether management is achieving the intended results. According to Kaplan and Norton (1992), its main purpose is to combine financial metrics, such as Net Present Value (NPV), with strategic measures to provide a more balanced view of performance. Moreover, as seen in figure 1 the Balanced Scorecard aims to capture the four perspectives of value creation: Financial Perspective, Customer Perspective, Internal Business Processes, and Innovation and Learning Perspective.

Figure 1:The Perspectives of the Original Balanced Scorecard

Moreover, Kaplan and Norton (1992) explains that The Financial Perspective focuses on the financial objectives of an organization and allows managers to track financial success and shareholder value. Typical metrics include revenue growth, return on investment and profitability. The Customer Perspective highlights customer satisfaction and retention. It focuses on questions regarding how the customers view the company. Typical metric is customer satisfaction scores. Internal Business Processes is about internal operational goals and outlines the key processes needed to deliver on customer demand. Usually it includes metrics like cycle times and quality rates. Finally, the Innovation and Learning Perspective emphasizes a company's ability to continually improve and create value over time. Typical metrics include measures on product and process innovation.

According to the Corporate Finance Institute (n.d.), the Balanced Scorecard is primarily used to prioritize products, projects and services; communicate targets and goals; and plan routine activities. Since the Balanced Scorecard relies on quantifiable and numeric metrics, it is often used as a structured reporting tool to evaluate the performance of various initiatives against Key Performance Indicators (KPIs). Industrial Finishes (2018) explains that KPIs are measurable indicators used to track and compare performance over time, both within the organization and in relation to external benchmarks. KPIs should be clear, quantifiable metrics that help assess progress toward defined goals.

Furthermore, Niven (2006) concludes that, for an organization to successfully implement a Balanced Scorecard approach, it must follow a structured four step process. First, the organization should define clear objectives and ensure that the Balanced Scorecard is aligned with its overall strategy. Second, ensuring the Balanced Scorecard accurately reflects performance across each of the four Balanced Scorecard perspectives. Third, the organization should foster stakeholder engagement by creating awareness and involvement at all levels. Finally, the Balanced Scorecard should be reviewed and adapted regularly to remain effective.

Gomes & Romão (2014) highlight five main benefits of using the Balanced Scorecard approach to track performance. Firstly, it provides a holistic view of the organization's performance and helps identify which initiatives should be prioritized. Secondly, it enables strategic alignment by ensuring that short-term actions are aligned with long-term goals. Thirdly, it improves decision making by offering actionable insights through a balanced set of metrics. Fourthly, it encourages organizations to think strategically and prioritize objectives that drive long-term growth. By focusing on strategic priorities and defining clear performance targets, it increases resource efficiency and supports more accurate decision making. Finally, the Balanced Scorecard facilitates internal and external

communication by providing a common framework for discussing strategic objectives, performance measures, and initiatives, ensuring that everyone understands the organization's strategic goals and priorities.

In addition to this, Pandey (2005) argues that the Balanced Scorecard improves performance evaluation and supports continuous improvement by linking a company's strategy to its daily operations and by enabling the tracking of progress toward strategic goals over time. Hwang & Rau (2007) also explains that it is common for the Balanced Scorecard to be used for maintaining long-term competitiveness by benchmarking the organization's performance against industry standards.

6.2 Methods to Modify the Original Balanced Scorecard

Even though Kaplan & Norton designed the Balanced Scorecard in a particular way, Bisbe & Barrubés (2012) highlight that the Balanced Scorecard should not be seen as a rigid framework, and that companies often modify the Balanced Scorecard to better fit the reality and specific needs of their industry.

This can be done through several different ways. Firstly, Rühle & Wagner (2016) explains that companies can add perspectives with respect to the original four perspectives to address specific needs. For example, companies can add a technical perspective or an organizational culture perspective. Secondly, Philbin (2011) also notes that these adjustments could mean that a certain perspective is removed or adjusted if it then better fits the organization's goals and challenges. This is strengthened by Sanchez-Marquez et al. (2020), who concludes that in order to reduce complexity, one may select to focus on the most critical metrics from the Balanced Scorecard. To achieve this, it could involve qualitative and/or statistical analysis to identify a smaller set of metrics that more efficiently summarize the performance of a particular project, or the company in general. Finally, the Balanced Scorecard can also be integrated with other management tools to enhance its effectiveness.

6.3 Challenges with the Balanced Scorecard

Although having the potential of being a valuable tool that can be customized to fit an organization's specific needs, there have been several examples where the Balanced Scorecard has failed to be successfully implemented. The reasons for such failures can vary, stemming from a range of factors.

Firstly, Aljaman et al. (2023) explains that one major challenge is that the implementation of the Balanced Scorecard can be time consuming and resource intensive, which can hinder organizations from fully implementing it. Secondly, Trébucq (2011) concludes that the Balanced Scorecard often can be perceived as being complex and difficult to implement, if the organization does not have the adequate technologies available and proper information-sharing projects. Thirdly, Durović-Petrović et al. (2018) write that a common failure of the Balanced Scorecard is that organization's have not adapted the Balanced Scorecard well enough to fit the specific needs of the organization and how they operate. Finally, Trébucq (2011) highlights that another common issue affecting the successful implementation of the Balanced Scorecard is that it is sometimes not well understood, leading to resistance within the organization. If the people within the organization are not willing to embrace the Balanced Scorecard, it will be hard for it to gain traction.

6.4 Multi-Criteria Decision Making

Aziz et al. (2016) emphasizes that Multi-Criteria Decision Making (MCDM) models are useful for evaluating different options and choosing the best one based on multiple criteria. These models belong to a broader group of operations research methods that help make decisions when several factors need to be considered. One common MCDM method is the Analytic Hierarchy Process (AHP) method, which is a ranking tool used for group decision making. It is widely applied in many fields, including business, government, industry, education, and healthcare. The method includes a consistency check to help identify and reduce conflicting judgments. It uses mathematical values (called eigenvectors and eigenvalues) to calculate priority scores and a consistency index. Overall, AHP helps rank and prioritize different criteria, making it easier to identify which ones are more important.

6.5 Financials in R&D

Financial figures are important when working with R&D because successful products must not only cover their own development costs but also the costs of any projects that fail. Since the majority of R&D projects, particularly in biopharmaceuticals, are unsuccessful, profitability from the few successful products is essential for ensuring the company's future survival and the ability to fund continued innovation. A strong financial foundation reduces risk, justifies investment, and increases the ability to manage the expensive and uncertain nature of R&D. (Samanen, 2013)

In order to evaluate the financials of biopharmaceutical R&D projects, some set of financial metrics are often used. Commonly used metrics are outlined below.

6.5.1 Return On Investment

According to Schoukroun-Barnes et al. (2018), biopharmaceutical companies use Return On Investment (ROI) analysis to evaluate the value and priority of products, technologies, or potential acquisitions. It helps compare projects in the pipeline in a relative manner, by incorporating not only returns, but also costs for each project. ROI methods vary depending on the investment, so it's important to define and apply a consistent approach. A common method expresses ROI as a percentage by dividing the expected net profit (total revenue from a project minus related costs) by the total investment cost (including R&D, manufacturing, marketing, regulatory, and other expenses) using this formula:

$$ROI\ (\%)\ =\ (Net\ Profit\ /\ Investment\ Cost)\ *\ 100$$

6.5.2 Different Probabilities of Success in Biopharma

The Probability of Regulatory Success (PRS) is according to Weidman and Belsky (2020) the estimation of the likelihood that a regulatory authority (e.g., FDA, which is the Food and Drug Administration in the US) will approve a product. It's a supporting figure for businesses in the biopharmaceutical industry when planning prioritization, budget, and resources related to different projects in an R&D portfolio. A PRS assessment needs to be based on analytical and fact based parameters. It also needs to be transparent, concise, and well documented to have an impactful use for biopharmaceutical companies. The PRS is calculated for each project and results in a percentage between 0-100%, differing for each project due to said reasons.

On the other hand, the Probability of Technical Success (PTS) is according to Weidman and Belsky (2020) solely referring to the chance of a clinical trial or study meeting its pre-defined endpoints. It does not incorporate regulatory approval, rather it assesses scientific or clinical feasibility by factoring. Like the PRS, the PTS is calculated individually for each project in a company's R&D portfolio, resulting in a score between 0-100%.

The Probability of Technical and Regulatory Success (PTRS) is eventually calculated using the following formula:

$$PTRS\ =\ PTS\ *\ PRS$$

The PTRS considers both aspects of a project, giving stakeholders an overall view of the feasibility of a certain project in the biopharmaceutical industry (Weidman & Belsky, 2020). For instance, a project with a PTS of 80% and a PRS of 60% would result in a 80% × 60% = 48% PTRS, showcasing how

the chance of total success of a project in the biopharmaceutical industry often and easily becomes relatively low.

6.5.3 Discounted Cash Flow Analysis

Bogdan & Villiger (2010) explains that Discounted Cash Flow Analysis (DCF) is used to estimate a company's or assets future cash flow over a reasonable time period and thereafter discount the expected future cash flows to present value, by using a discount rate. Jungen (2020) concludes that the appropriate discount rate varies for different companies and projects, since it is derived from the Weighted Average Cost of Capital (WACC) of the firm. WACC represents the required rate of return for investment for stakeholders to consider risking their equity or debt into the company or the individual project. The terminal value is an estimation of the summation of all the future cash flows beyond the forecasting period. Furthermore, BiopharmaVantage (2024) explains that the DCF method is often used by the biopharmaceutical industry to value commercialized drugs and other assets, established enterprises and external stakeholders.

6.5.4 Net Present Value and Risk-adjusted Net Present Value

Bogdan & Villiger (2010) defines DCF as the summation of the present value of all future cash flows, resulting in the Net Present Value (NPV) of all cash flows. Thus DCF and NPV are equivalent to each other. By adjusting the NPV formula for the probability of success, you get a risk-adjusted Net Present Value (rNPV). Biopharma Vantage (2024) explains that this method is most suited for valuing early stage development projects such as valuing preclinical and clinical projects and new drugs undergoing development. Moreover rNPV values are more accurate than standard DCFs since they allow pharma valuation to be based on the stage of development that a project is in, meaning the risk is adjusted and lowered as the development proceeds.

The net present value (NPV) and the risk-adjusted net present value (rNPV) is calculated as:

$$NPV = -I_0 + \sum_{t=1}^{T} (CF_t/(1+r)^t)$$

$$rNPV = -I_0 + \sum_{t=1}^{T} (rCF_t/(1+r)^t)$$

Where:

I_0 = Investment into the project at time 0 (equal to CF_0)

rCF_t = Risk-adjusted cash flow at time t

r = Discount rate

T = Endpoint of the project (if today is $t = 0$, then T is the project duration)

6.5.5 Benefit-Cost Ratio

The Corporate Finance Institute (n.d.) explains that the Benefit-Cost Ratio (BCR) is a metric used to evaluate the feasibility of an asset by comparing the present value of all the benefits generated from the asset in comparison to the present value of the cost associated with the asset. If the BCR value is over one it indicates the asset is expected to generate incremental value. Moreover, the Corporate Finance Institute (n.d.) highlights the main advantages of using the BCR; it shows the value generated per dollar of costs, it considers the time value of money through the discount rate, and it is useful as a starting point for quickly assessing if a project is economically justifiable or not.

6.5.6 Internal Rate of Return

The Internal Rate of Return (IRR) is a financial metric used to estimate the profitability of an investment. It represents the discount rate that makes the Net Present Value (NPV) of all projected cash flows equal to zero. Essentially, IRR is the break-even interest rate for an investment. If the IRR exceeds the required rate of return (i.e. the WACC), the project is considered financially viable. It is particularly helpful for comparing the relative attractiveness of several investment opportunities. However, IRR assumes that all interim cash flows are reinvested at the same rate, which may not always reflect reality. (Investopedia, 2025)

6.5.7 Break-even Point

The break-even point is the level of sales at which total revenue equals total costs, meaning the business neither makes a profit nor a loss. It is commonly used to determine how many units must be sold, or how much revenue must be generated, to cover both fixed and variable costs. (Investopedia, 2024)

6.6 Strategy in R&D

In the biopharmaceutical industry, it is strategically important that new products fit into a firm's existing portfolio because a coherent portfolio enhances the company's ability to manage risks,

optimize resources, and capitalize on existing knowledge and capabilities. Strategic compatibility implies that new products either strengthen the firm's core therapeutic areas, complement current expertise, or open access to related markets where the company can leverage its competitive advantages. Without such alignment, firms risk spreading resources too thinly, losing focus, and weakening their long-term innovation and financial performance. A strategically composed portfolio enables firms to diversify intelligently, maintain innovation momentum, and better attract investors by signaling consistent growth potential and reduced operational risk. (Erden et al., 2009)

Strategy plays a central role in shaping direction and priorities within the biopharmaceutical industry, guiding decisions that ensure long-term growth and competitiveness. R&D Project Portfolio Management (PPM) functions as a key tool within this strategic framework, helping companies allocate resources effectively and align project selection with overarching business objectives. Within PPM, strategic evaluation is commonly structured around specific dimensions, such as different types of gaps in the portfolio that need to be filled, such as gaps within revenue, long-term and short-term goals and gaps within competence and production capabilities. These will be explained in more detail in the following sections. (Schuhmacher, 2022)

6.6.1 Portfolio Design to Offset Patent-Related Revenue Decline

Branstetter et al. (2022) emphasizes the importance of maintaining a continuous innovation pipeline to avoid underutilized resources such as production facilities or expert teams after a patent expires. Rao (2019) mentions that companies can, through portfolio management, coordinate a variety of projects based on their contribution to the goals of the organization. One approach is to construct a portfolio based on different stages of the product lifecycle, from early R&D to market maturity. This is beneficial to create a consistent flow of profits and losses and such balancing through the lifecycle is often used in industries where timing is strategic.

In addition to life cycle diversification, timing factors such as patent expirations are considered in portfolio strategy. By granting exclusive marketing rights for a specified period, patents allow companies to protect either the process or the product for a set period of time, thereby giving them favourable circumstances to recoup the substantial costs associated with research and development. This exclusivity not only supports the recovery of initial investments but also generates profits (Williams, 2017). Companies operating in IP-intensive industries must anticipate the decline in revenues when key assets lose exclusivity through patents, which pressures the company to find a suitable replacement to fill the revenue gap (Rao, 2019).

6.6.2 Long and Short-Term Trade-Offs in Biopharmaceutical Innovation

Decision making processes naturally tend to favor the allocation of resources to exploitation projects, as these often provide faster and more frequent positive feedback to decision makers compared to exploration projects (Killen & Hunt, 2013). To cope with market pressures from shareholders, biopharmaceutical companies often leverage their core competencies by repurposing existing chemical compounds, allowing them to quickly launch incrementally improved products aimed at established markets. However, according to Suzuki & Methé (2011), excessive reliance on this approach can gradually weaken a firm's ability to innovate and develop truly groundbreaking products based on new chemical entities (NCEs).

Conversely, when firms overly focus on the exploration of NCEs, they may face significant competitive disadvantages in the short-term due to an insufficient portfolio of biopharmaceutical products on the existing market. This imbalance can lead to a gradual depletion of critical resources, such as financial capital, thereby jeopardizing the long-term sustainability of the development and commercialization of NCEs that could potentially become viable in the future.
In other words, biopharmaceutical companies can maintain their value creation efforts and continue developing innovative products by establishing a balance between short-term and long-term projects. (Suzuki & Methé, 2011)

6.6.3 Strategic Resource Retention in Biopharma R&D: Competence and Manufacturing

Palmer (2022) emphasizes the importance of maintaining and attracting highly skilled competence within the biopharmaceutical industry. The best workforce enables innovative products in a rapidly evolving industry. Moreover, one of the biopharma industry's biggest growing concerns is key competence leaving for competing firms. An annual employee turnover rate of 20% is considered significantly higher than many other sectors (Sykes, 2022). Therefore, the importance of highly specialized competence combined with high turnover rates make competence retention essential for the success of any biopharma company. One usual reason for competence leaving for competing firms is the lack of career progression opportunities. Since competence within biopharma is highly specialized, a stopped R&D-project can mean that core competences don't have any work opportunities within the company anymore. A strategic element of investment decisions within R&D is therefore to prioritize projects within specialized scientific areas, where core competences are at risk of having no assignments (Phaidon International, 2023).

In the same way, manufacturing capabilities within biopharma are highly specialized. Different tools, machines and equipment vary between different research areas and are often highly expensive. Just as core competences need to be strategically allocated, it is crucial for a biopharma company's profitability that its production capabilities are utilized to a high degree. (Schmalfuhs, 2024)

Additionally, there is a strong relationship between agile resource allocation and higher portfolio performance, although many companies lack the capacity to successfully relocate resources (Killen & Hunt, 2013). According to Halliday et. al (2002), biopharmaceutical R&D companies have increased the part of their budget regarding salaries in an effort to maximize sales through minimizing time-to-market. This is seen as a business strategy to keep resources available, as deficient resources leads to an increased time-to-market.

6.7 Competition in R&D

In the biopharmaceutical industry, monitoring competitors is important because strong competition, long product development cycles, and high risks mean that firms must be aware of technological trends, market movements, and alliance opportunities. By keeping an eye on rivals' patent activity, licensing strategies and product pipelines, companies can identify emerging threats, avoid duplication of costly R&D efforts, and find potential partnership or market positioning opportunities. Competitive awareness through competitive analysis helps firms to innovate more effectively, allocate resources smarter, and maintain a leading edge in a highly dynamic and global industry. (Xia & Roper, 2009)

According to Coursera (2025), competitor analysis involves understanding peers to identify your niche and position in the market. In the biopharmaceutical sector, Drug Patent Watch (2025) notes that competitor analysis is more complex, encompassing R&D, pipeline assets, regulatory approaches, manufacturing and commercial capabilities, which help companies spot emerging threats and opportunities. Competitor analysis often results in a mix of two different types of competitors that directly impact a project’s potential to succeed: evaluating new entrants and substitute products.

6.7.1 The importance of Competitor Analysis

R&D activities by competitors are closely monitored, as regulatory approvals or disapprovals are publicly disclosed and often signal significant shifts in market dynamics. When a competitor receives FDA approval, companies can assess their own positioning and potential opportunities. Conversely, a disapproval allows companies to identify pitfalls and make strategic adjustments to their own development programs. In addition, analyzing competitors’ patent landscapes, particularly upcoming

patent cliffs, provides valuable insight into their portfolio strategies. An anticipated patent cliff often indicates a higher likelihood of new drug launches as companies seek to offset impending revenue losses. (Drug Patent Watch, 2025)

According to Rao (2019), when projecting potential cash flows, financial assumptions typically include an estimated market size. This market is often presumed to accommodate only a limited number of competitors, meaning that if one company makes significant progress on a particular drug, others may choose to withdraw their investments in similar drugs. Biopharmaceutical firms decide whether to abandon drug development projects, particularly in Phase 3. The study finds that if a competitor receives approval, other firms are less likely to pursue R&D for similar drugs. This reluctance stems from the reduced remaining market share, which diminishes the potential return on investment.

6.7.2 New Competition

New competition can be in the form of both new entrants and substitute products.

Firstly, analyzing the risk of new entrants is essential, as early market entry can be critical for success. If a new competitor enters the market early with a similar product, it can reduce the chances of profitability for others. Since markets often only support a few strong players, latecomers may struggle to gain market share. Evaluating the likelihood of new entrants helps avoid investing in projects where competition is already high or expected to become so, making it a key factor in R&D decision making. (Lilien & Yoon, 1990)

Secondly, according to Aung and Danastri (2023) substitutes are also crucial to consider when evaluating investment decisions within biopharma. Substitutes refer to alternative products or technologies that could compete with the planned product, potentially reducing the market value for the planned product. Aung and Danastri highlight the importance of carefully analyzing substitutes, as rapid technological advancements or regulatory changes can significantly affect future demand. Ignoring the threat of substitutes can lead to major financial setbacks, making this factor a critical consideration in R&D investment decisions.

7. AstraZeneca's Investment Decision Making in Late-Stage R&D

The following chapter presents the case study about the company AstraZeneca and particularly with focus on their investment decision making in Late-Stage R&D. It is meant to introduce the company, how the company is structured, how it works with important topics related to R&D investments (such as finance, strategy and competition), the Balanced Scorecard at AstraZeneca, and which data has been received from the company.

Chapter 7 has been made with the help from four sources. The major part builds upon the interviews with the 3 types of AstraZeneca employees. One Project Finance Director, one Senior Director in Late-Stage Governance, and one Head of R&D Finance. Also, AstraZeneca's website has been used to find information.

7.1 Organizational structure with regards to R&D investment decision making

AstraZeneca's business can be segmented into five different therapy areas: oncology; cardiovascular, renal and metabolism; respiratory and immunology; rare disease; vaccine and immune therapies. The therapy areas can be divided further into subcategories such as oncology being divided into tumour drivers and resistance, immuno-oncology, DNA damage response, antibody drug conjugates, epigenetics and cell therapies.

According to the Head of R&D Finance at AstraZeneca, the R&D organization is highly cross-functional, integrating scientific, medical, commercial, and financial expertise across therapeutic areas. Within drug development's late-stage, each project is managed by a dedicated team that includes experts from clinical development, regulatory affairs, commercial strategy, and finance. AstraZeneca has a total of 194 projects in its pipeline (AstraZeneca, n.d.), spanning between all categories, and all projects compete for the same budget, meaning that there is a need for a rigorous investment decision making process.

The investment governance process within AstraZeneca involves multiple internal review gates, particularly at key transition points during the R&D-lifecycle, such as end-of-Phase 2 (or phase 2b, phrase used by AstraZeneca) and Phase 3. In biopharmaceutical development, drug evaluation progresses through Phase 1 to Phase 3 clinical trials. Phase 1 primarily assesses safety and dosage in a small group of healthy volunteers, Phase 2 focuses on evaluating efficacy and side effects in a larger

patient population, and Phase 3 involves extensive testing in a broad patient group to confirm effectiveness, monitor adverse reactions, and compare the drug to standard treatments before regulatory approval is sought (Läkemedelsboken, 2024). At each stage, project teams must present an updated investment case to the governance board. The investment case includes not only clinical results but also financial figures, competitor landscape, and strategic fit within the portfolio. These aspects of the investment case will be presented more in depth in chapters 7.2 - 7.4.

According to AstraZeneca's Head of R&D Finance, the gates mentioned are designed to ensure that resources are allocated toward the projects with the highest probability of success and strategic value. He notes that "capital is always constrained, even in a company the size of AstraZeneca, so each decision must be backed by robust evidence and clearly articulated trade-offs". The same respondent also points out that the decision making body related to R&D investments at AstraZeneca, named LSPC (Late-Stage Portfolio Committee), is a board which decides whether projects should receive further investment or be discontinued. That board includes members such as the CEO, other top-level executives, experts for each therapy area, competition-experts, finance-experts etc. This ensures that the vast complexity connected to biopharmaceutical R&D investment decisions is addressed by some of the most skilled and experienced people in each area and domain. Also, according to AstraZeneca's Head of R&D Finance, the process of presenting projects to the LSPC is very standardized, for example with regards to which metrics and data are expected, which is important to make the decisions objective. Objective decisions in this context refers to the ability of LSPC to make decisions on investing in projects without being biased toward a certain therapy area, project group or other subjective factors. He also says there might be a need for a tool which can increase traceability in decision making and make it easier to understand why some projects receive funding while others do not. This will be further explained in chapter 7.5.

7.2 Financial Aspects in R&D Project Evaluation at AstraZeneca

According to the Project Finance Director, AstraZeneca actively uses measures such as Max Exposure (maximum depth of costs of a project), IRR, Bang for Buck (same as Benefit-Cost Ratio, see chapter 6.5.5), NPV, eNPV (equivalent to rNPV in 6.5.4), PTRS, Peak Year Sales (PYS, describes at which level sales peak), Launch Date (when a project has its first sale) and Break Even Year (see 6.5.7 but expressed in years) in their current evaluation processes.

Financial models and analysis, resulting in financial figures such as the recently mentioned NPV etc, are made by AstraZeneca's finance professionals. The models are done for all R&D-projects.

Commercial reports and figures, technical insights from clinical experts, and regulatory guidance from experts within their respective field serve as the basis for all estimates when building cash flow models. Also, according to the Project Finance Director, the finance professionals working on projects also have frequent contact with operations employees. By having that, they can gain insights on manufacturing costs and ultimately get data on cost per unit for the drug they are developing. Common topics of discussion with the operations professionals include manufacturing feasibility, eventual product development costs, and possible process development to lower the cost per unit in the future.

Profitability Measures	AZ $m
NPV @ 9%	2,663
eNPV @ 9%	1,144
IRR	38.3%
PYS	1,579
Launch Date	2029
Payback Year	2031
Break Even Year	2032
Max Exposure	(385)
Bang for Buck	8
Peak Year Revenue	1,579

Figure 2: Financial Metrics used by AstraZeneca

After completing the thorough analysis and producing the financial metrics (see figure 2), these are then presented to LSPC. The metrics are meant to help the decision makers evaluate whether a project should reach the next stage or not. Financial figures presented to the LSPC are according to AstraZeneca's Head of R&D Finance highly standardized, meaning that the same financial metrics are demanded from each project when pitching to the LSPC. Consequently, teams know what is expected and fit their data into the standard format, supplementing with project-specific details when needed.

The Head of R&D Finance also highlights that finance is embedded into the project structure from an early stage, rather than being a separate function that intervenes only at key decision points. This enables finance professionals to work closely with scientists and strategists, contributing to early forecasting, risk modeling, and the identification of value drivers.

7.3 Strategic Considerations in AstraZeneca’s R&D Portfolio Management

One key aspect of strategics that the Head of R&D Finance mentions is the consideration of building a “moat”, or dominance, around a product area. For example, AstraZeneca tries to establish a strong position around breast cancer, even if some of the projects are less financially attractive. This is due to three reasons. Firstly, one objective is to create a strong market position. Developing several products in one product category streamlines the commercial efforts, making sales happen more easily. Secondly, it makes it easier to launch new products within that same product area in the future. Thirdly, it makes it easier to maintain a strong position and reputation among prescribing physicians within that same product area. These reasons justify investing in projects where the financial metrics are not the most attractive.

Additionally, the Project Finance Director mentions another important strategic factor to consider in investment decision making. Due to AstraZeneca being in an IP-intensive industry and their products often being protected by patents, their products have a limited lifecycle. Typically, their products are highly profitable, but for a set period of time. If an important product generating a large portion of the profits will run out of patent, AstraZeneca risks losing much of its profit and/or revenue. This strategic aspect of AstraZeneca’s business is an important aspect of investment decisions. During gaps due to patent cliffs, projects that have expected revenue during these profit gaps sometimes get prioritized, even if the financial metrics are not the most attractive. By doing so, AstraZeneca aims to balance the profit and loss structure of the R&D portfolio, ensuring there are no significant gaps in revenue. By acting preventively in an IP-intensive industry, AstraZeneca can reduce the impact of expiring patents and the subsequent decline in revenue.

According to AstraZeneca's Project Finance Director, the company actively works to maintain a balanced portfolio between short-term and long-term value creation. AstraZeneca’s shareholders need to be pleased, which often relate to short-term and evenly distributed profits. On the other hand, AstraZeneca also needs to prioritize projects further away in the future, to secure the company’s survival long-term. This approach is driven by more exploration, in order to sustain the innovation pipeline. Balancing short-term and long-term is a key strategic aspect for investment decisions.

Furthermore, according to AstraZeneca’s Project Finance Director, the resource agility is limited within the innovative biopharmaceutical industry. A scientist with a strong specialization in oncology can not be relocated to a project within CVRM. Furthermore, when a project is finished, projects within the same expertise are to be prioritized to minimize loss through unused resources. Moreover, a lot of production capabilities at AstraZeneca tend to be specifically niched towards certain therapy

areas meaning that if AstraZeneca does not fill a gap in the portfolio with a solution from the same therapy area, this may lead to unutilized production capacity. In these cases, it is important that a new entry to the project-portfolio can fill this gap in a suitable manner.

7.4 How the Competitive Landscape Shapes AstraZeneca’s R&D Investments

The Head of R&D Finance explains that a central consideration for LSPC when making investment decisions is the competitive landscape, specifically whether other companies are pursuing similar studies and how their development timelines compare. In the highly competitive biopharmaceutical industry, the market often supports only a few successful players. If AstraZeneca identifies that a competitor is likely to secure a patent first for a similar drug, the company typically discontinues further investment in that area. Hence, assessing competitor performance within a given therapeutic field is critical.

AstraZeneca's Project Finance Director emphasizes that the company’s innovation is tightly linked to a structured approach for tracking competitor activity. A dedicated department is tasked with this surveillance, particularly focusing on regulatory filings, such as filings submitted to the FDA. These filings, required when a drug enters phase 2 trials, are publicly accessible and offer strategic insights into rival pipelines. For instance, if a competitor receives FDA approval for a drug in an area where AstraZeneca has not yet initiated phase 1 trials, the company often deems it too late to pursue development in that space.

When competing within the same drug class, timing is crucial. According to the Project Finance Director, AstraZeneca aims to be among the first three companies to launch, as these early entrants typically capture the majority of the addressable market. During the cost-intensive later stages of development, maintaining a close watch on potential new entrants is therefore vital to securing a competitive edge.

Monitoring potential substitutes is also a key priority. AstraZeneca’s intelligence team closely follows which indications newly approved drugs are classified under, since a single drug can be approved for a range of conditions. These classifications are not always predictable, and unexpected approvals can lead to indirect competition. Staying ahead of such developments helps AstraZeneca protect its market position from unforeseen threats.

7.5 Rationale for an Adapted Balanced Scorecard at AstraZeneca

Two decades ago, AstraZeneca implemented a Balanced Scorecard approach, but it was phased out due to its perceived complexity and the administrative burden it placed on employees. According to the Project Finance Director, the model was not sufficiently integrated into existing workflows, meaning it was seen as an additional task that was quite time consuming rather than a helpful tool for employees. For a Balanced Scorecard to be successfully reintroduced, it should according to the Project Finance Director be streamlined, intuitive, and built around the metrics that AstraZeneca already works with, and are accessible for the employees. He also points out that it should create additional value in the eyes of the employees who are ultimately going to use it.

According to the Project Finance Director, an adapted Balanced Scorecard could serve as a communication and alignment tool, helping bridge that gap by offering a structured overview of the investment criteria that influence decision making at the highest level. He underscores that the adapted Balanced Scorecard can function as an explaining tool for several stakeholders when evaluating projects, especially for employees after a project has been facing the investment committee.

Lastly, the Head of R&D Finance emphasizes that the nature of investment decision making within biopharmaceuticals has become more complex with accelerated scientific development and tighter global competition. In this environment, intuitive or experience-based decisions may no longer suffice. He argues that a modern Balanced Scorecard could help formalize and visualize decision making processes, offering transparency, cross-functional alignment, and clearer justifications for strategic choices, particularly those made by bodies such as the LSPC. By supporting both clarity and consistency, such a tool could be pivotal in optimizing how AstraZeneca prioritizes and invests in its late-stage pipeline.

8. Categories and Parameters of the AstraZeneca Adapted Balanced Scorecard

The purpose of this study, to develop an adapted Balanced Scorecard for AstraZeneca's R&D project evaluation process, has resulted in an AstraZeneca adapted Balanced Scorecard that will be presented in detail in this chapter. The adapted Balanced Scorecard has been developed with careful consideration of both the theoretical foundation outlined in chapter 6 and the empirics from the case study presented in chapter 7. The literature review in chapter 6 provided a framework for identifying key evaluation parameters specific to R&D investments in the biopharmaceutical industry. Chapter 7 explored empirical insights in AstraZeneca's current practices, organizational structure, and strategic considerations, all of which were crucial in adapting the model to the company's specific context. The result from the study is presented in this chapter, which focuses on presenting the adapted Balanced Scorecard-parameters and their relevance. Figure 3 presents the three categories; Financial Impact, Strategic Fit and Competition, constituting the adapted Balanced Scorecard for AstraZeneca.

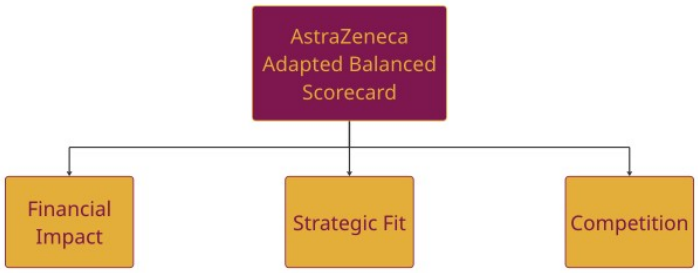


Figure 3: Categories of the AstraZeneca adapted Balanced Scorecard

The three categories were chosen based on both the theoretical framework, outlined more extensively in chapter 6, and the case study, where respondents emphasized these three aspects as important in investment decisions, explained in chapter 7. The categories will be further explained in 8.1-8.3.

8.1 Financial Impact: Category of the Adapted Balanced Scorecard

For the Financial Impact category of the adapted Balanced Scorecard the following six parameters will be used:

- PTRS (The Probability of Technical and Regulatory Success) = combined metric estimating the likelihood that a project meets its clinical goals and receive regulatory approval (see 6.5.2)
- Break Even Year = the level of sales at which total revenue equals total costs (see 6.5.7)
- NPV (Net Present Value) = represents the present value of expected cash flows (see 6.5.4)

- Bang for Buck = also known as Benefit-Cost Ratio, measures how much value a project generates per unit of cost (see 6.5.5)
- Max Exposure = the highest total cost a project may incur before generating returns (see 7.2)
- Peak Year Sales = at which level sales peak (see 7.2)

To determine the parameters for the financial category of the adapted Balanced Scorecard, both the financial part of the theoretical framework, presented in chapter 6.5, and financial insight from the case study in chapter 7.2 were analyzed. An additional aspect considered was if the project data, presented in chapter 5.3.2, was sufficient to establish meaningful intervals for the adapted Balanced Scorecard, which is explained in chapter 5.5.

Financial metric	AstraZeneca	Sufficient data for creating intervals	Literature	Included in model
Max Exposure	✓	✓		✓
Bang for Buck	✓	✓	✓	✓
PTRS	✓	✓	✓	✓
Peak Year Sales	✓	✓		✓
Break Even Year	✓	✓	✓	✓
NPV	✓	✓	✓	✓
IRR	✓		✓	
ROI			✓	
eNPV	✓		✓	

Table 1:Evaluation and selection of financial metrics for inclusion in the adapted Balanced Scorecard model.

Table 1 presents all financial metrics outlined in the theoretical framework and the case study, see the first column. The second column demonstrates if the financial metric was used by AstraZeneca. Column 3 shows if the financial metric had sufficient data to create intervals according to the methodology presented in chapter 5.3.2. Furthermore, the fourth column demonstrates whether the financial metric was present in the examined literature. Finally, column 5 shows if the financial metric is a parameter of the adapted Balanced Scorecard.

As explained in chapter 7.5, the Project Finance Director emphasizes that a working tool like an adapted Balanced Scorecard needs to be built around the metrics and parameters that AstraZeneca already works with, and are accessible for the employees, in order to be a useful tool. Therefore, all the parameters included in the adapted Balanced Scorecard are currently used by AstraZeneca, which is presented in chapter 7.2. For example ROI was presented as an important factor within biopharma according to literature, see table 1. However, it was not a financial metric used by AstraZeneca in this context, a requirement for the adapted Balanced Scorecard, and consequently it is not a parameter.

Another requirement for creating parameters was if the project data, presented in chapter 5.3, was sufficient to create intervals. Without intervals, the parameters would not be able to be graded in the adapted Balanced Scorecard (grading is further explained in 9.1). All financial parameters had sufficient data to create intervals. For example, IRR was an important financial aspect for AstraZeneca within R&D investment decisions, as presented in chapter 7.2, while also being highlighted by literature (see 6.5.6) as an important metric in the whole biopharmaceutical industry, which strengthened AstraZeneca's view. However, due to lack of sufficient data regarding AstraZeneca's IRR, intervals could not be created for this metric. Which implied that IRR could not be a parameter of the adapted Balanced Scorecard.

The literature based framework has been used to strengthen the choices of the parameters, but it has not been a requirement. According to chapter 6.5, the majority of the parameters are important aspects in R&D investment decision making within the biopharmaceutical industry. To exemplify, Bang for Buck and PTRS are supported by the theoretical framework, explained in 6.5.5 and 6.5.2, which underpins the inclusion of these parameters in the adapted Balanced Scorecard. To contrast, Max Exposure was absent in the literature framework. However, it is still a financial metric included in the adapted Balanced Scorecard as it is frequently used within AstraZeneca, as mentioned in 7.2 while also having sufficient data to create intervals.

All parameters are financial metrics currently used by AstraZeneca, and with sufficient data to create intervals. The literature was used to strengthen the choices of the majority of our parameters, but was not a requirement. With this methodology, the parameters of the Financial Impact-part of the AstraZeneca adapted Balanced Scorecard were chosen, as presented in figure 4 were chosen.

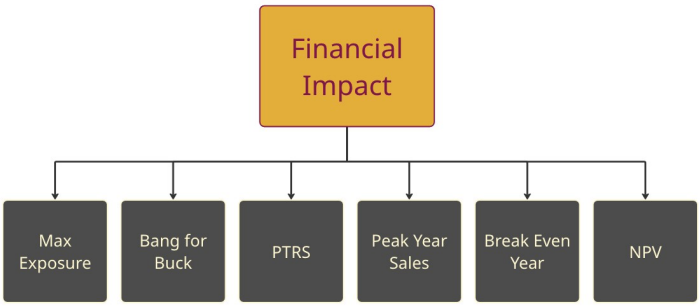


Figure 4: Parameters under the Financial Impact Category

8.2 Strategic Fit: Category of the Adapted Balanced Scorecard

For the Strategic Fit category of the adapted Balanced Scorecard the following four parameters will be used: Portfolio Gaps within Resource Capabilities, Portfolio Gaps within P&L, Investment Horizons, Product Area Dominance.

To determine parameters for the Strategic Fit part of the adapted Balanced Scorecard, both the literature (presented in chapter 6.6) and the case study (presented in chapter 7.3) was used. By using both types of sources, we were able to create a holistic view of strategic parameters important for AstraZeneca.

Due to the biopharmaceutical industry's characteristics of products being protected by patents, revenue gaps are an important strategic aspect to consider, since products' patents expiration is critical to handle, which is explained in chapter 6.6.1. Similarly, the Project Finance Director explains in chapter 7.3 that projects are sometimes prioritized due to patent cliffs. Since both literature and AstraZeneca mentions the importance of this, the parameter "Portfolio Gaps within P&L" will be a parameter of the adapted Balanced Scorecard.

Investment Horizons is another key strategic parameter emphasized in both literature and in the case study. As outlined in chapter 6.6.2, balancing short and long-term projects is essential to ensure continuous innovation, while meeting shareholder expectations. Short-term projects provide quicker returns, while long-term projects secure future growth. AstraZeneca works actively with balancing these time perspectives in their R&D project portfolio, explained in chapter 7.3, thereby following the approach outlined by literature, which is why Investment Horizons is included in the adapted Balanced Scorecard.

Retaining specialized talent in biopharma is a critical strategic priority, as innovation relies heavily on a highly skilled workforce. One key reason employees leave is the lack of career opportunities when specialized R&D projects come to an end. This risk can be mitigated by making investment decisions that prioritize projects where existing core expertise can be redeployed, as noted in section 6.6.3. The Project Finance Director confirms the importance of retaining specialized talent and further emphasizes the need to fully utilize niche production capabilities. This is achieved by prioritizing investments in R&D projects that leverage these specialized resources, as explained in section 7.3. Therefore, "Portfolio Gaps within Resource Capabilities" is included as a parameter in the adapted Balanced Scorecard.

Product Area Market Dominance was absent in the theoretical framework. However, it was the strategic aspect most emphasized by the Head of R&D Finance. Also, several positive side effects were mentioned, such as easier future product launches and better physician reputation, as explained in 7.3. The significance of this parameter to AstraZeneca was deemed to outweigh its limited representation in the existing literature. Consequently, it was added as a parameter in the adapted Balanced Scorecard.

In figure 5, the Strategic Fit category of the AstraZeneca adapted Balanced Scorecard is visualised, with all defined parameters in grey below.

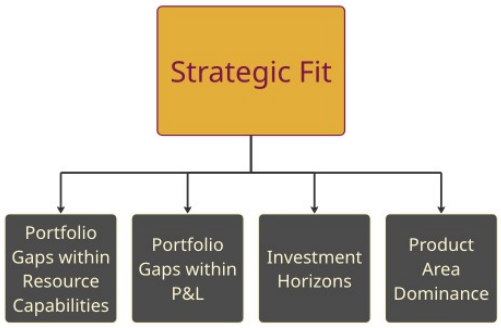


Figure 5: Parameters under the Strategic Fit Category

8.3 Competition: Category of the adapted Balanced Scorecard

For the Competition category of the adapted Balanced Scorecard the following two parameters will be used: New Entrants and Substitutes.

To determine parameters for the Competition part of the adapted Balanced Scorecard, both the literature (presented in chapter 6.7) and the case study (presented in chapter 7.4) was used. By using both types of sources, we were able to create a holistic view of competition parameters important for AstraZeneca.

Monitoring potential New Entrants is a key aspect of AstraZeneca's business and especially for decision making in the R&D-process. The monitoring is conducted to avoid delayed market entry and the consequent risk of capturing a limited market share, which is presented in chapter 7.4. At the same time, it is a critical aspect for any company within biopharma, as explained in 6.7.2. Since both AstraZeneca and literature emphasize New Entrants relevance, it is an important parameter for the adapted Balanced Scorecard.

Substitute products are also important to consider in biopharma, as they can enhance quick shifts in demand, as presented in 6.7.2. Therefore, AstraZeneca prioritizes the monitoring of potential substitutes by systematically tracking drug indication approvals in order to anticipate competition, as discussed in section 7.4. Given that both the case study and the theoretical framework underscores the relevance of substitutes, this factor has been incorporated into the adapted Balanced Scorecard.

The theoretical framework presented in chapter 6 emphasized the relevance of Competitive Advantage as a key parameter within the R&D sector. However, this parameter poses significant challenges in terms of quantification. AstraZeneca already employs the parameters included in the adapted Balanced Scorecard (explained in chapter 7.4), but given the difficulty in quantifying and standardizing that parameter, it was ultimately excluded from the adapted Balanced Scorecard.

Below in figure 6, the Competition-part of the AstraZeneca adapted Balanced Scorecard is visualised, with all defined parameters.

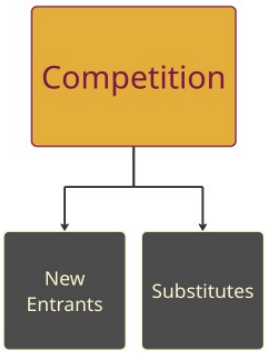


Figure 6: Parameters under the Competition Category

8.4 AstraZeneca-Adapted Balanced Scorecard Overview

The three main categories forming the backbone of the adapted model; Financial Impact, Strategic Fit, and Competition (see figure 3) are underpinned by the parameters presented in 8.1-8.3 to form a complete AstraZeneca adapted Balanced Scorecard which is visualised in figure 7 below.

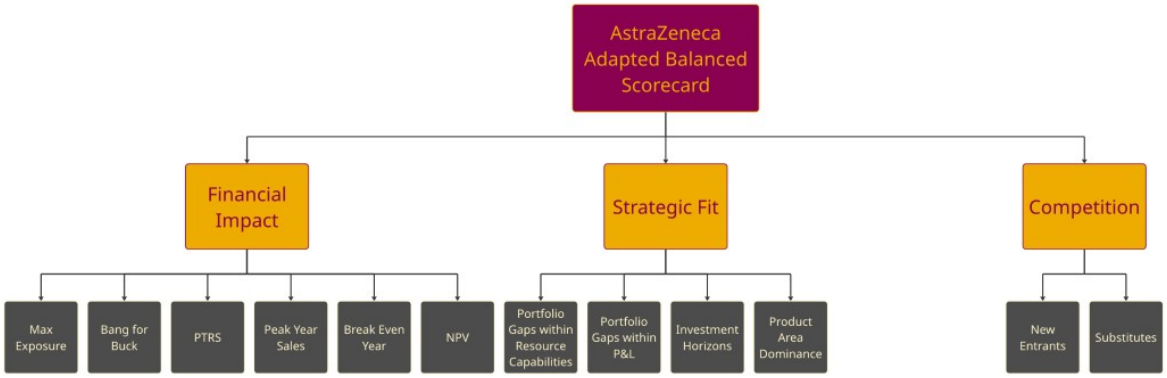


Figure 7. Tree diagram over the adapted Balanced Scorecard with all Categories and Parameters

9. Model Created and Technicalities of the AstraZeneca adapted Balanced Scorecard

This chapter presents the technical design and structure of the adapted Balanced Scorecard, first introduced in chapter 8, developed for AstraZeneca's R&D investment evaluation process. A demo-model has been created by the project group in Excel which will be shown in the chapter.

9.1 Design and Structure of the Adapted Balanced Scorecard

The structure of the adapted Balanced Scorecard is shown in a tree diagram in figure 8. The grey boxes are in the model called parameters. The parameters will each be assigned a grade and weight. The grade is a reflection of the performance of each parameter (further explained in chapter 9.3-9.4). The weights (further explained in 9.2) are meant to be a reflection of the importance of each parameter according to AstraZenecas' R&D investment strategy. The respective weight and grade are multiplied for each parameter which results in a weighted grade for all parameters.

The weighted grades of all parameters under a category (categories are shown as yellow boxes in figure 8) are added together to produce the overall grade for each category. The same procedure happens for the categories, where each category's grade is multiplied by its assigned weight. The weighted grades for all categories are summed up, which gives the total score of a project, shown in figure 9.

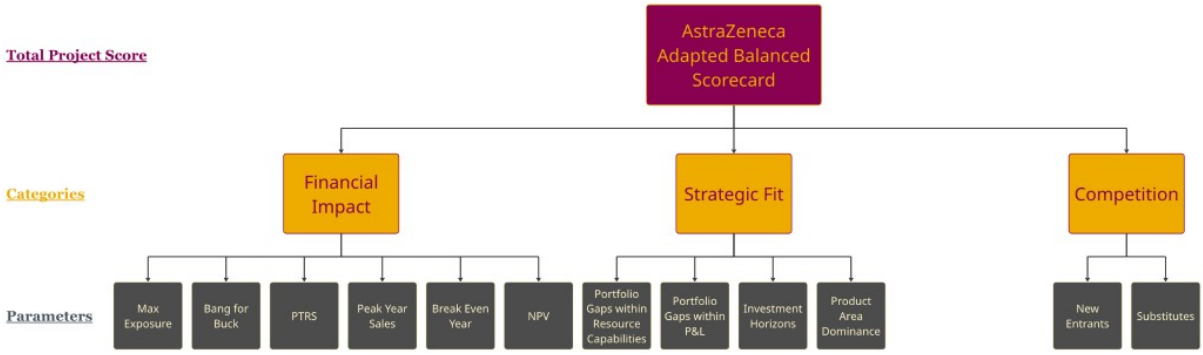
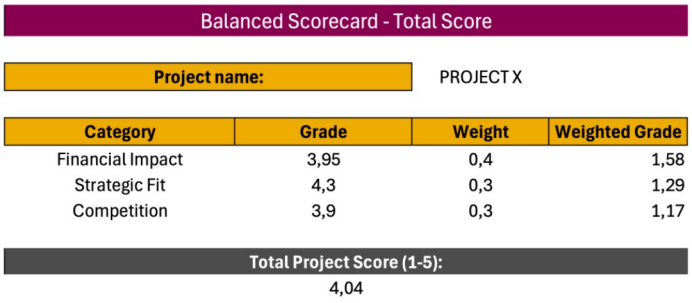


Figure 8: Tree diagram of the adapted Balanced scorecard structure with Total Project Score in purple, Categories in yellow and Parameters in grey.

The design of the adapted Balanced Scorecard is presented in figure 9, with pictures from the demo-model in Excel created by the project group containing a fictive project to help visualise the

adapted Balanced Scorecard. The grading is from 1 to 5, where 5 means something is particularly excellent and 1 means that something is particularly bad.

Figure 9 shows the categories with respective grade and weight, which is further explained in chapter 9.2-9.4. All categories' weighted grades are calculated by multiplying its grade with its respective weight. The sum of all categories' weighted grades results in the Total Project Score which is 4.04 for this project, see figure 9. The total score for the project is a number between 1 and 5. Thus, it can be used to compare several projects and get a quick and general feel for how well a project suits the organisation.



Balanced Scorecard - Total Score			
Project name:	PROJECT X		
Category	**Grade**	**Weight**	**Weighted Grade**
Financial Impact	3,95	0,4	1,58
Strategic Fit	4,3	0,3	1,29
Competition	3,9	0,3	1,17
Total Project Score (1-5):			
4,04			

Figure 9: The demo-model of the adapted Balanced Scorecard. Showcases each category with the respective grade, weight and weighted grade. Total Project Score is shown in the bottom.

9.2 Weights of the Categories and Parameters

Weights are an essential part of the adapted Balanced Scorecard since they decide the importance of each category and parameter.

Both the literature and AstraZeneca emphasized the importance of financials, strategy, and competition. Insights from interviews with the three employees further indicated that while all three categories are closely interconnected, financials are regarded as slightly more critical than the others. This is, according to the Head of R&D Finance, due to the fact that to some degree, there will always be a bare minimum of which projects can be accepted from a financial view. Thus, the Financial Impact-part of the model has slightly higher weight than the other main categories, 0.4 for Financial Impact, 0.3 for Strategic Fit and 0.3 for Competition. These weights are meant to help the model factor in the importance of each category and parameter when making an investment decision.

It's important to note that these weights for the parameters in the demo-model have not been mathematically calculated, due to lack of data to perform calculations on. Therefore, AstraZeneca

should further evaluate the weighting before full implementation of the adapted Balanced Scorecard. The weights can be calculated more precisely through Multiple Criteria Decision Making. AstraZeneca could, for example, apply the Analytic Hierarchy Process (AHP) to derive more accurate weights by systematically ranking the importance of each criterion based on expert input, as explained in chapter 6.4. When using this method, experts are needed for certain evaluation. Experts could in this case, with regards to chapter 7.1, be some different members of the LSPC who have great insight in AstraZeneca's R&D investment goals and strategies.

9.3 Methodology of Calculating Grades of Financial Impact

For grading Financial Impact, every parameter has an input number stemming from project-specific financial metrics, see chapter 7.2. Each input number results in a grade, based on predetermined intervals.

Intervals were established using cash flow data from 12 projects, as detailed in chapter 5.3.2. For each project, key financial metrics were calculated, including Maximum Exposure, Bang for Buck (Benefit-Cost Ratio), NPV, PYS, and Break-Even Year. PTRS values were also obtained for each project. See figure 10 for how the intervals were defined by using a relative scoring approach, as explained in 5.3.2. This allowed the model to identify what constitutes strong or weak performance, with the results subsequently translated into a grading system to enable standardized evaluation of project outcomes.

Financial Impact	Max Exposure (bUSD)	Bang for Buck	NPV (bUSD)	PTRS	PYS (bUSD)	Break Even Year
Grade	Interval	Interval	Interval	Interval	Interval	Interval
5	0 - -0.25<	>9	>4	>60%	>6	<6
4	-0.25 - -0.5<	>7-9	>3-4	>50% - 60%	>4.5-6	6-9<
3	-0.5 - -0.75<	>5-7	>2-3	>40% - 50%	>3-4.5	9-12<
2	-0.75 - -1	>3-5	>1-2	>30% - 40%	>1.5-3	12-15
1	< -1	1-3	0-1	>0% - 30%	0-1.5	>15

Figure 10: Intervals for the Financial Impact Parameters.

For the Financial Impact category of the adapted Balanced Scorecard, the grades of the parameters under the Financial Impact category are given depending on how well the project is estimated to perform financially for a specific parameter (see 7.2 for details). Figure 10 shows what grade every parameter will receive based on the predetermined intervals. For example, in figure 11, a PTRS of 61% is given a grade 5. This is done for all parameters in the Financial Impact-part of the model.

Balanced Scorecard - Financial impact				
Parameter	Input Number	Grade	Weight	Weighted Grade
Max Exposure (-bUSD)	-0,25	5	0,1	0,5
Bang for Buck	7	3	0,2	0,6
NPV (bUSD)	4	4	0,25	1
PTRS (%)	61%	5	0,25	1,25
PYS (bUSD)	4	3	0,1	0,3
Break Even Year	9	3	0,1	0,3
Total score - Financial impact:				
3,95				

Figure 11: The Financial Impact category and its parameters with respective Input Number, Grade, Weight and Weighted Grade. The total Financial Impact score is shown in the bottom.

While the grading system and intervals for the Financial Impact category of the Balanced Scorecard appear reasonable based on the data received from AstraZeneca, it is important to acknowledge that the assessment is based on only 12 projects with available cash flow data. These 12 projects were selected at random, which increases the likelihood that they are representative of the broader project portfolio. However, AstraZeneca has a total of 194 projects in its pipeline (AstraZeneca, n.d.), and as such, the sample may still not fully capture the diversity of the entire portfolio, which is mentioned in chapter 5.5. Therefore, prior to broad implementation of the Balanced Scorecard, it is recommended that AstraZeneca conduct an internal review and, if necessary, adjust the grading intervals to ensure their validity across the full set of projects.

9.4 Methodology for Calculating Grades for Strategic Fit and Competition

The Strategic Fit category in the Balanced Scorecard is composed of four parameters, each of which is used to grade individual projects on a scale from 1 to 5, as outlined in Section 9.1.

To improve consistency and relevance in future applications, it is recommended that AstraZeneca establish a structured internal process in which senior portfolio management representatives assess each project's Strategic Fit parameters. These representatives should have a broad overview of the portfolio and no direct affiliation with the projects being evaluated. Grades should be assigned based on their strategic understanding and informed judgment. A grade of 1 reflects weak alignment with AstraZeneca’s R&D portfolio strategy, while a grade of 5 indicates strong alignment. For instance, in the demo-model in figure 12, the parameter Product Area Dominance received a grade of 5, indicating that the project operates within a product area that is currently being prioritized and expanded.

Balanced Scorecard - Strategic Fit			
Parameter	Grade	Weight	Weighted Grade
Product Area Dominance	5	0,45	2,25
Portfolio Gaps within P&L	4	0,2	0,8
Investment Horizons	3	0,15	0,45
Portfolio Gaps within Resource Capabilities	4	0,2	0,8
Total score - Strategic Fit:			
4,3			

Figure 12: The Strategic category and its parameters with respective Grade, Weight and Weighted Grade. The total Strategic Fit score is shown in the bottom.

A central limitation in assigning these grades has been the lack of access to internal strategic context from AstraZeneca. Information regarding the company's current priorities, portfolio direction, and organizational goals is essential for accurately defining what constitutes a strong or weak strategic fit. In the absence of this data, parameter grades have been based on qualitative insights gathered through interviews and general interpretation.

For the grading of Competition category of the Balanced Scorecard, the two parameters, New Entrants and Substitutes, are graded on a scale between 1 and 5. Figure 13 visualises an example of the Competition category. For the New Entrants parameter, a score of 1 indicates a high likelihood of new competitors entering the relevant market segment, which could significantly impact the project's competitive position. A score of 5 reflects a low risk of new entrants, suggesting a more stable market environment with fewer anticipated disruptions.

For the Substitutes parameter, a score of 1 signifies the presence or emergence of alternative treatments that could substitute the drug being developed, thereby reducing its market potential. A score of 5, in contrast, indicates that few or no viable substitutes exist, strengthening the strategic position of the project within its therapeutic area.

Balanced Scorecard - Competition			
Parameter	Grade	Weight	Weighted Grade
New Entrants	5	0,45	2,25
Substitutes	3	0,55	1,65
Total score - Competition:			
3,9			

Figure 13: The Competition category and its parameters with respective Grade, Weight and Weighted Grade. The total Competition score is shown in the bottom

10. Discussing the Adapted Balanced Scorecard

The purpose of chapter 10 is to critically reflect on and discuss the adapted Balanced Scorecard. Firstly, the value of its potential applications is assed. Secondly, a reflection is made on the alterations made to the original Balanced Scorecard, why they have been made and what this could entail. Finally, the chapter also discusses what potential risks could be associated with the adapted Balanced Scorecard.

10.1 Applications and Added Value for AstraZeneca with an Adapted Balanced Scorecard

Today, several factors suggest that a modernized and adapted Balanced Scorecard could add significant value. As stated in chapter 7.5, AstraZeneca has grown substantially over the past two decades, increasing the organizational distance between strategic decision makers and operational employees. This has made it more difficult for those not directly involved in investment decisions, such as finance professionals within individual therapy areas, to fully understand which parameters matter and why certain decisions are made. With this in mind, the project group has identified potential applications for the adapted Balanced Scorecard which are described below.

Firstly, having an adapted Balanced Scorecard tailored to AstraZeneca's evaluation parameters can be a powerful tool for late-stage governance decision making, as it provides a standardized and structured methodology. In chapter 7.2, the Head of R&D Finance explains that the LSPC's work is highly standardized, with set templates outlining the parameters being evaluated. Introducing the adapted Balanced Scorecard, with clearly defined and standardized categories and parameters, could therefore complement the standardized processes currently in operation within the LSPC. This provides a new way for decision makers to compare and evaluate projects, thereby improving decision making which is highlighted as one of the main benefits of the Balanced Scorecard in chapter 6.1.

Today, several factors suggest that a modernized and adapted Balanced Scorecard could add significant value. Over the past two decades, AstraZeneca has grown substantially, increasing the organizational distance between strategic decision makers and operational employees. This has made it more difficult for those not directly involved in investment decisions, such as finance professionals within individual therapy areas, to fully understand which parameters matter and why certain decisions are made. This aligns with what the Project Finance Director mentions in chapter 7.5.

Secondly, the Balanced Scorecard could provide project managers with a comprehensive perspective on how well their project fits into AstraZeneca's broader portfolio, beyond pure financial metrics. For instance, if a project manager approaching the investment committee has completed the necessary financial analyses, the adapted Balanced Scorecard shows what other more qualitative parameters might be relevant. For example, involving portfolio managers and competitive intelligence experts in the evaluation process allows project managers to receive clear and structured feedback on how their project performs across key parameters, which helps them prepare more effectively for the investment committee. This is aligned with benefits that the Project Finance Director at AstraZeneca believes a Balanced scorecard could have for the organization as highlighted in chapter 7.6.

Thirdly, by implementing the adapted Balanced Scorecard at AstraZeneca, it can serve as a basis for organizational learning and continuous improvement. Through tracking which parameters and base-level scores correlate with successful outcomes, AstraZeneca can gain a better understanding of the fundamentals needed for successful projects. Thus, also enabling further refinement of the adapted Balanced Scorecard, making it even more predictive and insightful. This is in line with the potential for continuous improvement via the Balanced Scorecard as explained in chapter 6.1.

Finally, as stated in chapter 6.1 it is common for the Balanced Scorecard to be used for maintaining long-term competitiveness by benchmarking the organization's performance against industry standards. Therefore, the Balanced Scorecard could possibly serve as a tool for benchmarking against industry best practices, ensuring that AstraZeneca's project evaluation processes remain competitive.

10.2 Guiding Goals with Altering the Original Balanced Scorecard Perspectives

As explained in chapter 6.3, there are four common challenges related to the Balanced Scorecard: time-consuming and resource intensive, complex to implement, poor adaptation to organizational needs, and lack of understanding and internal resistance. Based on the shared challenges identified in the theoretical framework in section 6.3 and AstraZeneca's previous experiences, described in chapter 7.5, two guiding goals have been considered when altering the original Balanced Scorecard.

The first guiding goal was to actively reduce the risk of failure by simplifying the process, which had previously been time-consuming and resource-intensive. The second guiding goal was to adapt the Balanced Scorecard to the organizational need of evaluating R&D-projects, instead of evaluating the whole business as the original Balanced Scorecard does.

10.2.1 Alterations Made on the Original Balanced Scorecard Based on the Guiding Goals

The perspectives included in the original Balanced Scorecard are Financial Perspective, Customer Perspective, Internal Business Perspective and Innovation & Learning Perspective, which are explained in chapter 6.1. Out of the original perspectives, we have removed Customer Perspective, Internal Business Perspective and Innovation & Learning Perspective. Instead we have added the categories Strategic Fit and Competition, meaning that the new adapted Balanced Scorecard consists of the categories Financial Impact (renamed from Financial Perspective), Strategic Fit and Competition. Altogether, three perspectives have been removed while two categories have been added. As the adapted Balanced Scorecard has fewer categories and is aligned with Astra Zeneca's standardized workflow mentioned in chapter 7.1, this could mean easier use of the tool. This alteration was done with the purpose of achieving the first guiding goal.

We have removed Customer Perspective to achieve both guiding goals. As the Customer Perspective is not part of AstraZeneca's current workflow, (according to the case study presented in chapter 7), removing it could make the adapted Balanced Scorecard easier to use. Furthermore, the Customer Perspective highlights customer satisfaction and retention (described in chapter 6.1), which is more relevant for a whole business rather than individual R&D-projects. By removing it, the Balanced Scorecard is more adapted to the organizational need of evaluating R&D-projects. Some risks of removing the Customer Perspective include missing shifts in demand and developing products that do not meet real market needs.

The Internal Business Perspective, which according to chapter 6.1 includes metrics like cycle times and quality rates, was removed to achieve the first guiding goal of making the tool easier to use. Even if these metrics can be relevant for an R&D-project, the number of different cycle times and quality rates within an R&D-project makes the Balanced Scorecard more complex. Thereby making it more difficult for the user of the Balanced Scorecard regarding which type of cycle times and quality rates to include in the model. However, removing the Internal Business Perspective can reduce insight into how efficiently and effectively internal processes function. This makes it harder to identify delays or quality issues that may affect the outcome of R&D projects.

The Innovation & Learning Perspective, which according to chapter 6.1, emphasizes a company's capacity for continuous improvement and long-term value creation, was removed to achieve both of the guiding goals with the alterations of the Balanced Scorecard. Although this perspective is relevant in broader organizational settings, it is less applicable to late-stage R&D-projects where most

innovation has already taken place. By removing it, the Balanced Scorecard becomes more focused and less complex, making it easier for decision makers to apply it consistently across projects. Some risks of removing the Innovation & Learning Perspective include a shift toward short-term thinking at the expense of long-term development. This can result in missed opportunities for learning, improvement, and strengthening the skills and knowledge needed for future innovation.

Strategic Fit was added as a category to the adapted Balanced Scorecard to achieve the second guiding goal of adapting to AstraZeneca's organizational need to evaluate R&D-projects. As presented in chapter 6.6, the literature emphasizes that strategy is crucial in guiding decisions, prioritizing investments, and ensuring long-term competitiveness. Also, AstraZeneca respondents mention several strategic aspects being important for evaluating R&D-projects as shown in chapter 7.3.

Competition was added as a category to achieve the second guiding goal of adapting to AstraZeneca's organizational need to evaluate R&D-projects. As highlighted in chapter 6.7, the literature emphasizes that competitive dynamics, such as the likelihood of rival companies reaching the market first, can have a significant negative impact on a project's future value. This is further supported by chapter 7.4, where AstraZeneca's Project Finance Director explains that projects are commonly discontinued if a competitor is expected to secure FDA approval first. Some risks of adding Competition as a separate category include an overemphasis on external threats, which may reduce focus on the project's own strengths and long-term value. It can also lead to missed opportunities for partnerships or differentiated market positions if the evaluation focuses too narrowly on direct competition.

10.3 Potential Risks With the Adapted Balanced Scorecard

Although the adapted Balanced Scorecard offers advantages to AstraZeneca, no management tool is without risk and there are a few risks with the adapted Balanced Scorecard that needs to be taken into account.

As noted in chapter 9.2, the weights presented in the demo-model have not been mathematically calculated. Since the final scores depend on the weights assigned to each category and its parameters, this represents a clear flaw in the current model. For example, based on the rationale detailed in chapter 9.2, Financial Impact should have a slightly higher weight than the other categories. However, the main concern is that without any mathematical evidence to support the weighting, the term "slightly higher" remains ambiguous. For instance, this might suggest weighting Financial Impact 0.1 higher than Strategic Fit or Competition, possibly even as much as 0.5 higher, though it could also be

a more modest difference, like 0.05. Depending on how the decision maker chooses to interpret this, the final score of the project under evaluation could be significantly affected.

By using Multiple Criteria Decision Making, specifically Analytic Hierarchy Process (AHP) as explained in chapter 6.4, AstraZeneca could calculate the weights and mitigate this risk through expert input. However, this raises questions regarding who the experts should be. Depending on the background of individual experts, their opinions could differ significantly, which would, in turn, impact the derived weights. One solution could be to gather expert input through groups to reduce the margin of error and minimize individual bias by encouraging balanced discussions and consensus-driven evaluations. Although the composition of these expert groups could also affect the results, as homogeneous groups are more likely to arrive at similar conclusions, while heterogeneous groups are likely to have more diverse opinions.

A concrete example would be if the group of experts were all experts within CVRM. In that case the weights and therefore the Balanced Scorecard, would likely favor projects within the CVRM area. Conversely, if the experts come from a different therapy area, the adapted Balanced Scorecard would likely be more suited to that specific area. This raises further questions, such as whether different therapy areas should have different weights or entirely separate adapted Balanced Scorecards.

As stated in chapter 9.4 the grading of parameters within Strategic Fit and Competition will be based on predefined guidelines, and that it is up to the user to interpret guidelines and input suitable grades for these parameters directly into the excel model. This raises questions regarding the validity of these inputs as individual interpretation of the guidelines could vary depending on the background, expertise and position of the individual within the organization. Therefore, it is important that the guidelines are well defined, non-ambiguous and well anchored across the organization in order to ensure that grading throughout remains consistent.

Further research could be done on grading guidelines and weighting. This area could be of particular interest to AstraZeneca, should the company seek to deepen its understanding and further refine the implementation of the adapted Balanced Scorecard. However, the work conducted serves as an important initial step in applying an adapted Balanced Scorecard within R&D investment decision making in biopharma.

11. Conclusion

This thesis set out to develop an adapted Balanced Scorecard tailored to AstraZeneca's specific needs in evaluating R&D projects during the late-stage governance. The study resulted in an adapted Balanced Scorecard consisting of three main evaluation categories: Financial Impact, Strategic Fit, and Competition.

The project group has conducted a literature review, created a case study by analyzing anonymized project data from AstraZeneca and carried out interviews with three relevant respondents within R&D evaluation and decision making. The interviews offered different expertise and perspectives on how the company evaluates R&D projects.

We conclude that AstraZeneca should be able to integrate the adapted Balanced Scorecard into the LSPC decision making process. This tool is closely aligned with existing workflows and uses parameters that are already familiar to employees, which could overwin challenges experienced during previous experiences with the Balanced Scorecard.

We believe this conclusion is well supported because the parameters chosen reflect both theoretical best practices and AstraZeneca's internal priorities, the model builds on metrics already used in decision making today, and the tool provides a structured and communicable format for comparing projects, supporting more standardized and consistent investment decisions.

One key challenge identified during the project was the difficulty of defining exact weights and grading guidelines for the parameters within Strategic Fit and Competition. Due to limitations in data access, we recommend that AstraZeneca continue developing weights and grades internally, which may be done through Multiple Criteria Decision Making. A broader dataset and further internal testing will be required to finalize the weights and scoring guidelines to ensure further refinement of the adapted Balanced Scorecard.

Finally, we see the adapted Balanced Scorecard developed in this thesis as a first step. It serves as a concrete and valuable step toward strengthening AstraZeneca's project evaluation process and can become a valuable component of AstraZeneca's R&D governance toolbox.

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