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Impact of big data analytics on telecom companies' competitive advantage

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28.March.2024

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Abstract

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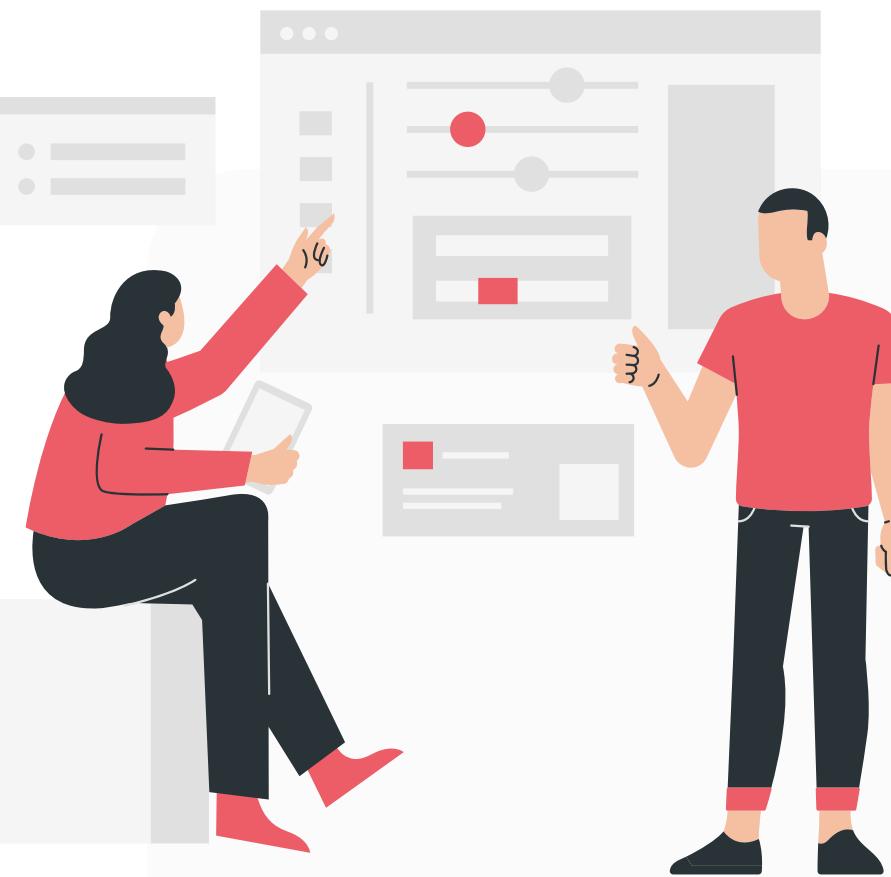
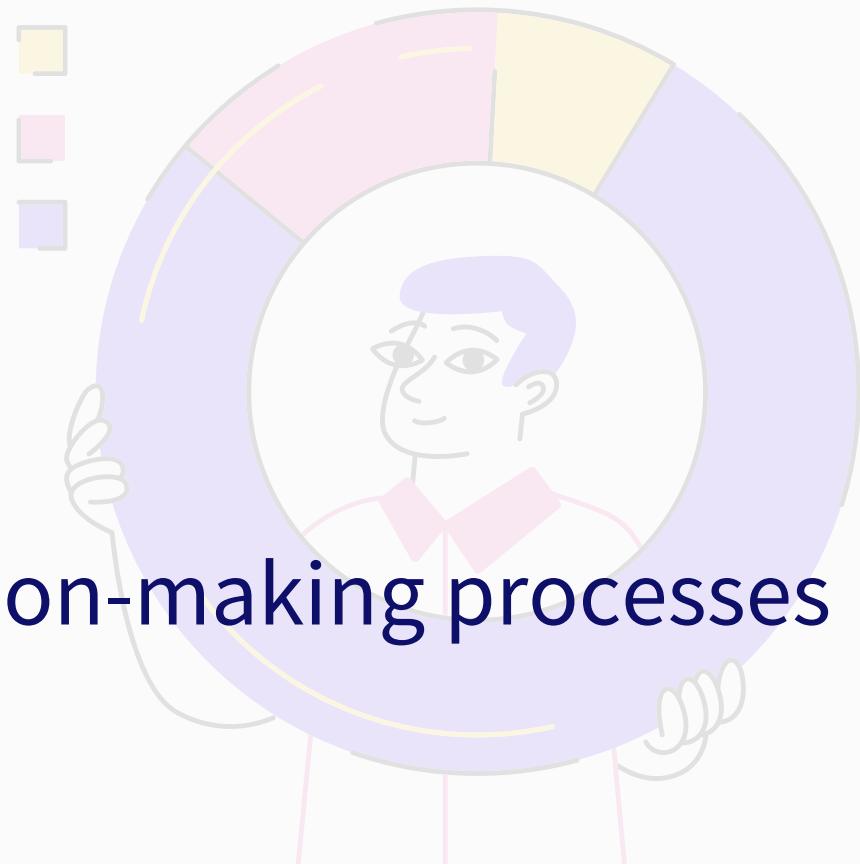
07 Discussion

Background

Companies' data is continuously expanding in **size, type, and speed**, along with the implementation of the process.

This data assists in

- realizing internal and external changes,
- facilitating scientific analysis, and
- making significant contributions to decision-making processes



Introduction

Business Analytics



Business Analytics (BA) can provide a company with broad and valuable insights to optimize decision-making by generating a deep understanding of business environments and customer behavior patterns.

BA uses various analytical tools, including *statistical techniques, data extraction, optimization tools, and simulation supported by a query and reporting mechanism* that facilitates decision-making for business leaders.



Introduction

Big Data

Big Data (BD) is essential in creating new business patterns such as accurate marketing and targeted service allocation, leading to economic growth.

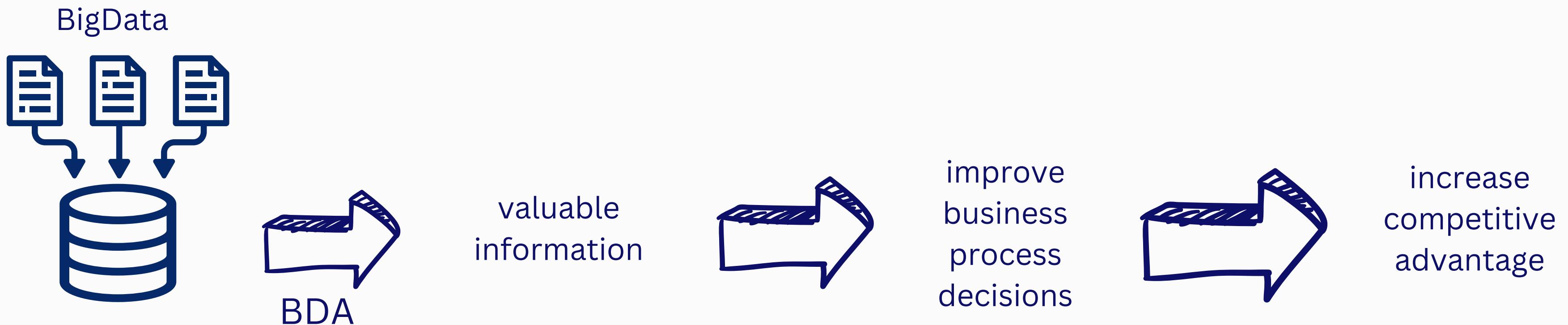
Big Data has **challenges** since its value does not lie in its variability or size, but rather in **how it is analyzed and utilized** to make better decisions.





Big Data Analytics

By combining two primary dimensions: **big data and business analytics**,
the term Big Data Analytics (BDA) has emerged.



Introduction

Determining the factors leading to an organization's competitive advantage is essential.

Therefore, this research proposal poses the following research questions:

RQ1

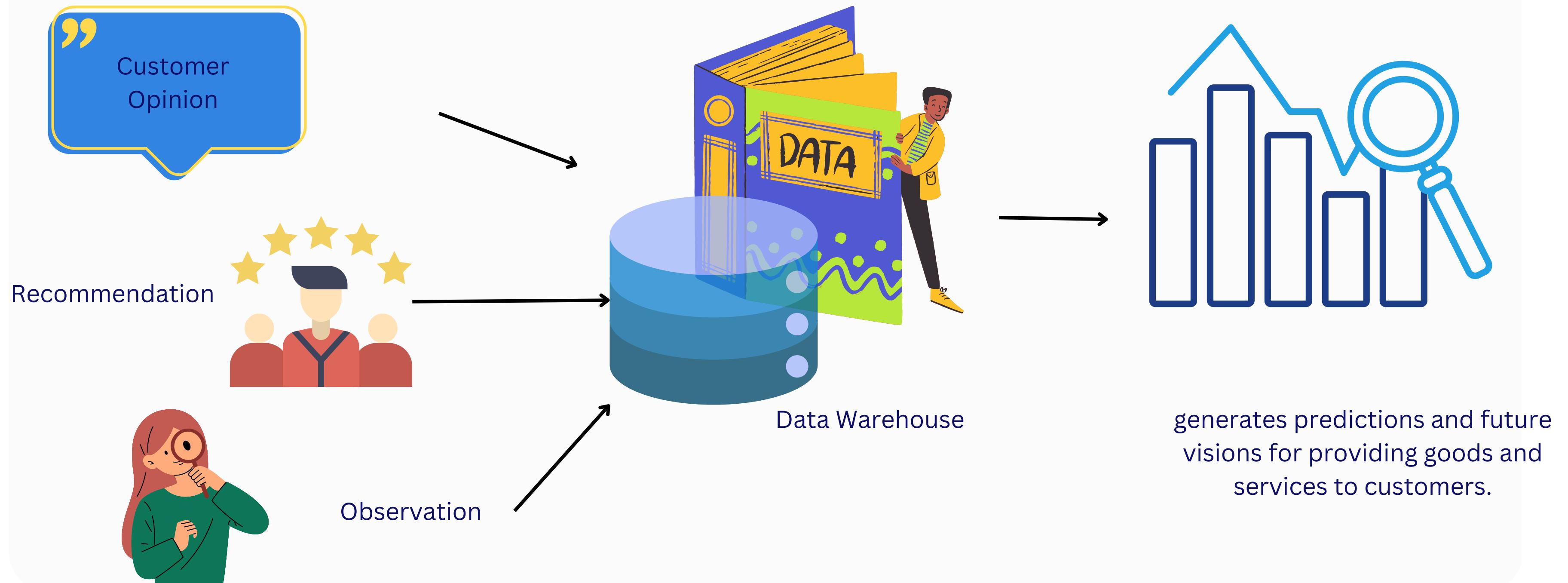
What role does BDA play in the strategy for creating competitive advantages in companies?

RQ2

What are the antecedents that condition competitive advantages through the use of BDA?

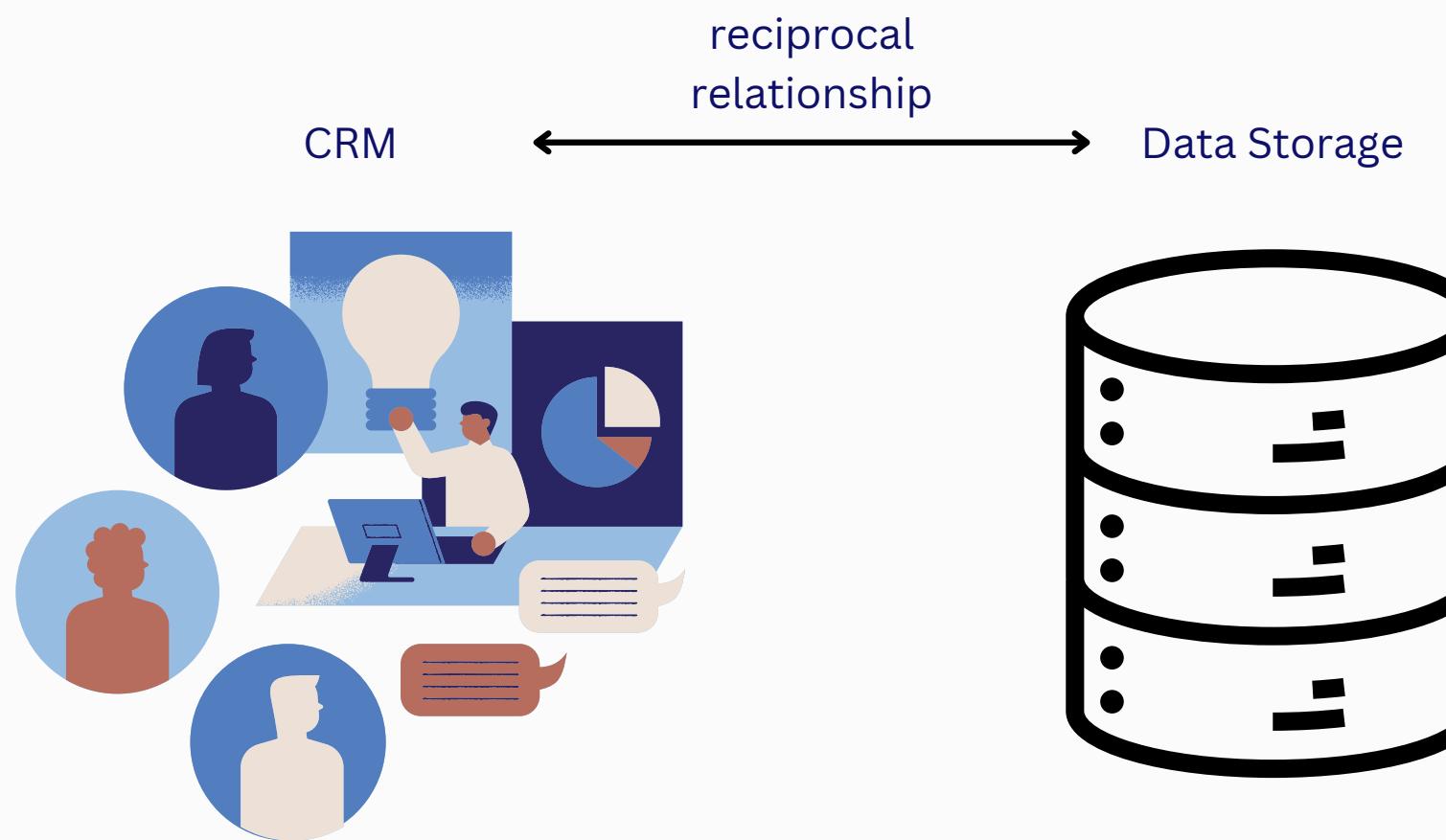
Roles of BDA

BDA is essential in promoting electronic worth of mouth (e-WOM).



Roles of BDA

BDA is essential for effectively managing electronic customer relationships, where companies can communicate with customers and understand their expectations better.



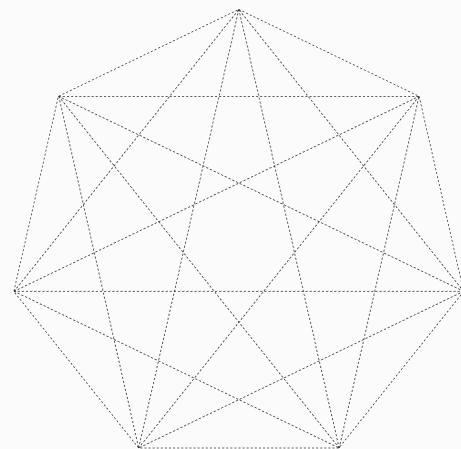
performance forecasts and insights into customer needs and market performance

Companies, especially telecommunications ones should provide high-quality electronic services

BDA reduces service-related problems and enables customized services for each customer

Roles of BDA

BDA is closely linked to social media, which serves as a significant source of data for companies' data warehouses.



Social media data is crucial for understanding customer preferences and behaviors, making it an essential pillar of e-WOM



Analyzing data from social media allows companies to shape creative automated **business patterns** and **gain a competitive advantage**.

Roles of BDA

01

BDA is considered a unique resource that enables companies to collect, process, and analyze extensive data, empowering them to **gain insights and make informed decisions.**

03

e-CRM systems provide to manage and analyze customer data, strengthening **customer relationships** and tailoring marketing efforts.

02

e-WOM is viewed as a source of valuable information generated by consumers, enhancing products or services, building customer trust, and **improving competitive advantage.**

04

social media serves as a channel for communication and interaction with customers.

market performance is a direct outcome of the effective utilization of these resources

electronic word of mouth (e-WOM)

- The rise of new communication channels has enabled electronic word-of-mouth (e-WOM) communication.
- Users trust online reviews more than traditional media when making purchasing decisions.
- **e-WOM** has become a crucial tool for companies **to gain a competitive edge by understanding their customers** better through Big Data Analytics (BDA).



Hypothesis

- By analyzing data from customer feedback and opinions, companies can better understand what consumers are saying about their products and services online, leading to enhanced offerings and **increased customer satisfaction**.
- BDA can also **uncover new information and unique patterns** that normal data analysis might miss, further **improving customer preferences and e-WOM**.
- BDA can effectively track and analyze e-WOM by identifying key opinion leaders, analyzing sentiment and the spread of e-WOM, and **developing targeted marketing strategies** that resonate with customers.
- BDA has the potential to positively impact e-WOM by providing companies with insights into consumer behavior and preferences.

Based on this evidence, the hypothesis is proposed that

H1. Big Data Analytics has a positive effect on electronic word of mouth.



electronic CRM (e-CRM)

- e-CRM empowers companies to engage with customers and improve satisfaction by collecting customer data and utilizing recent advancements in data repositories.
 - BDA technologies enable companies to analyze data on a larger scale, allowing for personalized services at a low cost. This capability **enhances the overall customer service experience.**
- e-CRM is considered critical for organizational market performance and customer satisfaction,
 - with BDA, it is playing a pivotal role in **understanding customer needs.**

Hypothesis

- **Improving Customer Retention and Satisfaction:** Businesses using BDA are more likely to improve customer retention and satisfaction compared to those that do not. BDA helps identify customer needs and preferences, improve customer segmentation and targeting strategies, and enhance customer service and support strategies.

Based on this evidence, the hypothesis is proposed that

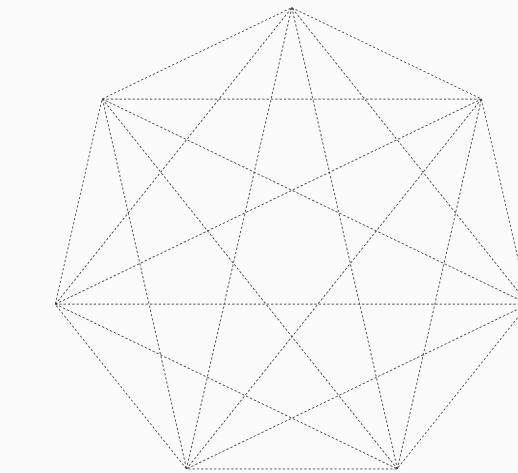
H2. Big Data Analytics has a positive effect on electronic customer relationship management.



Theoretical Framework

Social Media

- Social networks serve as platforms for people to share and consume information, resulting in a vast increase in data volume.
- Social media has become crucial for companies, providing valuable insights into customer behavior and preferences.



Hypothesis

- By analyzing social media data, BDA can help companies identify key influencers and target specific customer segments.
- Insights gained from social media analysis can improve marketing efforts and enable companies to promptly address customer complaints and concerns, enhancing customer satisfaction and loyalty.

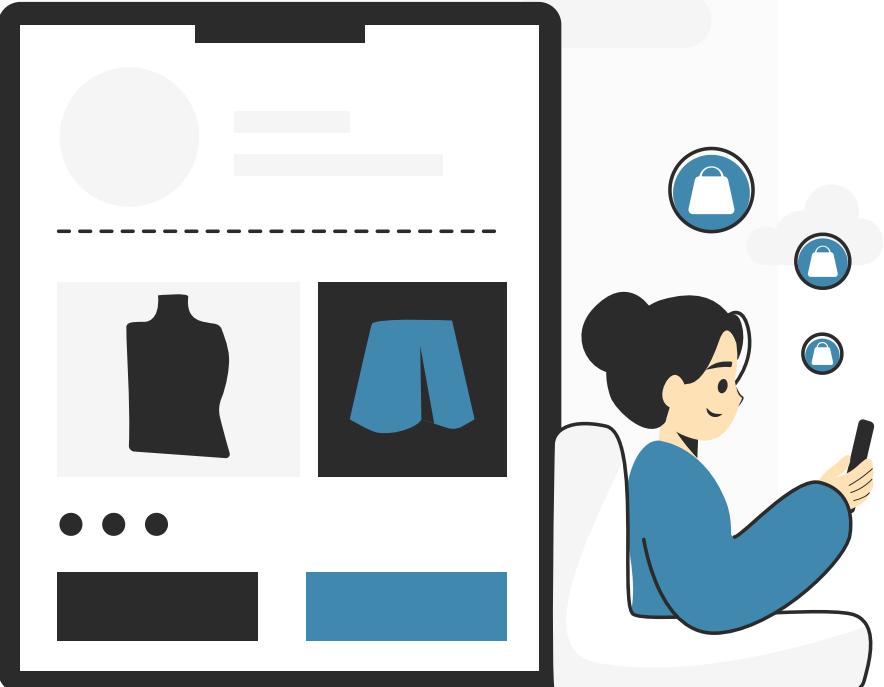
Based on the potential of BDA to improve social media marketing efforts and provide insights into customer behavior and preferences, the hypothesis is proposed that

H3. Big Data Analytics has a positive effect on social media.



e-WOM and market performance

- **Role of e-WOM:** Positive e-WOM is a crucial factor in marketing success, as it is closely related to increased customer satisfaction with products or services. Studies have shown a positive relationship between e-WOM and market achievements, with customer opinions influencing new market shares and sales volumes.
- **Impact on Market Performance in the Telecommunication Industry:** In the telecommunication industry, e-WOM plays a significant role in the consumer purchase process and overall market performance.



Hypothesis

Positive e-WOM can lead to increased sales, brand loyalty, and customer satisfaction, ultimately improving market performance for telecommunication companies.

Based on the evidence presented, the following hypothesis is proposed:

H4: Electronic word of mouth has a positive impact on market performance.



Theoretical Framework

eCRM and market performance

- **Building Strong Customer Relationships:** Companies that focus on building strong relationships with customers by developing organizational capabilities can improve their market performance. e-CRM, in particular, is highlighted as an effective strategy in this regard.
- **Increasing Customer Loyalty:** By engaging customers in operational activities while respecting individual privacy and building strategic relationships, a can increase customer loyalty, resulting in higher market share and improved market performance.

Hypothesis

Research findings indicate that e-CRM practices in telecommunication companies lead to higher customer satisfaction, loyalty, and retention, ultimately resulting in improved market performance, including increased market share and revenue growth.

Based on the evidence presented, the following hypothesis is proposed:

H5: Electronic Customer Relationship Management has a positive effect on market performance



Social media and market performance

- **Efficiency of Social Media:**

- With the rise of the global e-commerce sector, social media has become one of the most important areas for businesses and managers to focus on. Its application in marketing operations can boost a company's ability to penetrate new markets, thereby improving market performance.
- According to research, social media use is linked to higher market share, customer loyalty, brand awareness, and revenue growth. The use of social media has also been correlated with return on investment, stock price, and reputation building.

Hypothesis

- Social media platforms provide efficient ways for companies to engage with customers, share information, build trust, increase visibility, and attract potential customers. They are valuable tools for companies to communicate with stakeholders and gather valuable information from users expressing their opinions and intentions.

Based on the evidence presented, the following hypothesis is proposed:

H6: Social media has a positive impact on market performance.



Market performance and competitive advantage

- Market performance is crucial for creating unique competitive advantages by leading to improved sales, growth, and product development, thereby creating new opportunities in the markets.
- Companies with strong market performance are better positioned to generate higher revenues and profits, which can be reinvested in new technologies, improved customer service, and expansion into new markets.
- Additionally, strong market performance enhances a company's perception as an industry leader by customers, investors, and other stakeholders, leading to increased customer loyalty and trust.

Hypothesis

For the telecommunication industry, companies with strong market performance are better equipped to generate higher revenues and profits, attract and retain talented employees, and be perceived as industry leaders.

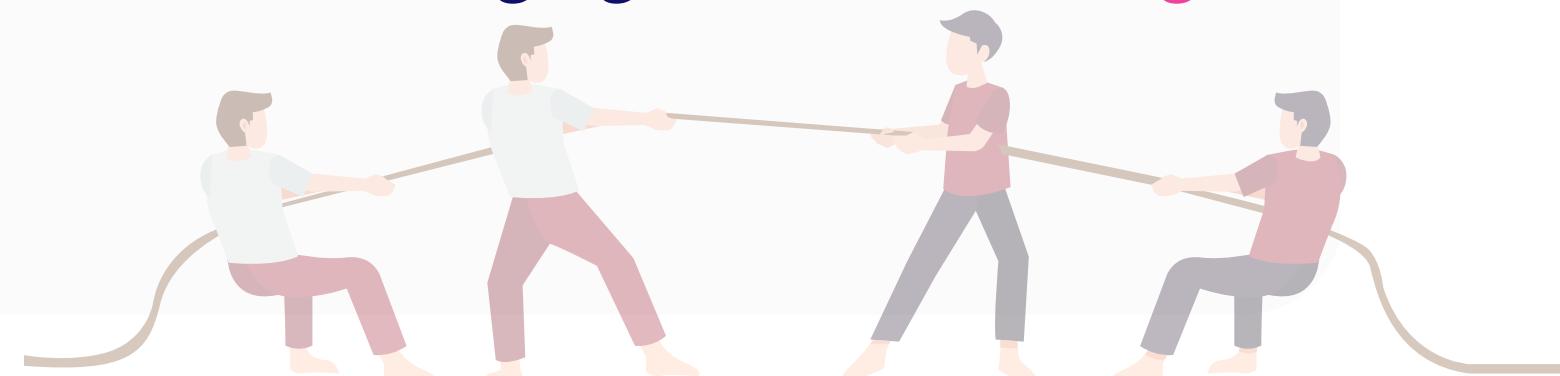
Based on the evidence presented, the following hypothesis is proposed:

H7: Market performance has a positive effect on competitive advantage.



Big data analytics and competitive advantage

- The use of BDA allows companies to make informed strategic decisions for market strategies, product development, and resource allocation. This results in more accurate and timely choices that positively impact market performance.
- Companies effectively utilizing BDA are better positioned to outperform their competitors. BDA enables them to identify market trends, understand customer preferences, and optimize their offerings, leading to a competitive advantage and improved market performance.
- BDA provides valuable insights into customer behaviors and preferences, allowing companies to tailor their products and services accordingly. This customization leads to increased customer satisfaction and loyalty, further enhancing market performance.
- BDA offers insights into customer behaviors, market dynamics, and emerging trends, enabling companies to adapt, innovate, and excel in the market.



Hypothesis

The impact of BDA on market performance is supported by practical applications and empirical evidence, highlighting its significance in modern business strategy and performance enhancement.

Based on the evidence presented, the following hypothesis is proposed:

H8: Big Data Analytics has a positive effect on competitive advantage.



Theoretical Framework

Mediating effect of e-CRM

- **Data Management:** e-CRM manages BDA-derived data effectively for strategic decision-making.
- **Personalization:** e-CRM uses BDA data for customer segmentation, enhancing satisfaction and retention.
- **Customer Retention:** Effective e-CRM boosts customer loyalty, leading to increased sales and brand promotion.
- **Informed Decision-Making:** e-CRM provides structured data analysis for strategic decisions, optimizing marketing strategies and resources.
- **Measurement and Tracking:** e-CRM tools monitor the impact of marketing strategies and customer retention efforts, allowing adjustments as needed.

Hypothesis

Based on the evidence presented, the following hypothesis is proposed:

H9: Hypothesis: Electronic Customer Relationship Management mediates the effect of Big Data Analytics on market performance .



Hypothesis

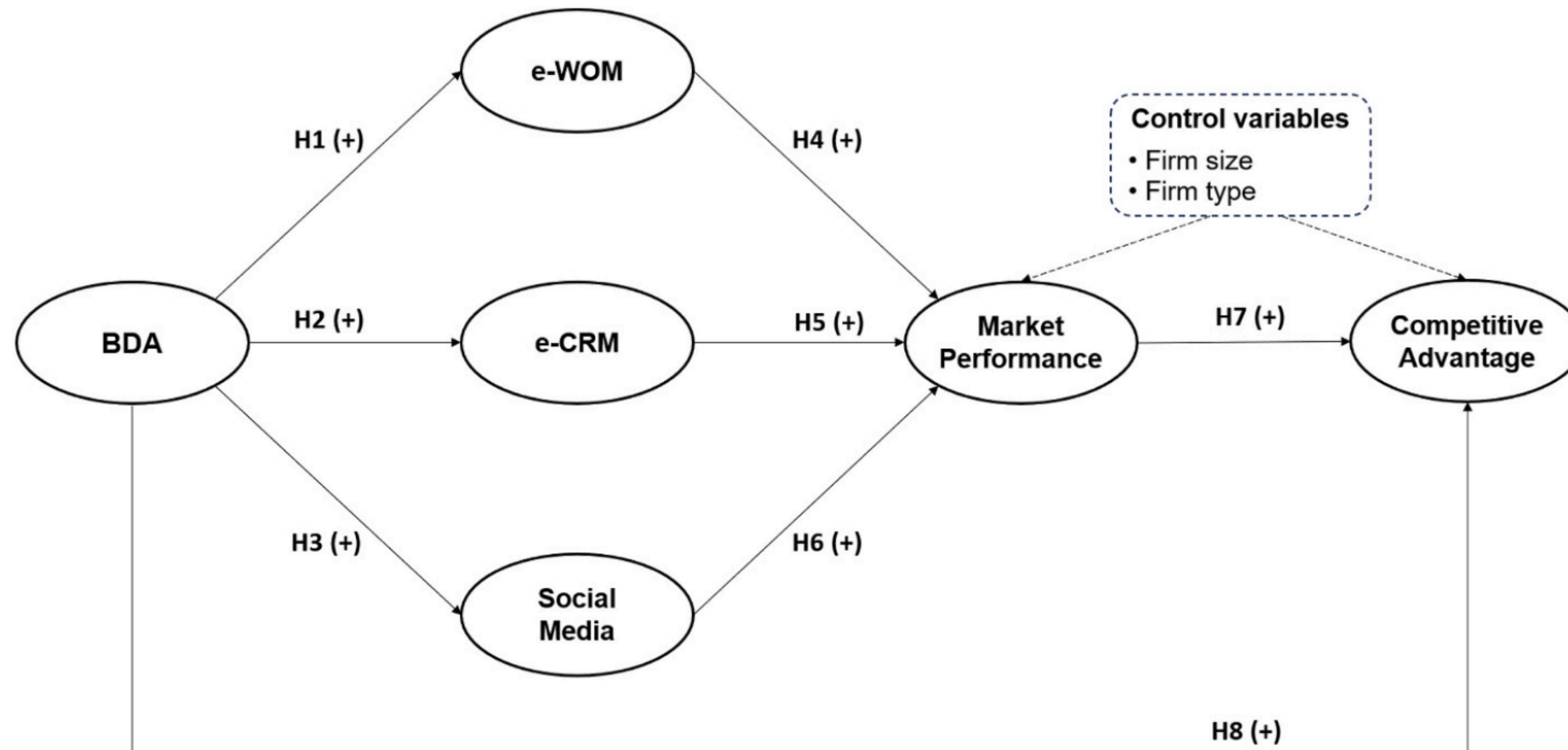
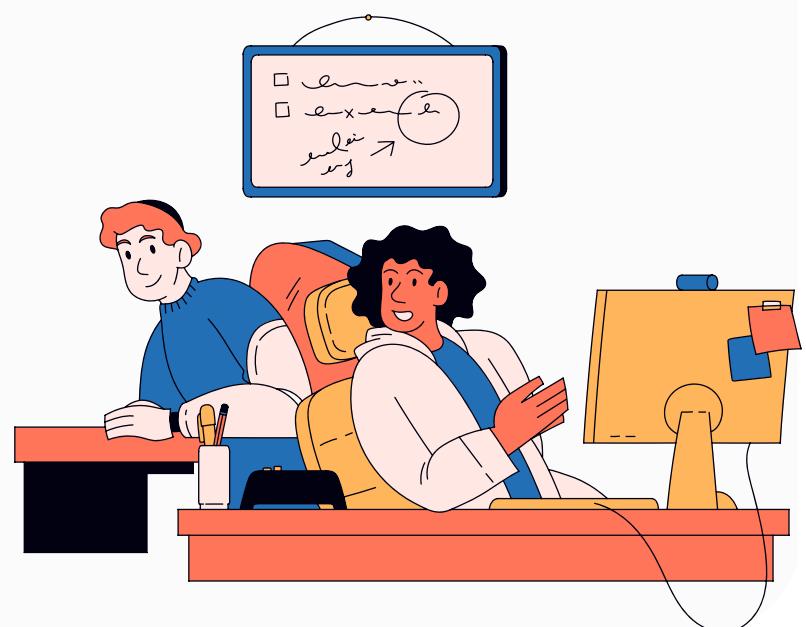


Fig. 1. Research model.

Hypothesis

This study also included **firm size and firm type as control variables** to mitigate influences from firms' characteristics.

- **Firm size** included three categories:
 - **small businesses**: companies with fewer than 50 employees
 - **medium-sized enterprises**: those with 50–250 employees
 - **large companies** have more than 250 employees.
- **Firm type** was a dummy variable coded as
 - **0** if the *level of technological innovation* in the firm was **low**, and
 - **1** if the *level of technological innovation* was **high**





Research Methodology

- Methodology Choice:
 - **A quantitative research approach was chosen** to collect and analyze primary data due to its ability to handle a large sample size effectively.
- Data Analysis Tools:
 - **structural equation modeling (SEM) using AMOS software** to analyze the relationships between different constructs.
 - **mediation analysis was conducted** using the PROCESS macro for SPSS.
- Statistical Analysis:
 - Coefficients and levels of statistical significance were calculated to examine the relationships between the constructs.
 - Bootstrapping, with 10,000 replications and a 95% confidence range, was used to determine the significance of indirect associations in the model.

Measurement Methodology

- Questionnaire Design:

The research instrument comprised two parts:

- gathering sample characteristics and
- measuring variables like Big Data Analytics, e-WOM, e-CRM, social media, market performance, and competitive advantage.
- A seven-point Likert scale was used, ranging from "strongly disagree" to "strongly agree".

- Scale Adaptation: Existing scales from reputable studies were adapted for each variable to ensure relevance and appropriateness. For example,

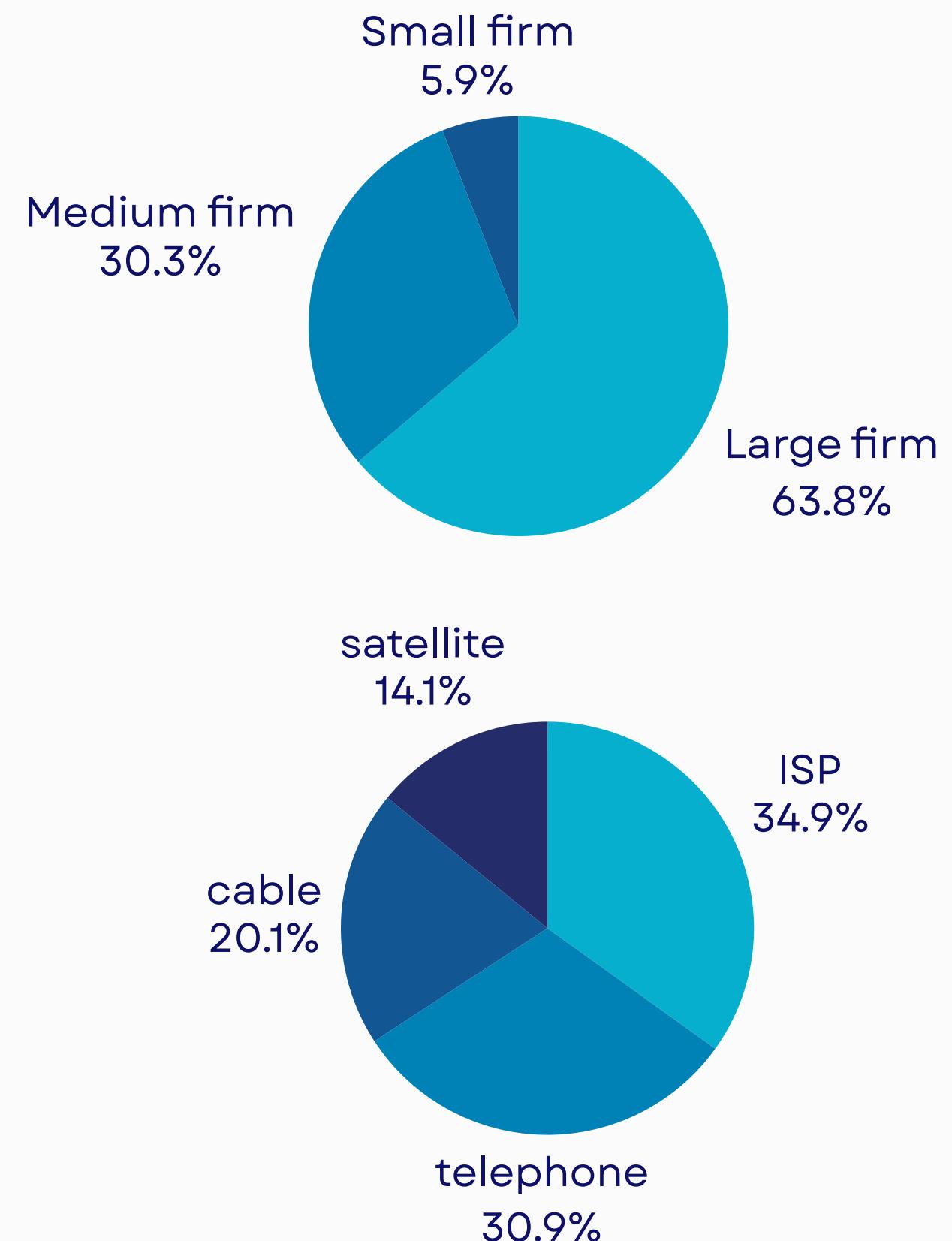
- items for Big Data Analytics were adapted from Al-Khatib and Shamim et al.,
- e-WOM from Sun et al. and Yoo et al.,
- e-CRM from Moreno and Melendez,
- Social Media from Pop et al.,
- Market Performance from Chowdhury and Quaddus and Olabode et al., and
- Competitive Advantage from Al-Khatib and Tu and Wu.

- Control Variables: Firm size and firm type were included as control variables

Data Collection

Data Collection:

- Cross-sectional data collection was conducted through an **online questionnaire** distributed **among managers and directors of Jordanian telecommunications firms**.
- Only managers were included, assuming their comprehensive understanding of business processes allows them to assess the impact of Big Data Analytics on competitive advantage effectively.
- A total of **304 completed surveys were obtained** from a pool of **384 Jordanian telecommunications companies**, resulting in a **response rate of 79.16%**.
- The sample included
 - a mix of large (63.8%), medium (30.3%), and small (5.9%) firms from various regions of the country,
 - with Internet service providers being the most prevalent (34.9%), followed by telephone operators (30.9%), cable companies (20.1%), and satellite companies (14.1%).



Measurement Assessment

Table 2
Discriminant validity.

	BDA	EWOM	ECRM	SM	MP	CA
BDA	0.914					
EWOM	0.553	0.856				
ECRM	0.675	0.769	0.858			
SM	0.729	0.489	0.604	0.845		
MP	0.835	0.525	0.608	0.707	0.894	
CA	0.825	0.555	0.714	0.730	0.735	0.848

- **One-Dimensionality Assessment:**

- Confirmatory Factor Analysis (CFA) was performed to assess one-dimensionality in all constructs.
- The CFA results, conducted with the maximum likelihood method using AMOS, demonstrated adequate validity. All confirmatory factor loadings exceeded 0.7 and were significant at a 0.001 level.

Measurement Assessment

	CR	AVE	alpha
BDA	0.938	0.836	0.938
EWOM	0.891	0.732	0.889
ECRM	0.893	0.736	0.894
SM	0.882	0.714	0.878
MP	0.922	0.798	0.917
CA	0.884	0.719	0.884

- **Internal Consistency Assessment:**

- Composite reliability (CR) and average variance extracted (AVE) were calculated to evaluate internal consistency.
- CR and AVE values exceeding 0.70 and 0.50, respectively, were considered satisfactory for exploratory studies. All values in the study met these criteria, ensuring adequate reliability.
- Cronbach's alpha values for each scale were also above 0.8, further supporting the reliability of the constructs.

Measurement Assessment

Table 2
Discriminant validity.

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- **Discriminant Validity Assessment:**
 - Discriminant validity was examined to ensure that each construct was distinct from its neighboring constructs.
 - This was assessed by evaluating the correlation matrix of latent constructs, where the diagonal elements represented the square roots of the average variance extracted (AVE).
 - Discriminant validity was achieved when the diagonal elements (square root of AVE) were greater than the off-diagonal elements in the same row and column.

Measurement Assessment

- **Bootstrapping Technique for Non-Normal Distribution:**
 - As the sample did not exhibit a multivariate normal distribution, bootstrapping was employed for 500 consecutive steps or samples at a significance level of 5%.
 - The Bollen-Stine's corrected p-value was utilized to test the null hypothesis that the model is correct.
- **Overall Model Fit Assessment:**
 - The model demonstrated a good overall fit, as indicated by various fit indices (GFI, NFI, TLI, CFI, AGFI, RMSEA) meeting the recommended thresholds.
 - (GFI =0.909; NFI = 0.949; TLI =0,965; CFI =0.973; AGFI =0.871; RMSEA =0.031)

Hypothesis Testing

Table 3
Hypothesized relationships.

Hypotheses	β	S.E.	C.R.	Result
H1: Big Data Analytics → e-WOM	0.598***	0.061	10.618	Supported
H2: Big Data Analytics → e-CRM	0.724***	0.058	13.094	Supported
H3: Big Data Analytics → Social media	0.792***	0.056	14.612	Supported
H4: e-WOM → Market performance	0.110*	0.057	2.144	Supported
H5: e-CRM → Market performance	0.215***	0.065	3.758	Supported
H6: Social media → Market performance	0.584***	0.074	9.235	Supported
H7: Market performance → Competitive advantage	0.177**	0.047	3.060	Supported
H8: Big Data Analytics → Competitive advantage	0.715***	0.064	10.952	Supported

Note: *** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$.

Hypothesis Testing

- Hypothesis 9: The BDA → e-CRM → Market Performance path was found positive and significant, confirming e-CRM as a mediator of the relationship between BDA and market performance ($\beta = 0.071$; confidence intervals [0.007, 0.139]).
- Control Variables: Firm size and firm type significantly affect both market performance and competitive advantage.
 - Firm size has a significant effect on
 - market performance ($\beta = 0.294$; $p \leq 0.001$) and
 - competitive advantage ($\beta = 0.131$; $p \leq 0.05$).
 - Firm type also has a significant effect on
 - market performance ($\beta = 0.527$; $p \leq 0.001$) and
 - competitive advantage ($\beta = 0.161$; $p \leq 0.01$).

Discussion

Theoretical Implication

research indicating the positive impact of Big Data Analytics (BDA) on various aspects such as consumer preferences, electronic word of mouth (e-WOM), and electronic customer relationship management (e-CRM).

there has a mediating role of e-CRM in the relationship between BDA and market performance

Practical Implications



Strategic Importance of BDA

- It emphasizes the need for these firms to invest in BDA capabilities to drive business success.

Operational Optimization

- BDA optimized the internal operations by identifying inefficiencies, allocating resources effectively, and improving processes.
- This leads to cost reductions and improved service quality, enhancing competitiveness.

Enhanced Customer Experience

- companies can personalize offerings and services, leading to increased customer satisfaction and long-term retention, essential for success in a competitive market.

Differentiation and Innovation

- offering innovative services tailored to customer needs. This helps them lead the market

Practical Implications



Data Quality Assurance

- data quality is crucial for informed decision-making
- must implement robust methods to ensure data integrity and accuracy, avoiding erroneous decisions based on unreliable information.

Overall Implications



Survival and Thriving in the Market

suggests that telecommunications companies can not only survive but thrive in a competitive environment by strategically leveraging BDA.

This requires continued investment in BDA capabilities to maintain and strengthen their position in the industry.

Continuous Improvement:

It is important to enhance BDA capabilities and adapt to evolving market dynamics

by emphasizing the need for continuous improvement and innovation in data analytics strategies.

Question and Answer...

Q

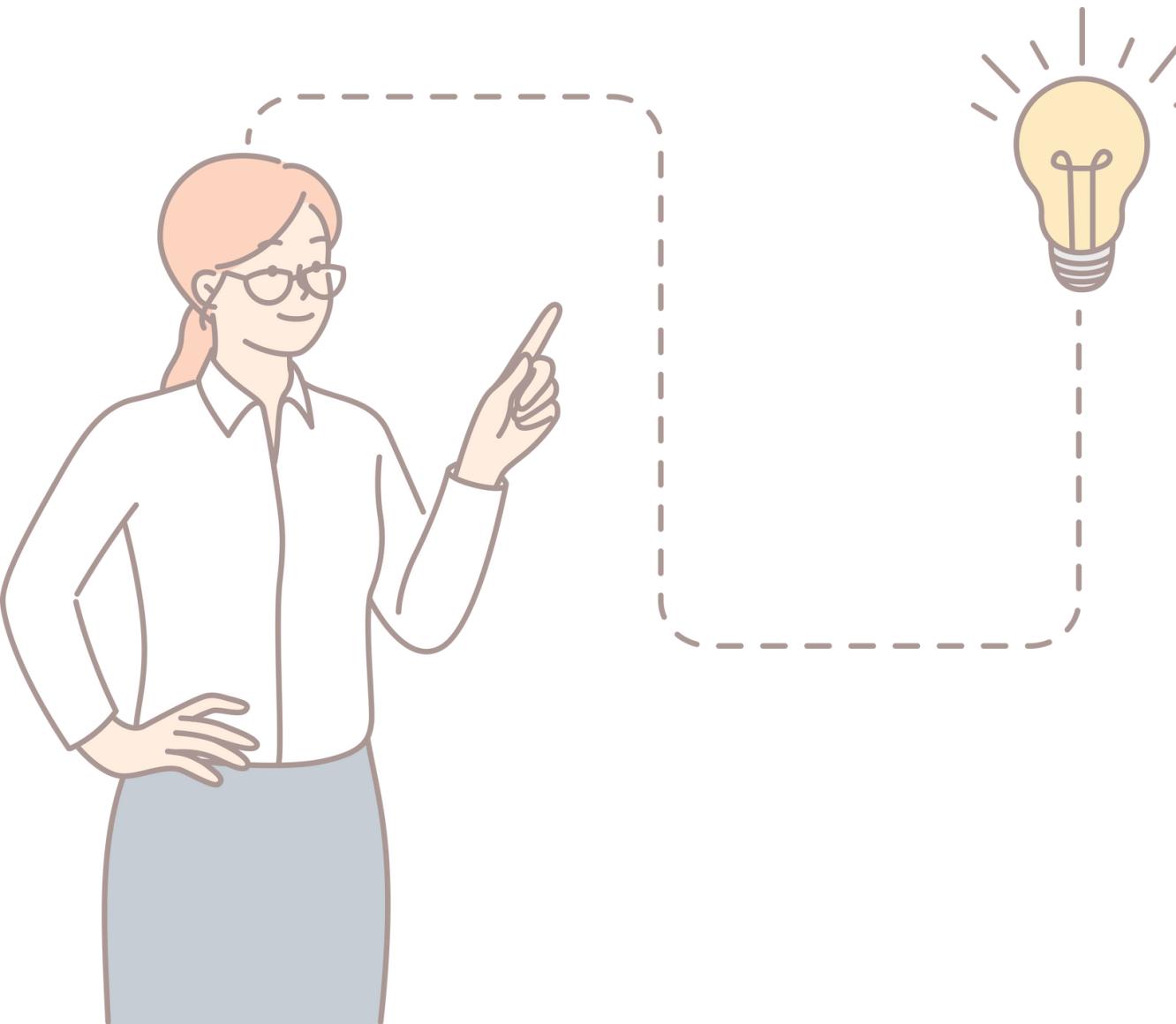
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PICK A POINT

discussed electronic word of mouth (e-WOM) as a significant driver of market performance and competitive advantage in the telecommunications industry...

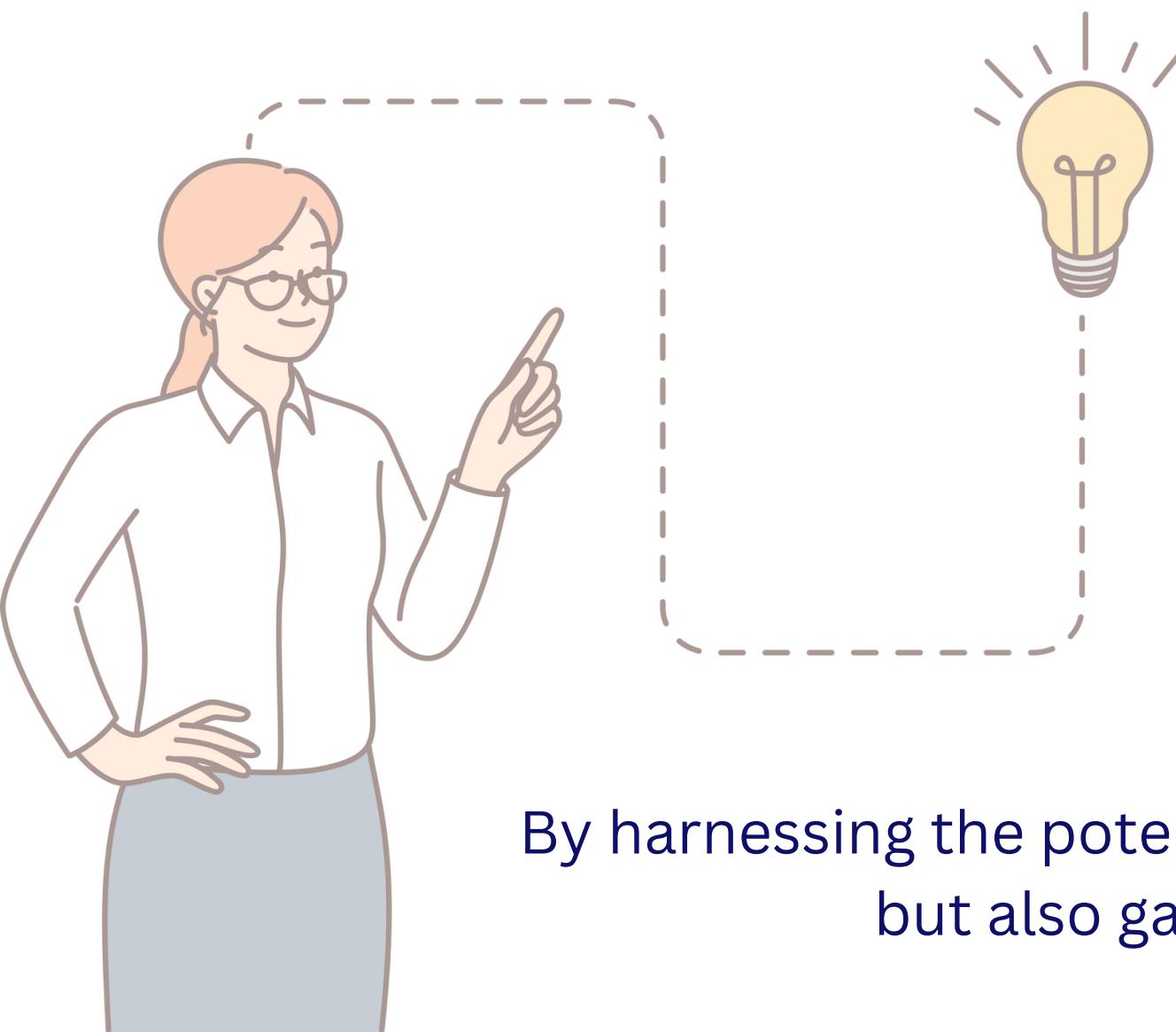
how telecommunications companies can leverage e-WOM effectively ?



PICK A POINT

discussed electronic word of mouth (e-WOM) as a significant driver of market performance and competitive advantage in the telecommunications industry...

how telecommunications companies can leverage e-WOM effectively ?



- **by monitoring online conversations,**
- **engaging with customers on social media platforms,**
- **encouraging positive word of mouth through exceptional service experiences**

By harnessing the potential of e-WOM, companies can not only enhance their market performance but also gain a competitive advantage in an increasingly digital landscape

Thank
you

