

# Overcoming Challenges and Unlocking the Potential: Empowering Small and Medium Enterprises (SMEs) with Data Analytics Solutions

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## Abstract

In today's data-driven business landscape, Data Analytics (DA) has emerged as a vital tool for organizations to extract insights from their existing data, enabling informed decision-making. While large enterprises have wholeheartedly embraced DA as a strategic asset for operational enhancement, SMEs have been comparatively slower in adopting these transformative solutions. To remain competitive and surpass their rivals, SMEs must recognize the significance of harnessing their data assets effectively to drive decision-making processes. This research aims to delve into the challenges hindering the adoption of DA among SMEs, particularly focusing on issues such as inadequate information infrastructure and limited awareness of the benefits that DA can offer. Furthermore, this study investigates the implementation of data analytics as a practical solution to address these challenges, providing a comprehensive analysis of both the advantages and disadvantages associated with DA adoption in the SME context. By shedding light on the untapped potential of data analytics, this research aims to empower SMEs and equip them with the necessary tools to thrive in today's digitally-driven era of business.

**Keywords**— Data Analytics, SME, Information Infrastructure, Decisions Making

## 1 Introduction

Over the past two decades, companies have witnessed a tremendous increase in the collection and generation of vast amounts of data from both internal and external sources. The ability to access, manage, and analyze this data has become crucial for making informed business decisions. Failing to harness the power of data can lead to missed business opportunities, making it imperative for companies to adopt strategies that enable them to stay competitive or even get ahead in the industry [1].

One of the most effective ways for companies to enhance their operations is by implementing a robust data analytics solution. This has evolved into an indispensable tool for making informed business decisions, particularly for large corporations. However, small and medium enterprises (SMEs) have lagged behind in adopting and developing data analytics solutions [2]. As a result, understanding the reasons behind their slower progress in this area becomes vital.

One significant challenge faced by SMEs is the measurement of their company's performance. By examining key performance metrics, companies, especially larger enterprises, can create comprehensive reports and dashboards using business intelligence (BI) analytics tools [3]. These reports help assess profit gains across various countries, track sales revenue, monitor gross profit, and more. By leveraging these insights, larger companies gain a competitive advantage over their counterparts.

Moreover, the rapid advancement of technology has led to a widespread ownership of tablets and smartphones among users in recent years. This proliferation of mobile devices has created new opportunities for businesses to collect valuable data and engage with customers. However, SMEs must adapt to this evolving landscape and utilize mobile technologies to gather relevant data and stay connected with their target audience.

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In conclusion, the ability to access, manage, and analyze large volumes of data has become integral to effective business decision-making. Companies that fail to embrace data analytics solutions risk missing out on valuable business opportunities. While larger corporations have recognized the importance of data analytics and leverage it to stay competitive, SMEs face challenges in implementing these solutions. By focusing on measuring their company's performance and exploring the potential of mobile technologies, SMEs can bridge the gap and harness the power of data analytics to enhance their operations and secure their position in the market [4].

According to Tohidi et al [5], there has been a notable shift in consumer preferences towards online sales over traditional in-store purchases, leading to a significant expansion in the e-commerce market. However, small and medium enterprises (SMEs) have not been able to fully capitalize on these opportunities. Many SMEs lack a dedicated company website, limiting their online presence. Moreover, a lack of technical expertise hampers their ability to convert data into meaningful information for effective business decision-making.

Another barrier faced by SMEs is their limited understanding of the benefits of data analytics and budgetary constraints, which make them hesitant to invest in data analytics solutions [6]. Additionally, there is a lack of information infrastructure specifically tailored for SMEs. While the financial industry heavily relies on information, there exists an information asymmetry between providers and seekers of funds in general. Large organizations can access a wide range of data through capital markets, enabling them to assess the reliability of significant investments. However, most SMEs do not have access to capital markets and, as a result, face difficulties in obtaining relevant financial information.

Some SMEs mistakenly believe that adopting data analytics or similar systems and processes may make them less competitive. However, the reality is that integrating data analytics can transform their businesses and help them stay ahead of the competition. Data analytics provides valuable insights that can be used to create dashboards, leading to numerous improvements such as enhanced order fulfillment, maximized customer value, cost reduction, and better product management [7]. Moreover, data analytics solutions enable SMEs to predict future outcomes by leveraging their existing data. By evaluating predicted outcomes, SMEs gain a deeper understanding of the financial impact of key decisions and become more adept at managing risks.

In conclusion, SMEs face several challenges in harnessing the potential of e-commerce and data analytics. Limited online presence, lack of technical expertise, budget constraints, and inadequate information infrastructure impede their progress. However, embracing data analytics can provide SMEs with a competitive edge by facilitating data-driven decision-making, enabling better customer engagement, and optimizing business processes. It is essential for SMEs to recognize the transformative power of data analytics and actively invest in these solutions to unlock their full potential and drive success in the evolving market landscape [8].

## 2 The Problems

In this section, we will delve into two prevalent issues commonly observed among SMEs in Malaysia, as identified in task 1. These issues include the insufficient utilization of information technology (IT) or related systems within SMEs and the lack of awareness and understanding of data analytics among SMEs.

Firstly, a significant challenge faced by SMEs in Malaysia is the limited use of information technology or other relevant systems to support their operations [9]. Many SMEs still rely on manual processes and traditional methods, which can be time-consuming, inefficient, and prone to errors. The inadequate integration of IT solutions hinders their ability to streamline processes, improve productivity, and adapt to the evolving business landscape.

SMEs that fail to leverage information technology miss out on opportunities for automation, optimization, and enhanced decision-making. By adopting IT systems such as enterprise resource planning (ERP), customer relationship management (CRM), or inventory management software, SMEs can streamline their operations, increase efficiency, and gain a competitive edge. These systems can help with tasks such as inventory tracking, order processing, customer data management, and financial analysis.

Secondly, another common issue observed among SMEs in Malaysia is the lack of insights and understanding about data analytics [10]. Many SME owners and decision-makers are not fully aware of the potential benefits and applications of data analytics in their businesses. This limited awareness often stems from a lack of exposure, knowledge, and resources dedicated to data analytics within SMEs.

Data analytics offers SMEs valuable insights and the ability to make data-driven decisions. By analyzing data from various sources, SMEs can uncover patterns, trends, and correlations that can inform strategic planning, marketing campaigns, product development, and customer engagement. Data analytics can also help SMEs identify areas for improvement, optimize operations, and enhance overall business performance.

To address these challenges, it is crucial for SMEs in Malaysia to prioritize the integration of information technology and data analytics into their operations. SMEs should invest in appropriate IT systems, such as enterprise software, e-commerce platforms, and cloud-based solutions, to improve their efficiency and

competitiveness. Additionally, fostering a culture of data-driven decision-making and providing training and resources on data analytics will enable SMEs to unlock the full potential of their data.

Government initiatives, industry collaborations, and educational programs can play a vital role in promoting the adoption of IT and data analytics among SMEs. By providing incentives, grants, and educational support, policymakers and industry stakeholders can encourage SMEs to embrace digital transformation and equip them with the necessary skills and knowledge to harness the power of data analytics.

In conclusion, the insufficient use of information technology and the lack of insights about data analytics are common challenges faced by SMEs in Malaysia. Overcoming these obstacles requires SMEs to invest in suitable IT solutions, embrace data-driven decision-making, and prioritize digital transformation. By leveraging information technology and data analytics effectively, SMEs can enhance their competitiveness, improve operational efficiency, and make informed decisions to drive growth and success in the dynamic business landscape.

### *2.1 Insufficient Use of Information Technology or Other Related Systems in SMEs*

The adoption of information technology in SMEs often falls short due to a lack of consideration and understanding. Many SMEs are hesitant to embrace technology due to concerns about increased operational costs. The perception among SMEs is that acquiring and maintaining servers, data centers, or hiring external vendors will place a strain on their financial resources, potentially impacting their profitability. Furthermore, it is noteworthy that some SMEs do not even have a website, which further hampers their ability to leverage digital platforms for business growth.

According to Escaloni and Mareque [11], SMEs significantly lag behind large enterprises when it comes to utilizing the internet for effective communication with customers and suppliers. This underperformance is primarily attributed to a lack of awareness and limited knowledge about the benefits and opportunities presented by digital connectivity.

To address these challenges, it is crucial for SMEs to recognize the potential advantages of information technology adoption. Rather than viewing it as a cost burden, SMEs should consider the long-term benefits that technology can bring, such as improved operational efficiency, enhanced customer engagement, and increased competitiveness.

SMEs can explore cost-effective solutions such as cloud computing, which eliminates the need for extensive hardware investments and allows for scalable IT infrastructure based on actual needs. Additionally, outsourcing IT services to specialized vendors can provide SMEs with access to expertise and technological resources without incurring significant upfront costs.

Furthermore, establishing an online presence through the development of a website or e-commerce platform is essential for SMEs to reach a broader customer base and effectively engage with potential buyers. With a website, SMEs can showcase their products or services, provide relevant information, and facilitate online transactions, thereby expanding their market reach and driving sales growth.

Educational initiatives and government support can play a crucial role in bridging the information technology gap among SMEs. Providing training programs, workshops, and incentives can help SMEs overcome their reservations and develop the necessary skills to integrate technology into their operations effectively.

In conclusion, the limited adoption of information technology in SMEs stems from concerns over increased costs and a lack of awareness regarding its potential benefits. However, it is important for SMEs to recognize the value that technology can bring in terms of operational efficiency and competitive advantage. By exploring cost-effective solutions, establishing an online presence, and embracing educational initiatives, SMEs can harness the power of information technology to drive growth and success in today's digital-driven business landscape.

### *2.2 Lacks of Awareness of Data Analytics*

A recent survey conducted in 2020 revealed that nearly seventy percent of the surveyed SMEs have not yet embraced data analytics [12]. This significant gap can be attributed to SMEs' reliance on familiar tools such as spreadsheets and databases, which limits their awareness and understanding of data analytics.

The lack of awareness and understanding of data analytics poses a significant hurdle for SMEs. Many SMEs are not fully aware of the potential benefits that data analytics can offer in terms of extracting valuable insights from their data. This lack of understanding prevents SMEs from leveraging their data effectively to drive informed decision-making and improve their overall business performance.

Furthermore, concerns about data protection and privacy also contribute to the hesitation among SMEs to adopt data analytics. SMEs often handle sensitive customer information and proprietary data, leading to apprehension

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about the security of their data. The perceived risks associated with data breaches and compliance issues can deter SMEs from fully embracing data analytics.

Additionally, limited financial resources serve as another obstacle for SMEs when considering the adoption of data analytics. SMEs often have budget constraints, making it challenging to invest in the necessary tools, technologies, and expertise required for implementing robust data analytics solutions. The perceived high costs associated with data analytics implementation can be a deterrent for SMEs, further hindering their ability to leverage data for decision-making.

The absence of data analytics adoption leads to a significant loss for SMEs, as they miss out on the potential benefits of transforming data into valuable insights. Data analytics enables SMEs to identify trends, patterns, and correlations within their data, enabling them to make more informed and strategic decisions. Without data analytics, SMEs are unable to tap into the full potential of their data, limiting their ability to enhance operational efficiency, optimize processes, and gain a competitive advantage.

To address these challenges, it is crucial for SMEs to prioritize data literacy and create awareness about the benefits of data analytics. Educational programs and workshops can be organized to equip SME owners and employees with the necessary knowledge and skills to leverage data analytics effectively. Additionally, SMEs can explore cost-effective data analytics solutions and cloud-based platforms that offer scalability and data security, alleviating concerns about financial resources and data protection.

Government support in the form of grants, incentives, and resources can also play a crucial role in encouraging SMEs to adopt data analytics. By providing financial assistance and access to expert guidance, governments can facilitate the adoption of data analytics among SMEs and bridge the existing gap.

In conclusion, the low adoption of data analytics among SMEs is primarily attributed to a lack of awareness, understanding, and financial resources. To unlock the potential of data analytics, SMEs must prioritize data literacy, address concerns about data protection, and explore cost-effective solutions. By embracing data analytics, SMEs can harness the power of their data to drive informed decision-making and achieve sustainable growth in an increasingly data-driven business landscape.

Results and Discussion  
Discussion of the results of research and testing obtained is presented in the form of theoretical descriptions, both qualitatively and quantitatively. Experimental results should be displayed in the form of graphs or tables. For graphs, follow the format for charts and drawings.

### 3 Problem Solution

#### 3.1 Need for Data Analytics in SMEs

Data analytics plays a critical role in inspecting, cleansing, transforming, and modeling data to extract valuable insights that support informed business decision-making. However, as discussed in section 2.2, the lack of understanding about the benefits of data analytics often leads to underutilization of data, resulting in poorer and inaccurate decision-making within SMEs.

To illustrate the impact of data analytics, let's consider a newly launched online food delivery enterprise. In order to minimize material losses on days with low business activity, it is crucial for the SME to have a clear understanding of the required quantity of materials needed on a daily basis. By leveraging data visualization and analytics solutions, the SME can effectively analyze its sales and order volume data to make more precise, reliable, and business-oriented decisions. This enables the SME to mitigate risks, optimize resource allocation, and ultimately boost its revenues.

Furthermore, adopting data analytics can have a direct impact on increasing profits for SMEs. According to Willets et al [13], those that invested in analytics to gain a competitive advantage experienced an increase in operating profit within the range of six percent. While the cost of implementing a data analytics solution may vary depending on the specific objectives and goals of an SME, it is important to note that with the growing prevalence of data analytics, there are now more affordable and budget-friendly options available. SMEs can explore outsourced analytics services, analytics tools or platforms, and even bespoke data analytics solutions that cater to their unique needs and budget constraints.

By embracing data analytics, SMEs can unlock the potential of their data, make more informed decisions, and achieve tangible business benefits. The ability to leverage data analytics has become increasingly accessible, empowering SMEs to enhance their competitiveness, identify new opportunities, optimize operations, and drive sustainable growth.

In conclusion, the utilization of data analytics is essential for SMEs to derive meaningful insights and support effective decision-making. By investing in data analytics, SMEs can minimize risks, maximize profits, and gain a competitive edge in today's data-driven business landscape. With various affordable options available, SMEs can

explore different data analytics solutions that align with their objectives and resources, leading to improved performance and long-term success.

### 3.2 *Problems Faced by Professionals*

There are two common challenges that professionals encounter when managing various types of data [14]:

1. **Keeping Pace with Regulatory and Data Protection Issues:** One significant challenge professionals face is staying up to date with the ever-changing landscape of regulatory requirements and data protection regulations. Laws and regulations regarding data privacy and security are continuously evolving, making it challenging for professionals to ensure compliance. Failure to adhere to these regulations can result in severe legal and financial consequences for organizations. Professionals must stay informed about relevant laws, such as the General Data Protection Regulation (GDPR), and implement appropriate measures to protect sensitive data, including encryption, access controls, and secure data storage.
2. **Tracking the Trail of Related Information:** Another common issue professionals encounter is effectively managing and tracking the interconnectedness of data. In today's complex data environments, data is often scattered across multiple systems, platforms, and repositories. Professionals need to be able to trace the lineage and flow of data to ensure its accuracy, reliability, and integrity. Understanding the origin and transformation of data is crucial for data quality management, regulatory compliance, and decision-making processes. Without a comprehensive system or approach in place, professionals may struggle to establish a clear and auditable trail of related information, leading to data inconsistencies, errors, and challenges in data governance.

To address these challenges, professionals can take several steps:

- **Stay informed about regulatory requirements:** Regularly monitor and stay updated on relevant laws and regulations related to data protection and privacy. Establish processes and policies to ensure compliance and regularly review and update them as needed.
- **Implement robust data protection measures:** Employ strong encryption techniques, access controls, and secure storage mechanisms to safeguard sensitive data. Regularly assess and enhance security measures to address evolving threats and vulnerabilities.
- **Invest in data governance and management solutions:** Implement data governance frameworks and technologies that enable professionals to track data lineage, establish data quality controls, and maintain a clear audit trail. Utilize data cataloging and metadata management tools to enhance data discoverability and understand the relationships between different datasets.
- **Foster a culture of data awareness and accountability:** Educate employees about data protection and privacy best practices. Promote a culture of data responsibility, ensuring that individuals understand their roles and responsibilities in managing and protecting data throughout its lifecycle.
- **Collaborate with legal and compliance teams:** Work closely with legal and compliance professionals to understand and address regulatory requirements. Foster collaboration between IT, data management, and legal teams to ensure alignment and adherence to data protection and privacy standards.

By proactively addressing these challenges, professionals can better manage various data types, ensure regulatory compliance, and enhance the overall data governance and management practices within their organizations.

### 3.3 *Keeping up with regulatory and data protecting issues*

Data is often considered a valuable asset for organizations, holding critical information such as employee personal details, customer transaction history, sales pipelines, accounting records, and much more. It serves as a foundation for the success and growth of businesses. However, in recent years, several prominent companies have suffered from the failure to adequately protect this invaluable resource. Data breaches, whether caused by hackers or employee negligence, pose significant financial implications for organizations. However, the damage inflicted on a company's reputation and the erosion of customer confidence resulting from a data breach are immeasurable.

The importance of data security and protecting sensitive information cannot be overstated. Data breaches can lead to severe financial losses for organizations, including costs associated with incident response, remediation,

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legal actions, and potential regulatory penalties. The direct financial impact of a breach can be substantial and have long-lasting consequences for the affected companies.

Yet, the repercussions of a data breach extend beyond monetary losses. The damage to an organization's reputation can be devastating. News of a breach spreads rapidly, eroding the trust that customers, partners, and stakeholders have placed in the organization. The loss of customer confidence can result in decreased sales, customer attrition, and difficulties in attracting new business opportunities. Rebuilding a damaged reputation takes time, resources, and a concerted effort to regain trust, making it an arduous task for organizations that have experienced a breach.

Moreover, the indirect costs associated with a data breach are difficult to quantify but equally significant. Negative media coverage, social media backlash, and the potential for lawsuits can all have a lasting impact on an organization's brand image. Customers may hesitate to share their personal information, affecting customer engagement and hindering the organization's ability to deliver personalized experiences. Ultimately, the intangible costs resulting from a breach can have far-reaching effects on an organization's long-term success.

To mitigate the risks associated with data breaches and protect their reputation, organizations must prioritize data security. This involves implementing robust cybersecurity measures, including encryption, access controls, threat detection systems, and employee training on best practices for data handling and protection. Regular security audits, vulnerability assessments, and incident response plans should be established to proactively identify and address potential risks.

Additionally, organizations should adhere to data protection regulations and standards relevant to their industry and geography. Compliance with frameworks such as the GDPR, CCPA, or industry-specific regulations helps ensure the safeguarding of customer data and demonstrates a commitment to protecting privacy rights [15].

Investing in cyber insurance can also provide financial protection in the event of a breach, covering costs associated with forensic investigations, legal fees, public relations efforts, and potential liability claims. By taking proactive measures to secure data, organizations can minimize the likelihood and impact of breaches, protect their reputation, and maintain the trust and confidence of their customers and stakeholders. Recognizing data as a valuable resource and treating its protection as a top priority is crucial in today's interconnected and data-driven business landscape.

### 3.4 *Trying to follow the trail of related information*

Both large corporations and SMEs often maintain extensive databases that work collectively to provide access to vital information within their organizations. These databases contain various tables and interconnected data, forming a network that enables efficient data retrieval and management. Let's consider an example to illustrate this concept.

Imagine a database with a table that stores employee names and their corresponding document ID numbers. Clicking on an employee's ID number would lead to another table that contains additional information, such as the document type and expiry date. If this information were stored in individual documents for each employee, a standard search by employee name would retrieve all the relevant information. However, in a database scenario, the search tool needs to understand the connections between the employee name, ID number, document type, and expiry date to retrieve all the necessary information effectively.

To accomplish this, databases use relational structures and query languages to establish relationships between tables and perform complex searches. By defining relationships and using query tools, organizations can connect different pieces of information and retrieve comprehensive results.

For example, a structured query language (SQL) statement can be written to join the employee table with the document table using the common ID field. This SQL query would retrieve all the relevant information, such as the employee's name, ID, document type, and expiry date, in a single search. By linking tables through shared identifiers, organizations can access interconnected data efficiently and retrieve the information they need for decision-making, reporting, or any other operational requirement [16].

Centralizing information in a database offers several advantages over maintaining individual documents. It enables faster and more accurate data retrieval, facilitates data analysis and reporting, ensures data consistency and integrity, and simplifies data maintenance and updates. However, it requires a proper understanding of the database structure and the relationships between tables to utilize its full potential.

Moreover, organizations need robust database management systems and search tools that can navigate through the database structure, execute complex queries, and present the retrieved information in a user-friendly format.

These tools streamline the search process and enhance productivity, enabling users to access the required information efficiently.

Whether it's a large corporation with extensive databases or an SME with a smaller-scale setup, understanding the interconnectedness of data within databases and utilizing appropriate tools and techniques to access and retrieve information is essential. By effectively leveraging database structures and query languages, organizations can harness the power of their data, improve decision-making processes, and optimize operational efficiency.

### 3.5 *Using Data Analytics for Decision-making*

#### 1. The Advantages

First and foremost, leveraging data allows SMEs to make more confident and informed decisions. Data plays a crucial role in providing valuable insights and benchmarks that enable SMEs to assess the potential impact of their decisions on their businesses. By analyzing relevant data, SMEs can gain a deeper understanding of their current situation and make strategic choices with greater confidence.

Additionally, data analytics can lead to significant cost savings for SMEs. A survey conducted by NewVantage Partners (2019), which involved 1,000 executives, highlighted that using data to decrease costs was one of the most impactful initiatives. Over 49 percent of organizations that implemented cost reduction projects reported positive outcomes from their data-driven efforts. By leveraging data to identify inefficiencies, streamline processes, and optimize resource allocation, SMEs can achieve substantial cost savings and enhance their overall financial performance.

Furthermore, embracing data-driven practices empowers SMEs to become more proactive in their operations. When equipped with the right tools, practices, and access to relevant data, SMEs can leverage it in a proactive manner. For example, they can identify emerging business opportunities before their competitors, enabling them to gain a competitive edge. Moreover, data analysis can help SMEs detect potential threats and risks at an early stage, allowing them to take proactive measures to mitigate or address these issues before they become more serious or detrimental to their business.

By harnessing the power of data and employing data-driven approaches, SMEs can unlock numerous benefits. These include making more confident decisions based on insights derived from data analysis, realizing cost savings by identifying and addressing inefficiencies, and proactively leveraging data to identify opportunities and mitigate risks. As data analytics and technologies continue to evolve and become more accessible, SMEs have the opportunity to leverage their data assets effectively and drive their businesses forward in an increasingly competitive landscape.

#### 2. The disadvantages

Firstly, it is important to acknowledge that decisions based on data are not guaranteed to always be correct. While data can reveal patterns and provide insights, its interpretation and collection process may be flawed. If there are errors or biases in the data collection or analysis, any decisions made solely based on that information may lead to inaccuracies or misguided outcomes. It is crucial to ensure the data is collected accurately, validated, and analyzed with a critical eye to avoid potential pitfalls.

Secondly, one of the challenges with analytical decision-making is the potential for delayed action. The process of gathering, analyzing, and interpreting data can be time-consuming, especially when dealing with large datasets or complex analyses. This can become problematic when decisions need to be made within tight deadlines or when there is a need for swift action. Decision-makers relying on analytical insights may face the pressure of balancing the need for thorough analysis with the urgency to make timely decisions. Finding a balance between comprehensive data analysis and timely decision-making is crucial to ensure effective outcomes.

To address these challenges, organizations should focus on establishing robust data collection processes and ensuring data quality and integrity. Implementing thorough validation and verification mechanisms can help identify and rectify any inaccuracies or biases in the data. Additionally, investing in data literacy and providing training to decision-makers can enhance their understanding of data analysis and interpretation, enabling them to make more informed decisions.

Efforts should also be made to streamline the analytical decision-making process without compromising the quality of analysis. This can involve utilizing advanced data analytics tools, automation, and machine learning algorithms to expedite data processing and analysis. Furthermore, fostering a culture that values both data-driven insights and timely decision-making can encourage efficient and effective decision-making practices within organizations.

By addressing the challenges of potential inaccuracies in data and the time constraints associated with analytical decision-making, organizations can strive to make well-informed decisions while ensuring that timely action is taken when necessary. Balancing accuracy and speed in decision-making processes is essential for organizations to navigate the dynamic and fast-paced business environment effectively.

## 4 Conclusion

### 4.1 Data Analytics Solves Business Problem

Firstly, data analytics can help SMEs prioritize urgent matters. With the help of analytics software, SMEs can gain valuable insights into critical issues that require immediate attention. For example, if a customer has an urgent need for a specific product or service due to personal circumstances, data analytics tools can enable the SME to identify and prioritize this customer's needs. By understanding the urgency and importance of specific cases through data analysis, SMEs can ensure timely and appropriate responses, thereby enhancing customer satisfaction and loyalty.

Secondly, data analytics removes the unknowns in decision-making. Analytics empowers companies to make informed decisions based on a solid understanding of the available data. By leveraging data analytics, enterprises can address complex business challenges and have greater confidence in moving forward with analytical reports and insights. Data-driven decision-making minimizes reliance on guesswork or intuition, allowing SMEs to make more accurate and well-founded choices, leading to better outcomes.

Lastly, data analytics enables SMEs to fully leverage the potential of their data. Many SMEs fail to realize the full value of the data they possess. In fact, studies have shown that some SMEs only utilize a small fraction, as low as 1 percent, of their stored data. This is where data analytics solutions come into play. Data analytics solutions help SMEs transform and convert raw data into meaningful and understandable information for employees across the organization. By making data accessible and usable to all employees, SMEs can unlock valuable insights, identify trends, discover opportunities, and drive informed decision-making at all levels of the organization.

In summary, data analytics offers several benefits to SMEs. It enables prioritization of urgent matters, removes uncertainties in decision-making, and maximizes the utilization of available data. By harnessing the power of data analytics, SMEs can make faster and more informed decisions, improve customer satisfaction, optimize operational efficiency, and gain a competitive edge in today's data-driven business landscape.

### 4.2 Challenges in Developing and Implementing Data Analytics Solutions

There are numerous challenges that SMEs face when developing and implementing data analytics solutions. Firstly, one major challenge is the lack of employee adoption and mindset shift towards relying on data analytics. Many employees may be more inclined to trust their instincts rather than relying on actionable insights generated by analytics. This can lead to inaccuracies in decision-making, as relying on inaccurate data to generate reports or support decisions can result in significant losses for the company. It is crucial for SMEs to foster a culture that encourages employees to embrace data analytics and understand its value in driving informed decision-making.

Secondly, SMEs often struggle with data management issues. Analyzing data from multiple sources can quickly become overwhelming, especially if proper data management practices are not in place. SMEs may find it challenging to extract meaningful information from the vast amount of data they possess. It is important for SMEs to have robust data management strategies, including data cleansing, organization, and integration techniques, to ensure that data analysis efforts yield accurate and useful insights. Additionally, SMEs should avoid the



misconception that storing more data automatically leads to better outcomes, as it is essential to focus on relevant and valuable data rather than simply accumulating vast quantities of information.

Furthermore, some SMEs may be measuring the wrong indicators or focusing solely on financial metrics. While financial metrics are important, relying solely on them can create data blind spots and limit the ability to make proactive changes. SMEs should consider adopting a more holistic approach to data analysis, incorporating a wide range of performance indicators and metrics. For example, instead of simply reacting to a decrease in profits by reducing spending, a more proactive approach would involve analyzing the underlying reasons for the decline in sales and identifying areas for improvement or adjustments in business strategies.

Overcoming these challenges requires SMEs to invest in data literacy and training for employees, develop effective data management practices, and broaden their perspective on performance measurement. By addressing these challenges, SMEs can unlock the full potential of data analytics and leverage it to drive strategic decision-making, enhance operational efficiency, and gain a competitive advantage in their respective industries.

### 4.3 Business Solution

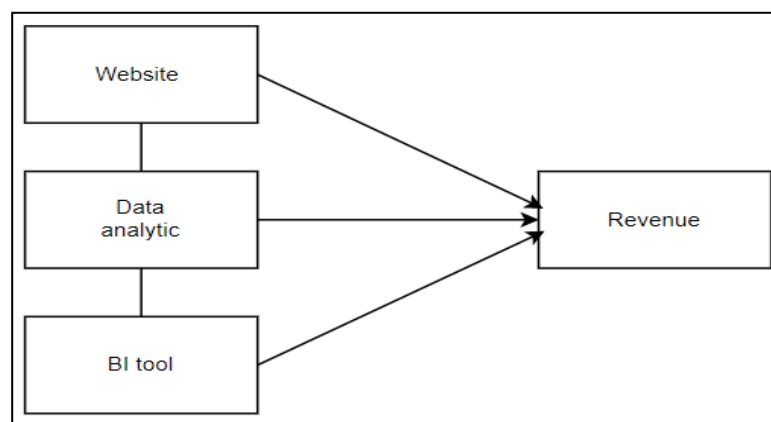


Figure 1 Shows the conceptual model for the business solution

Firstly, it is crucial for SMEs to establish their own website. Research indicates that a significant number of SMEs still do not have an online presence. By having a website, SMEs can tap into the growing trend of online shopping and reach a wider customer base. This provides an opportunity for SMEs to showcase their products or services, engage with customers, and generate sales online. Furthermore, the website can serve as a valuable source of data for SMEs, as they can gather insights from customer clicks, reviews, and preferences to identify areas for improvement and enhance their offerings. Rather than solely focusing on cost-cutting measures in response to a decrease in profit, SMEs can leverage the data obtained from their website to make more informed decisions and drive growth.

Secondly, SMEs should consider hiring a data scientist or analytics professional to manage their data. Data analytics requires specialized skills and expertise, and relying on an in-house employee without proper training may result in suboptimal data management and analysis. By having a dedicated data scientist or analyst, SMEs can ensure that their data is properly collected, cleansed, analyzed, and transformed into accessible and understandable information for the company. These professionals can apply advanced analytical techniques and tools to extract valuable insights from the data, enabling SMEs to make data-driven decisions and gain a competitive edge.

In addition to hiring a data scientist, SMEs can also explore collaborations with external data analytics service providers. This can be a cost-effective option for SMEs that may not have the resources to hire a full-time data professional. Outsourcing data analytics allows SMEs to leverage the expertise of experienced professionals who can assist in managing and analyzing their data, providing valuable insights and recommendations for business improvement.

By prioritizing the establishment of a website and investing in data expertise, SMEs can harness the power of data analytics to drive growth, enhance decision-making, and stay competitive in today's digital landscape.

Furthermore, by implementing data analytics, SMEs can significantly improve their decision-making processes. Accurate and reliable data generated through analytics enables companies to make informed decisions based on real-time insights. In cases where hiring a dedicated data analyst may not be feasible due to limited financial resources, SMEs can explore the option of outsourcing data analytics to external vendors. These vendors specialize in data analysis and can provide valuable insights and recommendations to support decision-making, even on a project basis.

Additionally, SMEs can leverage Business Intelligence (BI) tools to enhance their data analysis capabilities. BI tools such as Tableau and Microsoft Power BI allow companies to create interactive reports and dashboards that display key performance indicators, sales metrics, gross profit figures, and other relevant data. These tools enable SMEs to analyze data in a visual and user-friendly manner, facilitating better understanding and interpretation of the numbers. By leveraging BI tools, SMEs can identify areas for improvement, take proactive actions, and drive business growth.

Another option for SMEs is to consider adopting Software as a Service (SaaS) solutions. SaaS is a cloud-based software application that allows companies to access and utilize software functionality without the need for on-premises installations. This eliminates the upfront costs associated with purchasing and maintaining software and hardware infrastructure. SMEs can subscribe to SaaS solutions on a monthly or yearly basis, paying only for the services they use. This model is particularly beneficial for SMEs with limited resources, as it provides access to sophisticated data management and analytics capabilities without the need for substantial investments.

In conclusion, by embracing these data analytics solutions, SMEs can effectively leverage their data to generate valuable insights that support decision-making processes. This, in turn, leads to better decision-making, increased profitability, and revenue growth. Furthermore, implementing data analytics solutions enhances the company's reputation and instills confidence in customers, as the company demonstrates its commitment to leveraging data for continuous improvement.

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