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The Effect of Marketing Intelligence (MI) Adoption on Enhancing Profitability Indicators of Banks Adopting MI and Listed in the Egyptian Stock Exchange

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Abstract

The purpose of this study is to examine the effect of marketing intelligence (MI) adoption on enhancing the profitability indicators of banks adopting MI and listed in the Egyptian stock exchange. A statistical analysis was carried out based on data collected, using a questionnaire instrument to measure the efficiency of adopting MI among 12 central banks adopting MI and listed in the Egyptian stock exchange. The study focuses on using 2 measures of profitability indicators; return on equity (ROE) and return on assets (ROA).The profitability indicators (ROE, ROA) of 12 central banks adopting MI and listed in the Egyptian stock exchange were measured during the period (2012–2021),in which ROE and ROA for a five-year period before the adoption of MI (2012-2016) were compared with their equivalent for a five-year period after the adoption of MI (2017-2021) in each of those 12 banks. Hence, the effect of MI adoption on the profitability indicators of those 12 banks can be observed. Statistical analysis was conducted based on data

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collected using the simple linear regression model. The results of the study indicated a significant effect of MI adoption on enhancing the profitability indicators of 12 banks adopting MI and listed in the Egyptian stock exchange.

Keywords: Marketing intelligence (MI), profitability indicators, return on equity (ROE), return on assets (ROA), Egyptian Stock Exchange.

تأثير تبني الذكاء الاصطناعي التسويقي علي تحسين مؤشرات الربحية للبنوك المتبنية للذكاء الاصطناعي التسويقي و المسجلة في البورصة المصرية

ملخص البحث

يهدف البحث إلى اختبار مدي تأثير الذكاء الاصطناعي التسويقي علي تحسين مؤشرات الربحية للبنوك المطبقة للذكاء الاصطناعي التسويقي و المسجلة في البورصة المصرية. طبقاً لذلك، اعتمد البحث على أسلوب الدراسة الميدانية و تم تحليل البيانات الاحصائية التي تم جمعها باستخدام قائمة الاستقصاء لقياس المتغير المستقل وهو الذكاء الاصطناعي التسويقي. تم توجيه استمارة الاستقصاء إلى اثني عشر بنكا رئيسيا متبنيا للذكاء الاصطناعي التسويقي و مسجلين في البورصة المصرية و ذلك لقياس مدي التبني الكفء للذكاء الاصطناعي التسويقي فيما بين تلك البنوك . تم قياس المتغير التابع و هو مؤشرات الربحية للبنوك من خلال استخدام مقياسين كمؤشرين للربحية ، احدهما هو العائد علي الملكية و الاخر هو العائد علي الأصول. تم قياس هذة العوائد لاثني عشر بنكا رئيسيا متبنيا للذكاء الاصطناعي التسويقي و مسجلين في البورصة المصرية خلال الفترة (٢٠١٢- ٢٠٢١). بعد ذلك تمت المقارنة بين عوائد تلك البنوك خلال فترتين و هما خمسة سنوات ما قبل تبني الذكاء الاصطناعي التسويقي (٢٠١٢- ٢٠١٦) و خمسة سنوات اخري ما بعد تبني الذكاء الاصطناعي التسويقي (٢٠١٧- ٢٠٢١). و من ثم يمكن ملاحظة مدي تأثير تبني الذكاء الاصطناعي التسويقي علي تحسين مؤشرات الربحية لهذة البنوك. تم تحليل هذه البيانات باستخدام أسلوب الانحدار البسيط لاختبار

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فروض البحث، و توصلت النتائج النهائية الي أنه يوجد تأثير معنوي للذكاء الاصطناعي التسويقي علي تحسين مؤشرات الربحية لتلك الاثني عشر بنكا المتبني للذكاء الاصطناعي التسويقي و المسجلين في سوق البورصة المصرية.

مفاتيح الكلمات الذكاء الاصطناعي التسويقي، مؤشرات الربحية، العائد علي الملكية، العئد علي الأصول، سوق البورصة المصرية..

1. Introduction

The Egyptian banking sector is one of the huge service sectors that contribute to Egypt's economic growth, creating around a third of the whole nation's annual GDP. However, this sector operates in a fast changing environment characterized with highly competitive market. Moreover, the competitive pressure intensively increased due to the penetration of foreign and private banks to the Egyptian market. (Haripriya, 2020, p. 71; Kamu and Njuguna, 2020, p. 21; Al-Weshah, 2017, p. 5; Jeyarani and Thangaraja, 2016, p. 756).

Intensifying competition forced banks operating in Egypt to offer more technologically – based services in order to better serve their customers including automated teller machines (ATMs), plastic cards, mobile banking, internet banking, and electronic fund system. (Haripriya, 2020, p. 71; Vishnoi and Bagga, 2020, p. 5, Ismaeel and Alzubi, 2020, p. 2, Al-Hashem, 2020, p. 688; Moghaddam et al., 2014, p. 84). Therefore, the banks operating in Egypt are required to adapt to that highly competitive market and respond to these rapid changes in the marketplace.

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In the light of severe competition between banks operating in the Egyptian market, the adoption of MI within banks was absolutely necessary, in order to be able to respond to the market pressures and compete with larger banks in the marketplace. That's why; the vast majority of banks operating in Egypt have adopted MI. This study focuses on 12 central banks adopting MI and listed in the Egyptian stock exchange. MI adoption was the key to success for those 12 banks listed in the Egyptian stock exchange, in terms of managing their marketing activities, as well as analyzing large amount of marketing information gathered about their customers, competitors, and marketing environment. (Azeez, 2020, p. 535; Vishnoi et al., 2019, p. 1). MI helped those 12 banks to predict their customers' needs and interests, know their competitors, and analyze the internal and external marketing environment to determine their strengths, weaknesses, opportunities, and threats; referred to SWOT analysis. (Azeez, 2020, p. 538; Noviyanti et al, 2020, p. 1236).

Furthermore, financial analysis is an essential tool used by banks' management to gain a break through in the financial situation of those 12 banks listed in the Egyptian stock exchange and make decisions related to their business. (Perisa et al, 2017, p. 233). Financial analysis allows banks' management to analyze and interpret their financial data which provides them with a deep understanding on their banks' financial situation and helps them to evaluate their banks' performance. (San and Heng, 2013, p.

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651). Financial analysis involves calculating financial ratios. That's why; it is often called ratio analysis. (Lipunga, 2014, p. 43). There are many financial ratios that can be used to assess the bank profitability performance. This study uses two main financial ratios as measures to profitability indicators of those 12 banks adopting MI and listed in the Egyptian stock exchange; which are return on equity (ROE) and return on assets (ROA).

2. Literature Review

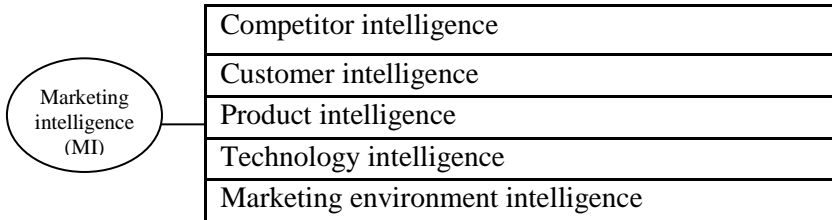### 2.1 Definition of marketing intelligence (MI)

There are many definitions of MI, among of them include: "Marketing intelligence is the process of collecting daily information about important developments in the marketing environment that help managers to set, adjust, and update marketing plans". (Haripriya, 2020, p. 73; Rao, 2020, p. 126; Ade et al., 2017, p. 55, Al-Weshah, 2017, p. 3; Igbaekemen, 2014, p. 24; Moghaddam et al., 2014, p. 83). Inha and Bohlin (2018); Jeyarani and Thangaraja (2016) added that "marketing intelligence is the continuous and systematic collection and analysis of everyday information about any changes occurring in the company's marketing environment including competitors, technology, consumers' needs, preferences; attitudes, or buying behavior for the purpose of helping managers to better understand what is happening in the market and the available market opportunities. This in turn will help managers to make effective and accurate decisions". Moreover, Kamau and

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Njuguna (2020); Kant (2020) defined MI as "a system which can be viewed as a continuing and interacting structure of people, equipment, and procedures that are responsible for gathering, sorting, analyzing, and distributing pertinent, timely, and accurate information that help decision makers to improve their marketing planning, implementation and control". Furthermore, Vishnoi et al. (2019) stated that "marketing intelligence refers to the information, primarily quantitative in nature, that organizations gather through direct interaction and dialogue with market participants including customers, competitors, suppliers, sales force, social media, blogs, internet, or any combination of these in order to produce actionable insights for decision makers".

In addition to Vishnoi and Bagga (2020); Noviyanti et al. (2020); Lekhanya (2014) who defined MI as "a proactive mechanism used to scan, monitor, analyze, and evaluate marketing information gathered from all accessible points (internal and external marketing environment, marketing research, and market developments) in order to counteract on competitors' actions and prevailing market conditions for improving the company's competitive advantage and overall performance through enhanced and intelligent decision making".

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2.2 Main variables of MI adoption

According to Azeez (2020);Vishnoi et al. (2019); Faryabi et al. (2013); there are 5 main dimensions or variables that constitute the adoption of MI. These 5 variables are illustrated in the following figure.

Marketing intelligence (MI)	Competitor intelligence
	Customer intelligence
	Product intelligence
	Technology intelligence
	Marketing environment intelligence

Source: Vishnoi et al. (2019), p. 557.

- **Competitor intelligence:** is the process of collecting and analyzing information about competitors, their trends, strategies, and future plans. This helps an organization to form a clear picture of the competitive environment where it works in, as well as helps it to build comprehensive competitive profiles. Competitor intelligence is based on the ethical gathering of different types of information including government records that are openly available. (Haripriya, 2020, p. 72; Maria et al., 2020, p. 4; Rao, 2020, p. 131; Vishnoi and Bagga, 2020, p. 1; Al-Hashem, 2020, p. 689; Noviyanti et al., 2020, p. 1236; Kumar, 2020, p. 88).

- **Customer intelligence:** is the process of gathering and analyzing information about customers' buying behavior,

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intentions, preferences, motivations, concerns, beliefs, and perceptions. This helps an organization to create customers' profiles. As a result, an organization will be able to produce the products that satisfy customers' needs, as well as meet their expectations. (Maria et al., 2020, p. 4; Rao, 2020, p. 131; Carson et al., 2020, p. 797; Al-Hashem, 2020, p. 689; Noviyanti et al., 2020, p. 1236; Al-Weshah, 2017, p. 4; Al-Zoubi, 2016, p. 27; Lymperopoulos and chaniotakis, 2005, p. 485).

 - **Product intelligence:** is the process of collecting and analyzing information about an organization's products as well as about those of competitors. This provides an organization's management team with deep insights about product development and innovation activities. Product intelligence enables an organization to make individual product decisions including decisions about product attributes such as product quality, price, design, features, labeling, packaging, as well as after – sale services. (Shailza et al., 2020, p. 132;Kumar, 2020, p. 88; Kant, 2020, p. 117; Inha and Bohlin, 2018, p. 6; Ade et al., 2017, p. 56; Igbaekemen, 2014, p. 27; Ozturk et al., 2012, p. 231).

- **Technology intelligence:** is the process of identifying and analyzing the technological opportunities and threats that may affect an organization's development. This helps an organization to understand what is going on in the surrounding world of technology, and adopt the technologies that help an organization to gain the most competitive advantage. The good technology

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intelligence provides an organization with a solid knowledge and support for planning and creating its own innovation path. (Shailza, 2020, p. 132; Kamau and Njugunga, 2020, p. 22; Ismaeel and Alzubi, 2020, p. 7; Inha and Bohlin, 2018, p. 6; Faryabi et al., 2013, p. 35, Ozturk et al., 2012, p. 331).

- **Marketing environment intelligence:** MI goes beyond gathering information related to competitors and customers. It extends to gather information about the external marketing environment of an organization. The marketing environment intelligence aims at identifying the opportunities as well as the threats an organization faces in the external marketing environment. MI works to take advantage of the available opportunities and overcome the threats as well as try to turn them into investment opportunities. Due to global competition and the complexity of surrounding environment, it became difficult to predict the events surrounding the organization. MI reduces the environmental uncertainty through continuous monitoring of events that help to receive signals about any changes in the environment. This in turn leads to excellence and competitive advantage. (Ismaeel and Alzubi, 2020, p. 1 ; Kamau and Njuguna, 2020, p. 22; Vishnoi et al., 2019, p. 556; Inha and Bohlin, 2018, p. 6; Igbaekemen, 2014, p. 27; Faryabi, 2013, p. 35; Ozturk et al., 2012, p. 231).

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2.3 Importance of MI adoption

The significant importance of adopting marketing intelligence within any organization stems from its crucial role in performing the following functions: MI gathers daily information on all developments in the marketing environment which help managers to design and modify marketing plans. (Haripriya, 2020, p. 73; Kumar, 2020, p. 86; Vishnoi and Bagga, 2020, p. 1; Rao, 2020, p. 129; Al-Weshah, 2017, p. 2; Moghaddam et al. 2014, p. 83; Ozturk, 2012, p. 229; Ubiparipovic and Durkovic, 2011, p. 25). MI is an important tool for gathering relevant information that help marketing managers to improve decision making under different conditions including certainty, uncertainty, and risk. (Al-Hashem, 2020, p. 690; Al-Weshah, 2017, p. 1006; Igbaekemen, 2014, p. 27; Ozturk, 2012, p. 229; Ubiparipovic and Durkovic, 2011, p. 25). MI is a future – oriented activity that helps managers in predicting and planning for the future reactions of competitors. This enables managers to overcome threats and avoid risks of competitors early, as well as exploit available opportunities in the marketplace. (Azeez, 2020, p. 535; Noviyanti, 2020, p. 1235; Inha, 2018, p. 14; Ade et al., 2017, p. 57; Ozturk et al., 2012, p. 228). MI helps to reduce the astonishments and the employees' inability against environmental changes, as well as minimizes the company's exposure to environmental risks and danger. (Al-Weshah, 2017; p. 2; Ade et al., 2013, p. 34). MI helps marketing managers to

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identify the organization's target market, and provides insights about both current and potential customers who are predisposed to buy the organization's products/services. This will guide organizations in directing their marketing activities to the right target market. Moreover, MI helps to analyze consumer buying behavior. Thus, an organization can produce the products that only satisfy and meet consumers' needs and wants. (Carson et al., 2020, p. 797; Maria et al., 2020, p. 4; Ade et al., 2017, p. 60; Lekhanya, 2014, p. 1005). MI helps marketing managers to create long-term relationships with customers, manage customer relationships, which results in increasing customers' satisfaction, loyalty, retention, and positive word of mouth. (Carson et al., 2020, p. 797; Vishnoi et al., 2019, p. 557; Faryabi et al., 2013, p. 36). Efficient adoption of MI is vital in shaping an organization's competitive advantage. MI helps an organization to compete with other organizations, by providing it with relevant information about its competitors. This helps an organization to expect it competitors' reactions and be able to plan for the next strategic moves. (Carson et al., 2020, p. 797; Maria et al., 2020, p. 4; Noviyanti et al., 2020, p. 1236; Haripriya, 2020, p. 72; Raw, 2020, p. 126; vishnoi and Bagga, 2020, p. 5; Inha and Bohlin, 2018, p. 1; Igbaekemen, 2014, p. 27). MI contributes to improving an organizations performance due to its effect on increased sales, maximized profitability, and enhanced market share. (Ismaeel and Alzubi, 2020, p. 2; Kamau and Njuguna,

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2020, p. 23; Ozturk, 2012, p. 228; Nadeem and Jaffri, 2005, p. 2). MI plays an important role in encouraging innovation and creativity. The emergence of creative ideas from using MI helps an organization to produce new products and enter new markets. This results in improving an organization's competitive position. Thereby, it can survive and grow in competitive markets today. (Al-Hashem, 2020, p. 690; Carson et al., 2020, p. 797; Maria et al., 2020, p. 1, Noviyanti et al., 2020, p. 1240; Vishnoi and Bagga, 2020, p. 5; Al-Weshah, 2017, p. 2, Al-Zoubi, 2016, p. 26; Moghaddam et al., 2014, p. 87). MI helps an organization to analyze the marketing environment. This in turn enables marketing managers to identify the organization's strengths, weaknesses, opportunities, and threats (SWOT analysis). Also, MI helps in formulating the market penetration strategy, as well as market segmentation and market development strategies. (Maria et al., 2020, p. 1; Vishnoi and Bagga, 2020, p. 5; Ade et al., 2017, p. 52; Igbaekemen, 2014, p. 27; Ozturk et al., 2012, p. 228).

2.4 Requirements of MI adoption

The main requirements for adopting MI within any organization, include: Top management commitment and support. Al-Weshah (2017) and Lymperopoulos (2005) stated that adopting marketing intelligence requires top management commitment, support, and belief in the importance of adopting such system within banks. (Al-Weshah, 2017, p. 2; Lymperopoulos, 2005, p. 487; Nadeem and Jaffri, 2005, p. 2).

Using the latest up – to – date information technology is considered as the cornerstone and backbone of adopting marketing intelligence within banks. This enables top management as well as all managers to exchange the information required to serve customers, implement marketing plans, and improve decision making. (Maria et al., 2020, p. 3; Al-Hashem, 2020, p. 690; Al-Weshah, 2017, p. 4; Moghaddam et al, 2014, p. 1006; Ozturk, 2012, p. 229). Strong financial position. MI is a long-term investment which is very costly. This requires sufficient financial resources and enough funds to be able to finance such system within a bank. (Haripriya, 2020, p. 73; Kumar, 2020, p. 86; Vishnoi and Bagga, 2020, p. 1; Rao, 2020, p. 83; Ozturk, 2012, p. 229). Effective training programs. Maria, et al (2020); Al-Weshah (2017); Ade, et al. (2017) emphasized that adopting MI requires conducting effective training programs for all bank members including IT staff, on a regular basis. Trained professionals and experts will help them to acquire the adequate knowledge, skills, and abilities required to use MI efficiently. Reward systems. Top management should set incentives and reward systems in order to motivate and encourage the talented members for their efforts and outstanding performance. (Vishoi and Bagga, 2020, p. 5; Maria et al., 2020, p. 3, Kumar, 2020, p. 87; Ade et al., 2017, p. 55; Al-Weshah, 2017, p. 10). Effective team works. Adopting MI requires encouraging team work spirit, through building cross-functional

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teams that are skilled, experienced, competent, and credible enough to be able to use such system efficiently. Vishnoi and Bagga (2020); Maria et al. (2020); Kumar (2020); Al-Weshah (2017) added that all bank members should work in a friendly, cooperative, and synergetic manner, to be able to synthesis, analyze, and share MI information across the bank.

2.5 Bank profitability indicators

The banking sector is the most important segment of a country's financial system. Banks act as financial intermediaries that provide different financial services. (San and Heng, 2013, p. 649). Moreover, Banks play a crucial role in the economic resource allocation of countries by channeling funds from depositors to investors continuously. They offer all important services including providing deposits and loan facilities for personal and corporate customers, making credit and liquidity available under different market conditions, and providing access to the nation's payment systems. (Lipunga, 2014, p. 41). San and Heng (2013) added that the health of the nation's economy is closely and positively related to the soundness of its banking system. A highly developed banking sector plays an important role in promoting the whole country's economic growth. Nuhiu et al. (2017) confirmed that the financial performance of banks has significant impact on a country's economic growth. Good financial performance of banks reward the shareholders for their investment and stimulates additional investment which will bring

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further economic growth. On the other hand, poor performance of banks may lead to their failure and the appearance of financial crisis which will have negative consequences on economic growth. (Massadeh et al., 2021, p. 67; Nuhiu et al., 2017, p. 161; Jolevski, 2015, p. 6). The soundness of the banks depends greatly on their financial performance which indicates into either the strength or the weakness of a particular bank. Financial performance is evaluated by the bank profitability. (Asqar, 2022, p. 141; Al-Taei and Al-Shakarchi, 2022, p. 69; Massadeh et al., 2021, p. 68; Perisa et al., p. 231; Nuhiu t al., 2017, p. 161; Hossain and Ahamed, 2015, p. 44; Lipunga, 2014, p. 41; Erina and Lace, 2013, p. 2; Akbas, 2012, p. 104).

Since healthy and sustainable profitability is one of the essential conditions for maintaining the stability of banking system, this study focuses on bank profitability indicators among the different performance measures of the banks which can be analyzed. (Akbas, 2012, p. 104). Bank profitability refers to the efficiency of a bank in generating earnings. (Lipunga, 2014, p. 41). Profitability is defined as the net income after tax or net earnings of a bank. Profitability of banks contributes to the economic development of the entire nation by providing additional employment and tax revenues to the government. Moreover, profitability contributes to the income of investors by having a higher dividend, and thereby improve the standard of living of the people (Asqar, 2022, p. 141; Al-Taei and Al-

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Shakarchi, 2022, p. 69; Perisa et al., 2017, p. 231; Nuhiu et al., 2017, p. 161; Hossain and Ahamed, 2015, p. 44; Lipunga, 2014, p. 41; Erina and Lace, 2013, p. 2; Akbas, 2012, p. 104).

A number of previous studies argued that there are various ways to measure the bank profitability. They added that financial ratios are found to be the most generally used methods. Financial ratios help bank management to analyze and interpret the bank's financial data and accounting information, which in turn provides managers a deep understanding of a bank's financial situation and helps to evaluate a bank's performance. (Asqar, 2022, p. 142; Al-Taei and Al-Shakarchi, 2022, p. 72; Hossain and Ahamed, 2015, p. 43; San and Heng, 2013, p. 651). There are many financial ratios that can be used to assess the bank profitability performance. This study as well as previous studies focuses on using two measures of profitability indicators: return on equity (ROE) and return on assets (ROA). ROE and ROA are the most common used measures of bank profitability indicators. (Asqar, 2022, p. 141; Al Taei and Al-Shakarchi, 2022, p. 69; Hakudawal, 2021, p. 123; Al Harbi, 2019, p. 15; Perisa et al., 2017, p. 161; Hossain and Ahamed, 2015, p. 144; Lipunga, 2014, p. 41; Erina and Lace, 2013, p. 2; Akbas, 2012, p. 104).

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3. Research design and methodology

3.1 Research problem

In the light of the pilot study and previous studies, the research problem can be specified as follows:

What is the effect of MI adoption on enhancing the profitability indicators of banks adopting MI and listed in the Egyptian stock exchange?

Accordingly, two research questions are addressed; as follows:

1. What is the effect of MI adoption on enhancing ROE of banks adopting MI and listed in the Egyptian stock exchange?

2. What is the effect of MI adoption on enhancing ROA of banks adopting MI and listed in the Egyptian stock exchange?

3.2 Research variables

3.2.1 Independent variable:

1. MI adoption.

3.2.2 Dependent variable:

1. Profitability indicators of banks adopting MI and listed in the Egyptian stock exchange.

3.3 Hypotheses development

This study examines the effect of MI adoption on enhancing the profitability indicators of banks adopting MI and listed in the Egyptian stock exchange. The following section presents the development of the main hypothesis based on the relationship

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between MI adoption and the profitability indicators of banks adopting MI and listed in the Egyptian stock exchange.

3.1.1 Profitability indicators: help the bank's management in the decision making process of the bank's operations, as well as maintaining the efficiency and future stability of the bank by providing the management with concrete and realistic information on a bank's financial aspects. (Al-Harbi, 2019, p. 14; Perisa et al., 2017, p. 231; Jolevski, 2017, p. 7). In particular, the value of the profitability indicators can serve as radar for any changes that may occur in the bank's investments and financing. (Hakuduwal, 2021, p. 123; Al-Harbi, 2019, p. 15; Perisa, et al., 2017, p. 231). Based on the above discussion, the following main hypothesis is proposed:

H1: There is no significant effect of MI adoption on enhancing the profitability indicators of banks adopting MI and listed in the stock exchange market.

(A) Return on equity (ROE): There are various ways to measure the bank profitability indicators. This study focuses on using two measures of profitability indicators; one of them includes return on equity (ROE). The following section presents the development of the first sub-hypothesis.

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$$ROE= \frac{\text{Net income}}{\text{Average total equity}}$$

Return on equity is considered as an important measure of profitability indicators of banks. ROE is calculated as dividing net income (or net profits after tax) by average total equity. This indicator is most often shown in percentage. ROE measures bank accounting profits per dollar of book equity capital. ROE shows the efficiency of bank management in handling the shareholders' funds to generate profits. (Asqar, 2022, p. 142; Al-Taei and Al-Shakarchi, 2022, p. 73; Hakuduwal, 2021, p. 127; Hossain and Ahamed, 2015, p. 51). Higher ROE is preferable, as it implies that the management is efficient in managing the shareholders' funds and generating revenues to shareholders. Thus, the higher the value of ROE, the more profitable is the bank. This indicates into a more powerful bank that is capable of generating profits per unit of the invested capital. (Asqar, 2022, p. 142; Al Taei and Al-Shakarchi, 2022, p. 73; Hakuduwal, 2021, p. 127; Hossain and Ahamed, 2015, p. 51). Based on the above discussion, the first sub-hypothesis is proposed as follows:

H1A: There is no significant effect of MI adoption on enhancing the return on equity (ROE) of banks adopting MI and listed in the Egyptian stock exchange.

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(B) Return on assets (ROA): A second alternative measure of profitability indicators of banks is return on assets (ROA). The following section presents the development of the second sub-hypothesis:

$$ROA = \frac{\text{Net income}}{\text{Average total assets}}$$

ROA is a comprehensive financial ratio that measures the profitability performance of banks. It is used as a main indicator of the bank profitability. ROA is calculated as the net income (or net profits after tax) divided by total assets. This indicator is most often shown in percentage. It indicates into the returns generated from the assets financed by the bank. (Perisa et al., 2017, p. 234; Nuhiu, 2017, p. 164; Lipunga, 2014, p. 44; San and Heng, 2013, p. 651; Akbas, 2012, p. 104). In this sense, ROA represents the efficiency of bank management in converting bank's assets into net income. Higher ROA is preferable because this means that the management is efficient in making profits by utilizing the assets, which indicates into high bank's financial performance. Thus the higher ROA, the more profitable is the bank, and vice versa. ROA is the best measure for bank profitability. This is because ROA is not distorted by high equity multipliers. ROA is also a proxy measure used to determine the bank's ability to generate income from the assets. (Asqar, 2022, p. 142; Al-Taei and Al-Shakarchi, 2022, p. 73; Hakuduwal, 2021, p. 127; Al

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Harbi, 2019, p. 15; Perisa et al., 2017, p. 231; Nuhiu et al., 2017, p. 161, Hossain and Ahamed 2015, p. 44; Lipunga, 2014, p. 41).

In short, ROA measures profitability from the perspective of the overall efficiency of how a bank utilizes its total assets to achieve high profits; whereas ROE measures profitability from the perspective of shareholders, i.e. the efficiency of how a bank utilizes shareholders' funds to generate profits. (Asqar, 2022, p. 142; Al-Taei and Al-Shakarchi, 2022, p. 73; Hakuduwal, 2021, p. 127; Al-Harbi, 2019, p. 15; Perisa et al., 2017, p. 231; Nuhiu et al., 2017, p. 161; Hossain and Ahamed, 2015, p. 44; Lipunga, 2014, p. 41).

Based on the above discussion, the second sub-hypothesis is proposed as follows:

H1B: There is no significant effect of MI adoption on enhancing the return on assets (ROA) of banks adopting MI and listed in the Egyptian stock exchange.

3.4 Measures

On one hand, a questionnaire tool was used to measure the research independent variable which includes the MI adoption in 12 central banks adopting MI and listed in the Egyptian stock exchange. The questionnaire was directed to people working within the information technology (IT) department in those 12 banks. The questionnaire consists of questions with closed – form responses using five – point likert scale. In this study, all variables of MI adoption were developed based on an extensive

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literature review. From the previous studies, it has been concluded that MI adoption consists of five key variables, namely: customers, product/service, analyzing the marketing environment, competitive risks, and information technology. Consequently, the independent variables included in the present study have been adopted from measurements used in previous MI studies. Operationalization of the study variables is summarized in table 1. The questionnaire was originally prepared in English and then translated into Arabic. On the other hand, the research dependent variable which includes the profitability indicators of those 12 central banks was also measured. This study focused on using two measures of profitability indicators: return on equity (ROE) and return on assets (ROA). The ROE and ROA were calculated for the period (2012 – 2021); in which ROE and ROA for a five-year period before the adoption of MI (2012-2016) were compared with their equivalent for a five-year period after the adoption of MI (2017-2021) in each of those 12 banks. Hence, the effect of MI adoption on the profitability indicators of those 12 banks can be observed. This study extracts the banks' data from their financial statements which include annual reports on the income statements and the balance sheets of those 12 banks for the period (2012 – 2021). The financial statements of those 12 banks were drawn from Egypt for Information Dissemination (EGID), found in Cairo, Egypt.

Table 1.
Operationalization of the independent variables of MI

Variable	Operational measure	References
MI adoption	Dichotomous variable indicating 0 = No, 1 = Yes.	
- Customers	Mean of ten items on a five – point likert scale to evaluate the extent to which MI adoption helped the banks in predicting customers' behaviors & directions, analyzing customers' buying behavior, as well as determining customers' needs, interests and preferences.	Maria et al., (2020), Rao (2020), Carson et al., (2020), Al-Hashem (2020), Noviyanti et al. (2020), Al-Weshah (2017), Al-Zoubi (2016), Lymperopoulos and Chaniotakis (2005).
- Product or service	Mean of five items on a five-point likert scale to assess the extent to which MI adoption contributed to providing the banks with information about the current as well as the new	Shailza et al. (2020), Kumar (2020), Kant (2020), Azeez (2020), Inha dnd Bohlin (2018), Ade et al. (2017),

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Variable	Operational measure	References
	banking services that can be provided to customers.	Igbaekemen (2014), Ozturk et al. (2012).
- Analyzing the marketing environment	Mean of 11 items on a five-point likert scale to evaluate the extent to which MI adoption helped the banks in analyzing the marketing environment in order to identify its strengths, determine its weaknesses, exploit the available opportunities, and overcome competitors' threats.	Ismaeel and Al-Zubi (2020), Kamau and Njuguna (2020), Vishnoi et al. (2019), Inha and Bohlin (2018), Igbaekemen (2014), Faryabi (2013), Ozturk et al. (2012).
-Competitive risks	Mean of six items on a five-point likert scale to assess the extent to which MI adoption helped the banks in avoiding the risks of competitors, as well as analyzing any potential risks in the market.	Haripriya (2020), Maria et al. (2020), Rao (2020), Vishnol and Bagga (2020), Al-Hashem (2020), Kumar (2020).
-Information technology	Mean of five items on a five-point likert scale to	Shailza (2020), Kamau and

Variable	Operational measure	References
	evaluate the extent to which MI adoption helped the banks in adopting the most advanced information technologies in the marketplace, which in turn contributed to gaining a competitive advantage in technology.	Njugungo (2020), Ismaeel and Al-Zubi (2020), Vishnoi et al. (2019), Inha and Bohlin (2018), Faryabi et al. (2013), Ozturk et al. (2012).

3.5 The sample and response rate

In order to maintain the privacy and confidentiality of banks, the 12 central banks listed in the Egyptian stock exchange are numbered from 1 to 12 instead of mentioning their names. The main concern of the present study is targeting the IT people working within the information technology (IT) department due to their great knowledge of MI adoption. There are nearly 40 people working within the IT department in each of those 12 banks. Based on the research population which consists of 480 people, the research sample size consists of 224 people which represent the minimum sample size. The simple random sampling technique was the most suitable one for this research. The questionnaire was distributed to 320 people working within

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the information technology (IT) department in the 12 central banks adopting MI and listed in the Egyptian stock exchange. 80 questionnaires were excluded and removed from the sample for being largely incomplete, and only 240 out of 320 were collected. The remaining 240 usable questionnaires reflected an acceptable response rate of 75%, which was considered highly reasonable with regard to MI adoption studies.

4. Data analysis and results

4.1 validity and reliability.

To measure the validity and reliability of the constructs of the questionnaire instrument, several procedures were followed. Firstly, an exhaustive literature review was carried out to identify the constructs and items that were used in the previous studies related to MI adoption. Secondly, a wide range of items were selected and refined to express the measures that are included in the present study. Thirdly, an initial version of the questionnaire was prepared in English, and then translated into Arabic. Finally, a pilot study was conducted through directing the questionnaire to 25 IT staff working in different banks operating in Egypt. Relaying on their comments and recommendations, some questions and items was deleted and modified to ensure that the questionnaire reflects the investigated concepts, as well as to improve the clarity and relevance of the questionnaire. For the purpose of assessing the reliability of the questionnaire, cronbach's α was computed to evaluate the internal consistency

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of the five variables of MI, which is the independent variable used in the present study. The results presented in Table 2 indicate that the alpha values reflect good significant reliability of questions, as it ranges between 0.526 and 0.657, with P-value < 0.001. Therefore, the study independent variables reflect a sufficient and satisfied degree of reliability.

Table 2
Cronbach's α Coefficients

Variable	Cronbach's alpha	P-value
Customers	0.526	<0.001
Product/service	0.608	<0.001
Analyzing the marketing environment	0.612	<0.001
Competitive risks	0.645	<0.001
Information technology	0.657	<0.001

4.2 Descriptive statistics of the independent variables

The independent variable of the study is represented by MI adoption which consists of five independent variables namely; customers, product, analyzing the marketing environment, competitive risks, and information technology. As shown in Table 3, the mean values of all variables are ranged between 3.67 and 4.89, indicating that the respondents tend to agree or strongly agree to most of the statements that measure these variables. Table 3 reveals that the variable with the highest agreement and

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minimum variation (S.D. = 0.12) is the information technology. While the variable with the least agreement and maximum variation (S.D. = 0.35) is the competitive risks.

Table 3.

Descriptive statistics of the independent variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Customers	214	3.70	4.80	4.3766	0.24034
Product/service	214	4.20	5.00	4.5234	0.14410
Analyzing the marketing environment	214	3.73	4.73	4.2260	0.19415
Competitive risks	214	3.00	4.83	3.6721	0.35434
Information technology	214	4.60	5.00	4.8925	0.12349

Besides, a comparison was conducted between the 12 central banks listed in the Egyptian stock exchange, in order to determine the differences among the 12 banks in terms of the efficiency of adopting MI within each bank. The comparison is based on the 5 main variables of MI; namely customers, product/service, analyzing the marketing environment,

competitive risks, and information technology. The results of comparison are summarized in Table 4. As illustrated in Table 4, the results indicate that all the 12 central banks have adopted the MI. However, Bank 3, 8, 11, and 4 respectively come first, which indicates that those banks have adopted the MI in the most efficient way. While bank 12, 1, 5, 7, 9, 2 and 10 respectively come later, which indicates that those banks have adopted the MI less efficiently than the first group of banks. Finally, Bank 6 comes lastly, which indicates that it is has adopted the MI in the least efficient way. Table 4 also reveals the differences between the 5 main variables of MI adoption for each bank. In general, the information technology variable (97.85%) the most important variable in the MI adoption, followed by product/service (90.60%), followed by customers (87.70%), followed by analyzing the marketing environment (84.86%),and finally the competitive risks (72.89%). The results in Table 4 have concluded that: Based on the information technology variable; Bank 10 is the best bank that has the ability to use information technology (100.00%). However, the worst bank is bank 2 (95.45%). While, based on product/service variable; Bank 12 (92.67%) is the best bank that provides products/services. However the worst product/service is provided by bank 1 (88.84%). Moreover, based on customer variable; bank 11 (90.20%) is the most efficient bank in dealing with customers. However, the worst bank is bank 1 (83.47%). Furthermore, based

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on analyzing the marketing environment variable; bank 3 (87.64%) is the best bank. However, bank 6 (79.65%) is the worst bank. Finally, based on the competitive risks variable; bank 1 (79.65%) is the best bank in avoiding the competitive risks. However, bank 10 (68.33%) is the worst bank.
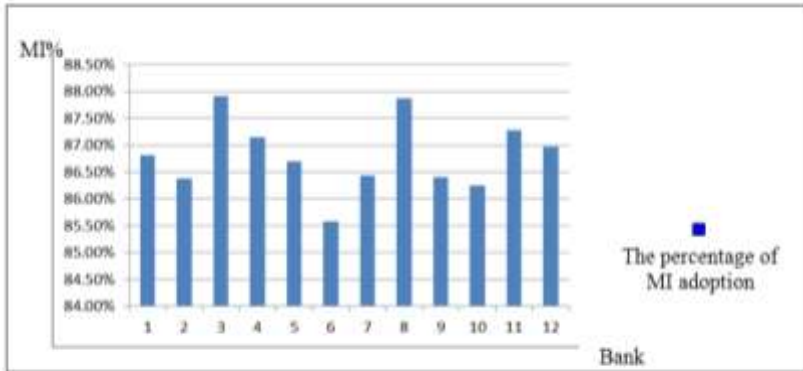
Table 4.

Comparison among 12 central banks based on the 5 variables of MI

MI variables

Bank number	Customers	Product or service	Analyzing the marketing environment	Competitive risks	Information Technology	Total
1	83.47%	88.84%	85.26%	79.65%	96.84%	**86.81%**
2	85.64%	90.18%	85.45%	75.15%	95.45%	**86.38%**
3	84.90%	90.60%	87.64%	78.67%	97.80%	**87.92%**
4	87.22%	89.56%	85.56%	75.37%	98.00%	**87.14%**
5	86.90%	91.80%	84.64%	72.50%	97.60%	**86.69%**
6	89.05%	91.24%	79.65%	70.79%	97.14%	**85.58%**
7	88.82%	90.82%	84.17%	68.63%	99.76%	**86.44%**
8	89.44%	90.22%	82.93%	79.44%	97.33%	**87.87%**
9	88.96%	90.56%	85.82%	67.47%	99.20%	**86.40%**
10	88.91%	90.18%	83.80%	68.33%	100.00%	**86.25%**
11	90.20%	90.60%	87.00%	71.33%	97.20%	**87.27%**
12	88.78%	92.67%	86.36%	69.26%	97.78%	**86.97%**
Total	**87.70%**	**90.60%**	**84.86%**	**72.89%**	**97.85%**	**86.78%**

A comparison between the 12 central banks adopting MI and listed in the Egyptian stock exchange is illustrated in a bar chart, as shown in figure 1. The results in figure 1 reveal the differences among those 12 banks in terms of the efficiency of adopting MI.

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Figure 1.
A comparison between 12 central banks in terms of the efficiency of adopting MI.

4.3 Descriptive statistics of the dependent variable:

The dependent variable of the study represents the profitability indicators of 12 central banks adopting MI and listed in the Egyptian stock exchange. This study focuses on using 2 measures of profitability indicators: return on equity (ROE) and return on assets (ROA). As shown in Table 5, the results indicate that all dependent variables whether before or after the adoption of MI, reveal small data distraction due to their coefficient variation which is less than 100%, whereby the standard deviation of this variation is less than the mean. Table 5 also shows the mean values of the first profitability indicator (ROE) that was 0.015983 before MI adoption. While, after MI adoption, the mean values of ROE raised to 0.030067, with a percentage of

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increase equals to 88%. Similarly, the mean values of the second profitability indicator (ROA) was 0.1538 before MI adoption, and raised to 0.2889 after MI adoption, with a percentage of increase equals to 88% as well. Moreover, the mean values of ROE and ROA are very close to median values, which indicate that the distribution of these variables is symmetrical. In addition to Skewness values which confirm that the emerging results as well as all coefficient values are very close to zero. Also, the minimum and maximum values of ROE and ROA are positive values, which indicate that all ratios, whether before or after MI adoption, express profitability ratios. Furthermore, the results in Table 5 indicate that all Jarque-Bera statistical values are less than the tabulated chi-square (with its value = 5.99); which means that all dependent variables follow normal distribution. This result is in compliance with the sig values (p-value > 5%).

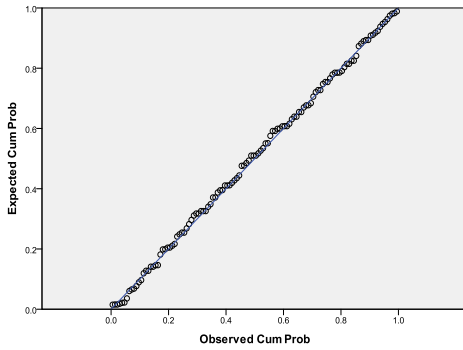The Effect of Marketing Intelligence (MI) Adoption on Enhancing Profitability ....

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Table 5

Descriptive statistics of the dependent variables and goodness of fit for normal distribution

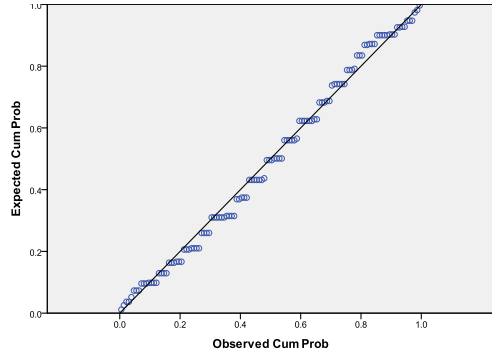|	Before		After	
	ROE	**ROA**	**ROE**	**ROA**
Mean	0.015983	0.1538	0.030067	0.2889
Median	0.0155	0.156	0.03	0.2835
Maximum	0.028	0.221	0.047	0.399
Minimum	0.007	0.049	0.016	0.185
Std. Dev	0.006108	0.034597	0.006257	0.058848
Coef. Var	38.2156	22.4948	20.81019	20.36968
Skewness	0.216123	-0.498	0.073132	0.001873
Kurtosis	1.770913	3.370287	3.032453	2.040236
Jarque-Bera	4.243727	2.822827	0.056116	2.302901
Probability	0.119808	0.243798	0.972332	0.316178

Source: The researcher relied on EViews8 Output.

Furthermore, the normal (P − P) plots verify the existence of normality. As shown below, figures 2 and 3 show the (P − P) plots which reveal that all data points are near or on the straight reference line, indicating that both ROE and ROA are normally distributed.

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Figure 2.

Figure 3.

The effect of MI adoption on ROE and ROA of 12 central banks adopting MI and listed in the Egyptian stock exchange is illustrated in (figures 4, 5, 6 and 7). As shown below; figures 4 and 5 show the effect of MI on ROE, while figures 6 and 7 show the effect of MI on ROA. The ROE and ROA of 12 central banks for a five-year period before the adoption of MI (2012 – 2016) were compared with their equivalent for a five-year period after the adoption of MI (2017 – 2021). All figures reflect the high efficiency of adopting MI, and its effect was clearly observed on enhancing the ROE and ROA of the 12 banks after adopting the MI.
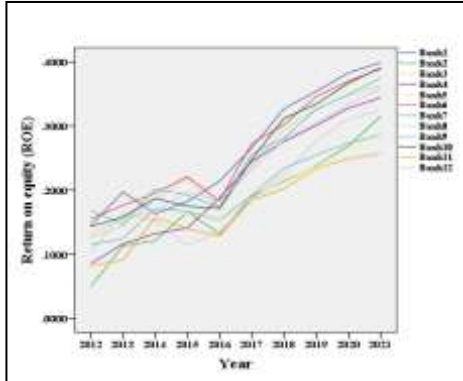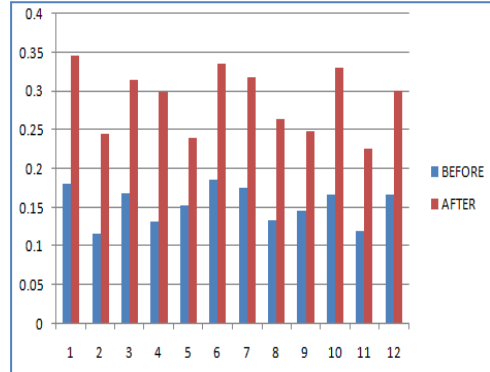
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The effect of MI adoption on ROE

Figure 4.

Figure 5.

The effect of MI adoption on ROA

Figure 6.

Figure 7.

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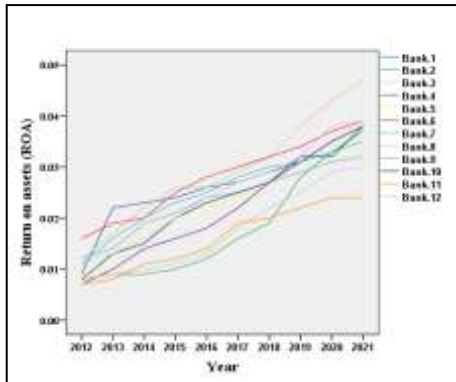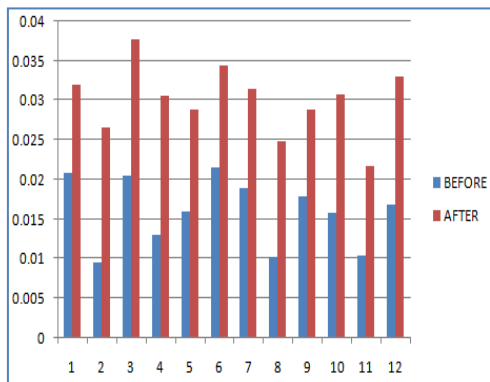
4.4 Correlation analysis

The correlation analysis of the variables of the study was conducted using Pearson correlation coefficient in order to examine the relation between MI and profitability indicators (ROE and ROA). The results of the correlation analysis are summarized in Table 6. The results in Table 6 show that; with 99% confidence level, there is a significant strong positive correlation between ROE and MI adoption, since the value of Pearson correlation coefficient is 0.816 with P-value < 0.001, and the strong positive correlation ranges between (0.7 and 1). Table 6 also reveals; with 99% confidence level, there is a strong positive correlation between ROA and MI adoption, since the value of Pearson correlation coefficient is 0.754 with P-value < 0.001.

Table 6.
Pearson correlation coefficient between variables

Variable	MI	
	Pearson correlation coefficient	**P-value**
ROE	0.816	< 0.001
ROA	0.754	< 0.001

4.5 Regression analysis

This study aims to examine the effect of MI adoption on enhancing the profitability indicators (ROE and ROA) of 12 central banks adopting MI and listed in the Egyptian stock

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exchange. Therefore, the simple linear regression model was used to test the two research sub-hypotheses. The independent variable (MI) will be expressed as dummy variable that takes the value 0 before the adoption, and takes the value 1 after the adoption. The following simple linear models were estimated as follows:

Reg.1: $ROE_{ij} = \beta_{01} + \beta_{11}MI_{ij} + \varepsilon_{1ij}$ i = 1,2, …., 120. j = 1, 2, …, 10

Reg.2: $ROA_{ij} = \beta_{02} + \beta_{12}MI_{ij} + \varepsilon_{2ij}$ i = 1,2, …., 120. j = 1, 2, …, 10

Where

ROE_{ij}: denotes the ith observed value of ROE within bank j.

ROA_{ij}: denotes the ith observed value of ROA within bank j.

MI_{ij}: denotes the ith observed value of MI within bank j.

β_{01}, β_{02}: refer to the intercept terms of Reg.1 and Reg.2 respectively.

β_{11}, β_{12}: refer to the intercept terms of Reg.1 and Reg.2 respectively.

ε_{1ij}: ε_{2ij} : denote the residual error terms of Reg.1 and Reg.2 respectively.

4.5.1 The analysis of Reg. 1

The main aim of the present study is to examine the effect of MI adoption on enhancing the return on equity (ROE) of 12 central banks adopting MI and listed in the Egyptian stock

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exchange. The results of ANOVA are summarized in Table 7. As shown in Table 7, the results of ANOVA indicate that there is a significant effect of MI adoption on enhancing the ROE of 12 banks adopting MI and listed in the Egyptian stock exchange, since F-statistic is 234.998 with P-value < 0.001. Also, based on the value of adjusted R2 (0.663), this indicates that MI could infer 66.3% from the total variation of ROE.

Table 7.
ANOVA table of MI on ROE

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	0.548	1	0.548	234.998	<0.001
Residual	0.275	118	0.002		
Total	0.823	119			

$R^2 = 0.666$

Adjusted $R^2 = 0.663$

In order to estimate the parameters of Reg. 1, the ordinary least square estimation method (OLS) was used, which is a parametric estimation method. Table 8 summarizes the regression coefficients. The results of Table 8 indicate that there is a positive relation between MI and ROE, and any change in the independent variable (MI) from 0 to 1 will lead to an increase of 0.135 in the predicted value of the ROE. Moreover, there is a significant effect of MI on ROE of 12 central banks adopting MI

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and listed in the Egyptian stock exchange, since (t-statistic = 15.33) with p-value < 0.001 and confidence interval (0.118, 0.153). Furthermore, the value of Durbin Watson (1.817) indicates that there is no serial autocorrelation problem, as the value is near to 2.

Table 8.
Regression coefficients:

	Coefficient	Std.Error	T	p-value	95% Confidence interval		Durbin Watson DW
					Lower limit	Upper limit	
Constant MI	0.154 0.135	0.006 0.009	24.680 15.330	<0.001 <0.001	0.141 0.118	0.166 0.153	1.817

Based on the above discussion, the first sub-hypothesis is rejected.

4.5.2 The analysis of Reg. 2

Similarly, the same analysis of the previous sub-section was conducted in order to examine the effect of MI adoption on enhancing the return on assets (ROA) of the 12 central banks adopting MI and listed in the Egyptian stock exchange. The results of ANOVA are summarized in Table 9. As illustrated in Table 9, the results of ANOVA indicate that there is a significant effect of MI adoption on enhancing the ROA of 12 central banks adopting MI and listed in the Egyptian stock exchange, since, F-statistic is 155.657 with P-value < 0.001. Also, based on the

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value of adjusted R2 (0.565), this indicates that MI could infer 56.6% from the total variation of ROA.

Table 9.

ANOVA table of MI on ROA

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	0.006	1	0.006	155.657	<0.001
Residual	0.005	118	0.000		
Total	0.010	119			

$R^2 = 0.569$

Adjusted $R^2 = 0.56$

Table 10 summarizes the regression coefficients. The results in Table 10 indicates that there is a positive relation between MI and ROA, and any change in the independent variable (MI) from 0 to 1 will lead to an increase of 0.014 in the predicted value of the ROA. Moreover, there is a significant effect of MI on ROA of 12 central banks adopting MI and listed in the Egyptian stock exchange, since (t-statistic = 12.476) with p-value < 0.001 and confidence interval (0.012, 0.016). Furthermore, the value of Durbin Watson (1.901) indicates that there is no serial autocorrelation problem, as the value is near to 2.

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Table 10.
Regression coefficients

	Coefficient	Std.Error	T	p-value	95% Confidence interval		Durbin Watson DW
					Lower limit	Upper limit	
Constant	0.061	0.001	20.024	<0.001	0.014	0.018	1.901
MI	0.014	0.001	12.476	<0.001	0.012	0.016	

Based on the above discussion, the second sub-hypothesis is rejected.

According to all previous statistical analysis results, it can be concluded that the main hypothesis is rejected.

5. Discussion

The present study contributes to the existing literature of MI adoption and its effect on enhancing the profitability indicators of 12 central banks adopting MI and listed in the Egyptian stock exchange; as the study explores a new domain (Egypt), and thereby filling a market gap. Since 2017, the adoption of MI has emerged as a modern marketing system in most of banks operating in Egypt. In this context, the present study aims to examine the effect of MI adoption on enhancing the profitability indicators of 12 central banks adopting MI and listed in the Egyptian stock exchange. The results of the study indicated a

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strong positive relationship between MI adoption and the profitability indicators of these 12 central banks. Moreover, the study provided empirical evidence that the MI adoption had a significant effect on enhancing the profitability indicators of those 12 banks. According to these results, the main hypothesis (H1) was rejected. This result may be explained by two facts: Firstly; MI adoption had a significant effect on enhancing the first profitability indicator (ROE) of those 12 central banks. As a result, the first sub-hypothesis H1A was rejected. This result was consistent with the findings of previous studies(e.g. Haripriya, 2020; Roa, 2020; Carson et al., 2020; Ismaeel and Al-Zubi, 2020, Kamau and Njuguna, 2020; Al-Hashem, 2020; Bohlin, 2018; Faryabi et al., 2013; Ozturk et al., 2012; Chaniotakis, 2005). Secondly; MI adoption had a significant effect on enhancing the second profitability indicator (ROA) of those 12 central banks. As a result, the second sub-hypothesis H1B was rejected. This result is consistent with the findings of these previous studies (Carson et al., 2020; Ismaeel and Al-Zubi, 2020, Noviyanti et al., 2020; Al-Weshah, 2017; Al-Zoubi, 2016; Igbaekemen, 2014; Faryabi et al., 2013). Despite the 12 central banks had adopted the MI, there were some differences between those banks in terms of the efficiency of adopting the MI. A detailed analysis of the five variables of MI adoption was conducted. The results revealed that the information technology variable was found to be the most variable to enhancing the profitability indicators of

those 12 central banks. This result supports the findings of the previous studies (e.g.: Shailza, 2020; Kamau and Njugungo, 2020; Ismaeel and Al-Zubi, 2020; Vishnoi et al., 2019; Inha and Bohlin, 2018, Faryaabi et al., 2013, Ozturk et al., 2012. The following variable to enhancing the profitability indicators of those 12 central banks was product/service. This was asserted by a great body of literature review (e.g.: Shailza et al., 2020; Kumar, 2020; Kant, 2020, Azeez, 2020, Inha and Bohlin, 2018; Ade et al., 2017, Igbaekemen, 2014; Ozturk et al., 2012). A third following variable to enhancing the profitability indicators of those 12 central banks was the customers variable. This result is in line with several previous studies (e.g.: Maria et al., 2020; Raq, 2020; Carson et al., 2020; Al-Hashem, 2020; Noviyanti et al., 2020; Al-Weshah, 2017; Al-Zoubi,2016; Lymperopoulos and Chaniotakis, 2005. A fourth variable to enhancing the profitability indicators of the 12 central banks was analyzing the marketing environment. This supports the research results of other previous studies (e.g.: Ismaeel and Al-Zuibi, 2020; Kamau and Njugunge, 2020; Vishno; et al., 2019; Inha and Bohlin, 2018; Igbaekemen, 2014. Faryabi, 2013; Ozturk et al., 2012). The last fifth variable to enhancing the profitability indicators of the 12 central banks was the competitive risks. This results was consistent with previous studies such as (Haripriya, 2020, Maria et al., 2020; Vishnoi and Bagga, 2020; Al-Hashem, 2020; Kumar, 2020. From the previous discussion, it can be concluded

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that there are some banks that had adopted the MI more efficiently than others. As a result, the 12 central banks were ranked in terms of the efficiency of adopting MI. The results indicated that Bank 3, 8, 11, and 4 respectively come first, as those banks had adopted the MI in the most efficient way. While bank 12, 1, 5, 7, 9, 2 and 10 respectively come later due to adopting the MI less efficiently than the first group of banks. Finally, Bank 6 comes lastly, as it had adopted the MI in the least efficient way.

6. Conclusion

Currently, the Egyptian banking sector witnesses severe competitive pressure within the financial service market. Accordingly, the vast majority of banks are urged to adopt MI due its effect on improving operational efficiency and effectiveness, gaining competitive advantage, increasing sales revenues, maximizing profitability, as well as achieving growth and survival in the marketplace. This highlights the significance of the present study through examining the effect of MI adoption on enhancing the profitability indicators of 12 central banks adopting MI and listed in the Egyptian stock exchange. The results showed the significant effect of MI adoption on enhancing the profitability indicators (ROE, ROA) of those banks. This result is largely in accordance with the findings of previous studies related to MI adoption in different countries and contexts. This study contributes to both knowledge and practice fields of

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MI adoption. Regarding knowledge, little research work has been carried out regarding MI adoption in the service sector and particularly within the Egyptian context. Hence the present study contributes to filling this research gab concerning MI adoption within the banks listed in the Egyptian stock exchange. As for practice, marketing managers need to move theory into practice and gain better understanding of MI adoption process. In this context, the study provides guidelines for marketing managers to focus their attention on the five main variables that constitute and support the adoption of MI within any sector. These include: customers, product or service, analyzing the marketing environment, competitive risks, and information technology.

7. Limitations and implications for future research

The research on which this study is based, like much social science research, is affected by several limitations. First, data were collected from self – reports, which may produce bias. Second, this study has been conducted in one country (Egypt). Moreover, the study focuses on one service sector (banking sector: only 12 central banks listed in the Egyptian stock exchange). Third, the present study aims to examine the effect of MI adoption on enhancing only 2 measures of the profitability indicators (ROE, ROA) of banks. Hence, the generalizability of findings needs more examination. In order to enhance the generalizability of the study findings, future researches need to be carried out on many other dimensions such as bank

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performance including sales revenues, market share, and competitive advantage.

The findings of the present study have several managerial implications for practice. For successful MI adoption, marketing managers need to understand the main requirements of adopting MI. The following managerial implications are suggested: First, top management commitment, support, and belief in the importance of adopting MI within banks. Second, using the latest up-to-date information technology which is considered to be the backbone of MI adoption. Third, MI adoption requires a strong financial position, as it is a long-term investment project which is very costly. Fourth, conducting effective training programs for all bank members especially IT staff, on a regular basis. Fifth, providing rewards and incentives in order to encourage and motivate the talent members for their devoted efforts. Sixth, building cross-functional team-works that are highly skilled, experienced, competent, and credible enough to be able to use MI efficiently.

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