

# ABCD Analysis of Cyber Attack Detection and Mitigation Model

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## Abstract

A cybersecurity framework is a structured set of guidelines, best practices, and standards that organizations use to manage and improve their cybersecurity posture. These frameworks provide a comprehensive approach to safeguarding digital assets, sensitive data, and information systems. By applying this ABCD analysis to a cybersecurity framework, organizations can systematically identify, assess, and address security risks, ensuring that resources are allocated to protect the most critical assets and defend against the most significant threats. This approach enhances overall cybersecurity posture and resilience.

## Keywords:

ABCD Analysis;  
Cyber attack;  
Attack detection;  
Attack Mitigation;  
ABCD Framework.

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## 1. Introduction

Complex decision-making procedures are frequently a part of strategic management. Businesses and organizations use a variety of tools and frameworks to negotiate this complexity. The Advantages, Benefits, Constraints, and Disadvantages (ABCD) framework is one such tool that facilitates the evaluation of methods, procedures, or initiatives [1]. The ABCD framework is a flexible analytical tool for analyzing and appraising several facets of a choice, a course of action, or a circumstance. It provides as a methodical way to thoroughly assess all the different aspects of a subject.

Company and industry analysis are regarded as the first steps in academic research. To identify the difficulties or problems or to analyze the past, present, and future performance of the system, data collected from businesses and industries utilizing primary and secondary sources must be analyzed in a systematic format. SWOT (strengths, weaknesses, opportunities, and threats), balanced scorecard, and quality function deployment are some of the various frameworks used for a corporate study. Other frameworks, like Porter's Value Chain Analysis (VCA), make it easier to analyze internal corporate processes, but they don't offer a simple way to connect those analyses to overarching business goals [2]. Relationships and an organization's overarching economic theory. Prior to implementing innovative changes within a specific environment, a consistent method for analyzing the structure, behavior, and dynamics of a company business should enable the identification of potential optimizations governing the business models, the assessment of the impact of innovative changes, and the identification of critical success factors. SWOC analysis, PESTLE analysis, McKinsey 7S framework, ICDT model, Portor's five force model, and other frameworks are used to examine individual traits or organizational effectiveness & tactics in a specific context.

When examining the business value in society, the ABCD framework can be used to examine individual qualities, system characteristics, the effectiveness of a concept or idea, and the effectiveness of a plan [3].

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The SWOT analysis, SWOC analysis, PEST analysis, McKinsey 7S framework, ICDT model, Portor's five force model, etc. can all be used to examine individual traits or organizational effectiveness & tactics in a particular context. In 2015, the ABCD analysis framework for business analysis was introduced [3]. It is suitable for analyzing business concepts, business systems, technology, business models, or business ideas in terms of determining various factors for selected determinant issues under four constructs known as advantages, benefits, constraints, and disadvantages. A specific resource (material, machine, information, or human resource) can be examined using the ABCD analysis framework based on how it is used in the society. The concept, system, strategy, technology, model, idea, and resource are further investigated in the qualitative analysis utilizing the ABCD framework by finding constitutional important factors [2]. The concept, idea, system, technology, or strategy can be accepted or rejected by evaluating the scores in the quantitative analysis using the ABCD framework [1]. The appropriate score or weight can be given to each constituent critical element under each construct through empirical research. As a result, the ABCD analysis framework, which takes into account a company's business models, systems, concepts, ideas, technology, strategy, and material analysis, can be used as a study tool in various fields.

## 2. Objectives

1. To identify the determinant concerns that can be taken into account while analyzing the study model.
2. To list the different essential characteristics for each determining factor.
3. To incorporate each essential component of each determining issue into the study model and evaluate it in light of the ABCD constraints (Advantages, Benefits, Constraints, and Drawbacks)

## 3. Dimension of the ABCD Framework

The four dimensions of ABCD Framework are explained as below:

1. **Advantages:** The "Advantages" dimension focuses on identifying the positive aspects or strengths associated with a decision, strategy, or situation [4]. It involves recognizing the inherent benefits that can be derived from a particular course of action. Advantages encompass both quantitative and qualitative factors, including cost savings, revenue generation, enhanced efficiency, improved customer satisfaction, competitive advantage, and more.
2. **Benefits:** The "Benefits" dimension delves deeper into the outcomes or gains that can be realized as a result of implementing the decision or strategy. Benefits are often measurable and specific, and they directly contribute to achieving organizational objectives [5]. They may include increased market share, expanded customer base, higher profitability, reduced operational risks, improved employee morale, and other tangible results.
3. **Constraints:** The "Constraints" dimension highlights the limitations, barriers, or challenges that may impede the successful execution of the decision or strategy. Constraints can manifest in various forms, such as budgetary constraints, resource limitations, regulatory hurdles, technological constraints, and time constraints [6]. Identifying constraints is crucial for devising effective mitigation strategies.
4. **Disadvantages:** The "Disadvantages" dimension focuses on the potential drawbacks, risks, or negative consequences associated with the decision, strategy, or situation. It is essential to anticipate and assess these disadvantages to make informed decisions. Disadvantages can encompass financial risks, reputational damage, legal liabilities, customer dissatisfaction, and other adverse effects.

## 4. Applications of the ABCD Framework

The ABCD framework finds applications across a wide range of domains and industries. It is a versatile tool that can be employed in decision-making, project management, risk assessment, and strategic planning [7]. Here are some key areas where the ABCD framework proves valuable:

1. **Strategic Planning:** In the realm of strategic management, the ABCD framework aids in evaluating and prioritizing strategic initiatives. It allows organizations to assess the advantages and benefits of proposed strategies, identify potential constraints, and anticipate any disadvantages that may arise during implementation.
2. **Project Management:** Project managers utilize the ABCD framework to conduct comprehensive project assessments. By analyzing the advantages, benefits, constraints, and disadvantages of a project, they can make informed decisions regarding resource allocation, risk management, and project prioritization.
3. **Risk Assessment:** When assessing risks associated with a particular course of action, the ABCD framework serves as a structured approach. It helps organizations identify potential constraints and disadvantages, enabling them to develop risk mitigation strategies and contingency plans.
4. **Investment Analysis:** In finance and investment, the ABCD framework assists investors and financial analysts in evaluating investment opportunities. By examining the advantages, benefits, constraints, and disadvantages of an investment, stakeholders can make well-informed investment decisions.

5. **Product Development:** In the context of product development, businesses use the ABCD framework to assess new product ideas. This evaluation considers the advantages and benefits of bringing a new product to market, along with any potential constraints or disadvantages, such as development costs and market competition

## 5. Advantages and Benefits of the ABCD Framework

The ABCD framework offers numerous advantages and benefits to organizations and decision-makers.

1. **Comprehensive Evaluation:** One of the primary strengths of the ABCD framework is its ability to provide a comprehensive evaluation of a subject matter. By considering advantages, benefits, constraints, and disadvantages, decision-makers gain a 360-degree view of the situation [8].
2. **Informed Decision-Making:** Incorporating the ABCD framework into decision-making processes promotes informed decision-making. Decision-makers can weigh the pros and cons, assess risks, and align their choices with organizational goals and objectives.
3. **Risk Mitigation:** Identifying constraints and disadvantages through the ABCD framework allows organizations to proactively address risks. This risk mitigation approach helps minimize the negative impacts of unforeseen challenges.
4. **Resource Allocation:** The ABCD framework aids in optimizing resource allocation. By prioritizing initiatives based on their advantages and benefits, organizations can allocate resources more effectively to projects or strategies with the greatest potential for success.
5. **Enhanced Communication:** When stakeholders use the ABCD framework to evaluate and communicate strategies or decisions, it fosters clear and transparent communication. All parties involved can understand the rationale behind a particular choice.
6. **Alignment with Goals:** The framework ensures that decisions align with organizational goals and objectives. By emphasizing benefits, organizations can ensure that initiatives contribute directly to desired outcomes.
7. **Flexibility:** The ABCD framework is adaptable and can be tailored to suit the specific needs of different industries and organizations. It accommodates both quantitative and qualitative assessments.
8. **Improved Accountability:** By systematically documenting the advantages, benefits, constraints, and disadvantages of a decision or strategy, organizations enhance accountability. They can track progress and measure outcomes against initial assessments.

## 6. Constraints and Disadvantages of the ABCD Framework

While the ABCD framework offers significant advantages, it is not without its constraints and disadvantages [9]. Understanding these limitations is crucial for using the framework effectively:

1. **Subjectivity:** The assessment of advantages, benefits, constraints, and disadvantages may involve subjective judgments. Different individuals or teams may perceive the same factors differently, leading to potential biases in the evaluation.
2. **Complexity:** In some cases, the ABCD framework may not fully capture the complexity of a situation. Decision-makers must be cautious not to oversimplify intricate issues by relying solely on this framework.
3. **Time-Consuming:** Conducting a thorough ABCD analysis can be time-consuming, particularly for complex decisions or projects. This may not be practical when quick decisions are required.
4. **Lack of Predictive Power:** While the framework helps identify potential disadvantages and risks, it may not always predict the exact outcomes of a decision. Unforeseen events and external factors can influence results.
5. **Overemphasis on Quantitative Factors:** The ABCD framework may tend to emphasize quantitative factors over qualitative ones. This could result in a bias toward easily measurable metrics while overlooking less tangible but equally important aspects.
6. **Dynamic Nature:** The framework does not inherently account for changes over time. Advantages, benefits, constraints, and disadvantages may evolve as circumstances change, requiring ongoing assessment and adjustment.
7. **Not a Standalone Solution:** The ABCD framework should not

## 6. The Methodology of ABCD Framework

The methodology includes the identification of the determinant issues in the beginning. Later the key attributes are determined for every determinant issue. The ABCD analysis is done on every key attribute of the determinant issue [10]. Here the determinant issues and the corresponding key attributes are chosen based on various parameters related to the research model considering the factors like technology, the contribution of the product to society, environmental benefits of the product, production, profitability, and the various stock holders of the research model.

The ABCD analysis methodology involves a structured and systematic approach to evaluating a subject matter comprehensively [10]. The detailed steps to conduct an ABCD analysis is:

**Step 1: Define the Subject of Analysis:** Clearly define the subject or decision that you intend to analyze using the ABCD framework. This step is critical as it sets the scope and boundaries of the analysis. The subject could be a strategic initiative, a project, a proposed business decision, or any other situation that requires evaluation.

Key Considerations:

- Clearly articulate the purpose and objectives of the analysis.
- Define the boundaries and timeframe for the analysis.

**Step 2: Identify Advantages:**

- a. **List the Positive Aspects:** Begin the analysis by identifying and listing all the positive aspects or strengths associated with the subject of analysis. These could be tangible and intangible benefits that might result from the decision or strategy.
- b. **Quantify if Possible:** If possible, quantify the advantages. For instance, if you're evaluating a marketing campaign, you might consider increased revenue, customer acquisition, or brand visibility as quantifiable advantages.

Key Considerations:

- Engage relevant stakeholders to gather insights into potential advantages.
- Prioritize advantages based on their significance and relevance to organizational goals.

**Step 3: Identify Benefits:**

- a. **Define Measurable Outcomes:** Determine the specific, measurable outcomes or benefits that can be expected from implementing the decision or strategy. These should directly contribute to organizational goals.
- b. **Set Clear Metrics:** Establish clear metrics and key performance indicators (KPIs) that will be used to measure the benefits. This ensures that you can track and evaluate the success of the initiative.

Key Considerations:

- Align identified benefits with strategic objectives.
- Ensure that benefits are quantifiable and time-bound for effective measurement.

**Step 4: Identify Constraints**

- a. **Identify Potential Barriers:** Identify the potential constraints or limitations that may hinder the successful execution of the decision or strategy. Constraints can take various forms, such as budgetary limitations, resource shortages, regulatory hurdles, or time constraints.
- b. **Prioritize Constraints:** Prioritize constraints based on their potential impact and likelihood of occurrence. Focus on those constraints that could have the most significant negative effects.

Key Considerations:

- Involve subject matter experts and relevant teams to identify constraints.
- Assess the severity of each constraint and its potential to derail the initiative.

**Step 5: Identify Disadvantages:**

- a. **Anticipate Negative Consequences:** Consider the potential negative consequences, risks, or disadvantages associated with the decision or strategy. This involves thinking critically about the potential pitfalls.
- b. **Assess Severity and Likelihood:** Assess the severity and likelihood of each identified disadvantage. Some disadvantages may have minor impacts, while others could be more significant and pose higher risks.

Key Considerations:

- Conduct a thorough risk assessment to identify potential disadvantages.
- Consider both short-term and long-term consequences.

**Step 6: Analyze and Weigh Factors:**

- a. **Consider the Interplay:** Analyze how the advantages, benefits, constraints, and disadvantages interact with each other. For example, a high potential benefit might be worth pursuing despite some constraints, but the severity of disadvantages might change that assessment.
- b. **Weigh Significance:** Assign relative significance or importance to each factor. This involves determining which factors have the most substantial influence on the decision-making process.

Key Considerations:

- Use a scoring or weighting system to objectively assess the significance of each factor.
- Engage decision-makers and stakeholders in discussions to reach a consensus on factor importance.

**Step 7: Develop Mitigation Strategies:**

- a. **Address Constraints:** For identified constraints, develop strategies to mitigate their impact. This might involve finding alternative resources, adjusting timelines, or seeking regulatory approvals.

- b. **Mitigate Disadvantages:** Similarly, develop strategies to mitigate or manage the potential disadvantages. Risk mitigation plans can help address negative consequences if they occur.

Key Considerations:

- Ensure that mitigation strategies are practical and aligned with organizational capabilities.
- Monitor the progress of mitigation efforts and adjust strategies as needed.

**Step 8: Make Informed Decisions:** Based on the comprehensive analysis of advantages, benefits, constraints, and disadvantages, make an informed decision regarding the subject of analysis. Consider the balance between positive and negative factors, as well as the alignment with organizational goals and objectives.

Key Considerations:

- Clearly document the decision and the rationale behind it.
- Ensure that all relevant stakeholders are informed

## 7. Determinant Issues and Key Attributes Involved in the ABCD Analysis

The ABCD (Advantages, Benefits, Constraints, and Disadvantages) analysis is a structured framework used to evaluate a subject or decision comprehensively. To conduct an effective ABCD analysis, it's important to understand the determinant issues and key attributes involved in each dimension of the analysis. The below table explains issues and attributes of ABCD analysis for each dimension:

### Advantages

Advantages encompass the positive aspects or strengths associated with the subject of analysis. To identify these, the following determinant issues and key attributes are considered as shown in below table:

Table 1. The summary of determinant issues and key attributes of various factors interms of advantages.

Sl. No.	Factor	Determinant Issue	Key Attributes
1	Positive Impact	Determine how the subject positively impacts the organization, project, or decision.	Consider factors such as increased revenue, cost savings, improved efficiency, enhanced customer satisfaction, and competitive advantage.
2	Strategic Alignment	Assess how the subject aligns with the organization's strategic goals and objectives.	Evaluate whether the subject contributes to achieving long-term strategic targets and whether it aligns with the organization's mission and vision.
3	Quantifiability	Determine if the advantages can be quantified or measured.	Identify specific metrics and key performance indicators (KPIs) that can be used to measure the advantages. This enables objective evaluation.
4	Stakeholder Perspectives	Consider the perspectives and feedback of relevant stakeholders.	Engage with stakeholders to understand their views on the advantages. Ensure that a diverse range of perspectives is considered.
5	Comparative Analysis	Compare the advantages of the subject with alternative options or scenarios.	Assess how the advantages of the subject stack up against the advantages of other potential courses of action. This provides context for decision-making.

### Benefits

Benefits delve deeper into the specific, measurable outcomes or gains that result from the implementation of the subject[11]. To identify these, the following determinant issues and key attributes are considered as shown in below table:

Table 2. The summary of determinant issues and key attributes of various factors interms f benefits.

Sl. No.	Factor	Determinant Issue	Key Attributes
1	Measurable Outcomes	Define the tangible and quantifiable outcomes that can be expected.	Identify specific benefits such as increased market share, revenue growth, cost reduction, improved product quality, or enhanced brand reputation.

2	Time Frame	Determine the timeframe within which the benefits are expected to materialize.	Assess whether the benefits are short-term or long-term. This helps in setting realistic expectations and planning
3	Alignment with Goals	Evaluate how well the benefits align with organizational goals and objectives.	Ensure that the benefits directly contribute to achieving strategic objectives and are consistent with the organization's mission.
4	Attribution	Understand which aspects of the subject are responsible for generating specific benefits.	Attribute benefits to specific features or actions related to the subject. This helps in optimizing and replicating successful strategies.
5	Risk Mitigation	Consider how the benefits contribute to risk mitigation and resilience.	Analyze whether the benefits help in reducing risks, enhancing resilience to external factors, or improving the organization's ability to respond to challenges.

### Constraints

Constraints encompass the limitations, barriers, or challenges that may impede the successful execution of the subject of analysis [12]. To identify these, the following determinant issues and key attributes are considered as shown in below table.

Table 3. The summary of determinant issues and key attributes of various factors interms of constraints.

Sl. No.	Factor	Determinant Issue	Key Attributes
1	Resource Limitations	Assess the availability of resources, including budget, personnel, and technology.	Identify resource constraints that may affect the subject's implementation. Consider whether resource allocation is adequate.
2	Regulatory Compliance	Examine regulatory requirements and compliance issues.	Identify any legal or regulatory constraints that may impact the subject's implementation. Ensure that the subject complies with applicable laws and regulations.
3	Technological Challenges	Evaluate the technological feasibility and readiness for implementation.	Consider whether technological constraints, such as compatibility issues or infrastructure limitations, need to be addressed
4	Time Constraints	Assess the time frame available for implementation.	Determine whether time constraints, such as tight deadlines, could hinder the subject's successful execution. Develop strategies to manage time effectively.
5	Stakeholder Resistance	Anticipate potential resistance from stakeholders.	Identify stakeholders who may resist the subject's implementation and understand their concerns. Develop strategies for stakeholder engagement and communication.

### Disadvantages

Disadvantages involve the potential drawbacks, risks, or negative consequences associated with the subject of analysis [13]. To identify these, the following determinant issues and key attributes are considered as shown in below table.

Table 4. The summary of determinant issues and key attributes of various factors interms of advantages.

Sl. No.	Factor	Determinant Issue	Key Attributes
1	Risk Identification	Conduct a comprehensive risk assessment.	Identify potential risks and negative consequences associated with the subject. Consider both the likelihood and severity of these risks.
2	Reputational Impact	Evaluate how the subject may impact the organization's reputation.	Consider whether the subject poses reputational risks, such as negative public perception or damage to the brand image.

3	Financial Implications	Assess the financial implications of potential disadvantages.	Analyze the financial risks, including potential losses, increased costs, and budget overruns, that may arise from the subject's implementation.
4	Contingency Planning	Develop contingency plans for managing disadvantages.	Create strategies and action plans to mitigate or address potential disadvantages if they materialize. This ensures preparedness.
5	Monitoring and Evaluation	Plan for ongoing monitoring and evaluation.	Establish mechanisms for continuously assessing the subject's impact and identifying disadvantages as they emerge. This allows for timely interventions.

Effective ABCD analysis involves a holistic approach that integrates all four dimensions. Consider how the advantages align with the benefits, how constraints may impact disadvantages, and vice versa. A well-rounded analysis provides a comprehensive view of the subject, enabling more informed decision-making. The ABCD analysis is a valuable tool for systematically evaluating decisions, strategies, projects, or situations. Understanding the determinant issues and key attributes within each dimension (Advantages, Benefits, Constraints, and Disadvantages) is essential for conducting a thorough and insightful analysis. By considering these factors, organizations can make informed choices that optimize positive outcomes, mitigate risks, and align with their strategic goals.

### 8. Framework of Systematic Review of its Usage

The ABCD analysis framework, which stands for Advantages, Benefits, Constraints, and Disadvantages, is a structured approach used to evaluate a subject or decision comprehensively. It provides a systematic method for considering both positive and negative aspects to make well-informed decisions. In this systematic review, we will explore the usage of the ABCD analysis framework in various contexts and industries [14].

Table 5. The summary of Systematic Review of ABCD Analysis Usage.

Sl. No.	Factor	Application	Benefits	Constraints
1	Strategic Planning	The ABCD framework is widely used in strategic planning. Organizations evaluate proposed strategies by considering their advantages and benefits against constraints and disadvantages. This aids in selecting strategies aligned with long-term objectives.	Improved alignment with organizational goals, better resource allocation, and reduced risks associated with strategic decisions.	Subjectivity in assessing advantages and disadvantages, and the need for thorough data collection.
2	Project Management	Project managers employ the ABCD analysis to assess project feasibility, resource allocation, and risk mitigation. It helps in understanding the potential benefits and constraints involved.	Enhanced project planning, effective resource allocation, and better risk management.	Time-consuming process, and the need for detailed analysis for complex projects.
3	Risk Assessment	In risk assessment, the ABCD framework helps in identifying potential disadvantages and constraints that could lead to adverse events. It assists in devising mitigation strategies.	Enhanced risk management, proactive identification of potential issues, and improved decision-making.	Subjectivity in risk assessment and the challenge of predicting all possible risks.
4	Investment Analysis	Investors and financial analysts use ABCD analysis to evaluate investment opportunities. They assess	Informed investment decisions, reduced financial risks, and improved portfolio	The complexity of financial markets and the need for robust data analysis.

		potential advantages and benefits against constraints and disadvantages to make investment decisions.	management.	
5	Product Development	Businesses apply the ABCD framework to assess new product ideas. It helps in evaluating potential benefits and advantages against constraints and disadvantages.	Enhanced product development decisions, improved product quality, and increased market competitiveness.	Subjectivity in product assessment and the need for comprehensive market research.
6	Supply Chain Management	In supply chain and inventory management, ABCD analysis helps optimize stock levels. It categorizes items based on their importance and value, enabling organizations to allocate resources effectively.	Reduced carrying costs, improved inventory turnover, and better supply chain efficiency.	Continuous monitoring and updating of item categorization.
7	Strategic Resource Allocation	Organizations employ the ABCD framework to allocate resources such as budgets, personnel, and technology. It helps prioritize resource allocation based on potential advantages and benefits.	Efficient resource allocation, cost optimization, and improved strategic decision-making.	Resource constraints may limit the implementation of strategies with high potential benefits.
8	Operational Efficiency Improvement	Companies use ABCD analysis to identify areas for operational improvement. By assessing advantages and benefits against constraints and disadvantages, they prioritize process enhancements.	Enhanced efficiency, cost savings, and streamlined operations.	Resistance to change and the need for continuous process monitoring.
9	Marketing Campaign Evaluation	In marketing, the ABCD framework is employed to evaluate the effectiveness of advertising campaigns. It helps assess advantages and benefits against constraints and disadvantages.	Improved marketing ROI, better targeting, and data-driven campaign optimization.	The complexity of tracking campaign metrics and the need for real-time data analysis.

## 9. Conclusion

The ABCD analysis framework is a systematic approach that helps individuals and organizations make informed decisions and solve complex problems. It encourages a structured process of assessment, creative idea generation, careful evaluation, and effective execution. This framework can be applied to a wide range of scenarios, from business strategy development to personal decision-making, to ensure that decisions are well-informed and actions are purposeful. A cyber-attack detection and mitigation framework offer several benefits, including improved security, proactive defense, risk reduction, regulatory compliance, and efficient resource allocation. However, these advantages must be weighed against the potential constraints and drawbacks, such as complexity, false positives, resource demands, and adaptability challenges. To maximize the benefits and mitigate the drawbacks, organizations should carefully choose and tailor a framework to their specific needs while staying agile in responding to evolving cyber threats.

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