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FINANCIAL DIAGNOSTICS AND SMART TECHNOLOGY: A THEORETICAL REVIEW AND BIBLIOMETRIC ANALYSIS OF RECENT RESEARCH IN SCOPUS

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Abstract: The overall objective of this study was to analyze the relationship between financial diagnostics and smart technology through a theoretical review of their conceptual foundations, main models, and financial theories, as well as a bibliometric analysis of scientific output recently indexed in Scopus. Methodologically, an advanced search was conducted in the Scopus database on February 25, 2026, delimiting the period from 2020 to 2026 and restricting the search to the fields of business and economics. The results identified 827 documents, showing a significant growth in academic interest, peaking in 2025. There is a strong concentration on applications of artificial intelligence, machine learning, and predictive analytics focused on risk assessment, bankruptcy prediction, and financial performance analysis. China, the United States, and India lead scientific output in this area. It is concluded that the integration of smart technology strengthens financial diagnosis by expanding the analytical, predictive, and strategic capabilities of business management, although significant challenges related to algorithmic interpretation and the integration of behavioral variables remain.

Keywords. Financial diagnosis; Intelligent technology; Behavioral finance; Bibliometric analysis; Risk management.

INTRODUCTION

Finance, as an area of economics applied to business management, is concerned with the efficient administration of monetary resources under conditions of risk and uncertainty. Ponce et al. (2019) define finance as the part of economics focused on the management and optimization of cash flows related to investment, financing, and the fulfillment of obligations, with the central objective of maximizing firm value.

From a theoretical perspective, the field of finance has evolved based on models that explain price formation, risk-return, and the optimal allocation of resources. The Efficient Market Hypothesis formulated by Eugene Fama holds that prices fully reflect available information. Meanwhile, the modern portfolio theory developed by Harry Markowitz introduces optimization based on expected return and variance criteria, while the CAPM model proposed by William Sharpe distinguishes between systematic risk and diversifiable risk.

However, empirical evidence has demonstrated limitations in the assumption of full rationality. Behavioral finance, driven by the work of Daniel Kahneman and Amos Tversky and later expanded by Richard Thaler, incorporates cognitive and emotional factors into financial decision-making, explaining anomalies and inefficiencies in the markets.

In this evolving context, the emergence of smart technology—artificial intelligence, machine learning, big data, and intelligent systems—has transformed traditional methods of financial diagnosis, enabling the processing of large volumes of information and improving predictive accuracy. Therefore, it is pertinent to analyze the current state of scientific research that links financial diagnosis and smart technology.

FINANCE: DEFINITION, DIMENSIONS, AND REPRESENTATIVE MODELS OR THEORIES

Ponce et al. (2019), in defining finance, refer to it as "the branch of economics responsible for managing and optimizing cash flows related to investments, financing, inflows from collections, and outflows from payments. One of the main objectives of finance is to maximize the value of the company and ensure that all obligations regarding the company's cash outflows can be met."

As a field of study that is part of business management, finance constitutes the area of economic and administrative knowledge that studies the efficient allocation of resources under conditions of risk and uncertainty, with the aim of maximizing the value of the organization.

In the context of business management, finance serves as the strategic function responsible for: 1) Investment decisions (asset structure), 2) Financing decisions (capital structure), 3) Dividend policy and profit distribution, 4) Risk management, and 5) Financial planning and control.

The finance function operates in close coordination with strategic management, production and operations, marketing, and human resources, such that the financial function translates operational decisions into monetary terms and its impact is measured in terms of value creation. From this perspective, the corporate financial objective focuses on maximizing the present value of future cash flows and thus provides direct support to corporate governance.

In the finance area, the perspectives for investment decision-making are viewed from two angles: on one hand, the investor (supplier), and on the other, the entity requesting the resource (demand side). Various scholars in the field have contributed theories that analyze these perspectives, focusing on decisions regarding investment, financing, resource allocation, and asset valuation for organizational growth, etc. In this sense, the decision-making process is underpinned by classical and modern finance, whose theories focus on the premise that individuals make informed decisions and behave in a rational and profit-maximizing manner.

The dimensions of finance in business management can be seen in the following chart

In the business world, investors make complex decisions regarding the management of their capital aimed at generating profits to maximize their wealth. Therefore, determining the type of financial strategy that generates the highest return and the lowest risk is a central objective in the financial sphere; consequently, in this field, financial professionals use various tools such as risk models, valuation models, econometric models, and portfolio theories, among others, to evaluate investment options and make forecasts that help identify the most suitable solution in line with their objectives.

In the field of finance, various theorists have focused on describing models or theories that examine market behavior and investors' attitudes toward risk. Table 1 provides an overview of the most representative theories in the field of finance.

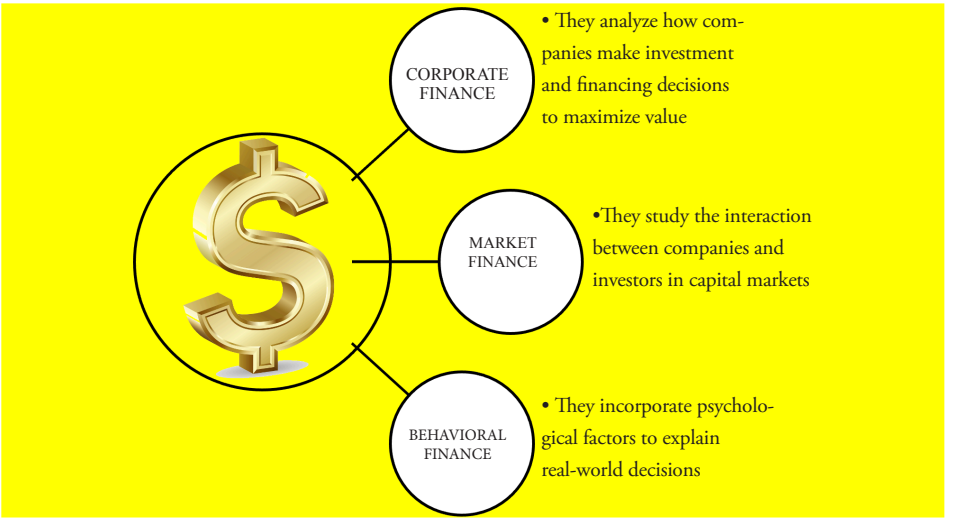

Figure 1. Dimensions of Finance

Source: Author's own work

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FINANCIAL THEORY OR MODEL / AUTHOR	DESCRIPTION OF THE FINANCIAL THEORY OR MODEL
THE EFFICIENT MARKET THEORY AND THE TWO-FACTOR MODEL WILLIAM SHARPE IN 1964	In an efficient market, prices "fully reflect" market risk; given the importance of the term "fully reflect," this is equivalent to positing that the equilibrium prices (or expected returns) of securities are generated according to the "two-parameter" model (Sharpe, 1964) Fama, in 1970, considered "that in general terms, just like the two-parameter model, theories would postulate that, given a set of relevant information, the expected equilibrium return on a security is a function of its 'risk' (and other theories differ mainly in how 'risk' is defined)" Eugene F. Fama (1970: p. 384) Fama explains price formation in competitive markets (focusing his study on capital markets) (Fama, 1970)

"Markowitz notes that to design a portfolio, it is necessary to understand the meaning of expected return and risk (Vásquez, Dextre, Mejia, & Calapuja, 2017). The first refers to the return or expected value of a financial asset, that is, the ability to generate economic and financial benefits, and the second can be defined as the possibility of loss of the financial asset (Equation 1)

$E(rp)n = \sum Zi\ (ri)ni = 1(1)$" (p. 33) (Molina, 2023)

THE PORTFOLIO THEORY BY HARRY MARKOWITZ IN 1952 AND VALUATION MODELS

Premises of the Markowitz model theory (Gimeno, 2014. p. 16)

"1. Investors are rational and risk-averse: this means that given two assets with the same return, the investor will choose the one with lower risk. That is, they expect a positive relationship between return and risk.

2. To select the optimal portfolio for each investor, the expected return of all assets and the risk (variance and covariance) are known

3. It is assumed that each investor has specific risk/return preferences. This is defined by each investor's utility function; that is, the investor seeks to maximize the expected utility of their final wealth. Utility functions are quadratic.

4. Markets are perfect in the sense that there are no transaction costs or taxes, the investor cannot influence prices through their actions, and securities are infinitely divisible.

5. There is no possibility of leverage in this model; the proportions invested in the various assets are always positive or zero.

The return on each asset (Ri) is defined as the average return over a given/known period. Thus, if Pt denotes the known price of any financial asset i at the beginning of the period t under consideration:

In the case where there are no dividends, it would be expressed as:

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$$

If, on the other hand, the asset pays dividends (also known), it would be:

$$R_i = \frac{P_t - P_{t-1} + Div}{P_{t-1}}$$

	In 1964, Sharpe contributed to refining the work of Markowitz (1952) and Tobin (1958) (Gimeno, 2014, pp. 15–23). He developed the CAPM model, a theory of financial asset pricing.
THE CAPITAL ASSET PRICING MODEL (CAPM) WILLIAM SHARPE IN 1964	"According to William Sharpe (1964), in his study of the market model, the risk of an asset consists of two key elements for its analysis: specific or diversifiable risk and systematic risk. The specific risk of an asset is a portion of the total risk of that asset that is determined by the asset's specific characteristics without being influenced by market fluctuations. This risk, as its name implies, is diversifiable by incorporating more assets into the portfolio being managed. On the other hand, and in contrast, the systematic risk of an asset is the other part of the total risk of that asset that is influenced or affected by market fluctuations, that is, by macroeconomic variables." (Gimeno, 2014: p. 27) […] the expected return on any financial security must be conditioned on a market factor, that is, on some index of economic activity. The relationship between an asset and the factor under study is linear, and if an index measuring market return (RM) were taken as the factor, then the market model proposed by William Sharpe would be: (Gimeno: p. 28) $\sigma_i = \beta_i * \sigma_M + \sigma_{\varepsilon i}$

Table 1. Key Contributions in the Field of Finance

Source: Author's own work based on Sharpe 1964; Fama 1970; Gimeno, 2014; Molina 2023.

Hernández (2009: p. 8), drawing on theorists such as (Elton, Gruber, and Busse, 2004; Stewart, 2006), explains that "the classical paradigm of financial theory assumes that investors operate in frictionless markets and make rational decisions. Under this argument, reference is frequently made to the efficient market hypothesis, which proposes that markets are composed of investors who are both rational and highly informed, which facilitates their decision-making and the derivation of the true value of assets. However, there is substantial evidence suggesting that the standard economic paradigm—rational agents operating in an efficient market— is not adequate to describe the observable behavior of individuals in financial markets."

Financial theory is based on the belief that the representative agent in the economy is rational in two ways: he makes decisions according to the axioms of expected utility theory and makes unbiased predictions about the future; thus, under this premise, the study of market behavior, the explanation of investor rationality, and the methods of risk diversification pave the way for the study of behavioral finance.

Behavioral finance analyzes the behavior of decision-makers by incorporating cognitive and emotional factors that systematically influence their judgments; consequently, this explains the presence of market anomalies and information inefficiencies that cannot be explained by traditional models. According to Hernández (2009: p. 9),

drawing on studies by Shiller (2003) and Sewell (2008), "behavioral finance is, in essence, the study of the influence of psychology and sociology on the behavior of financial practitioners and the subsequent effect this has on markets. It is the analysis of finance from a broader social science perspective, which has generated significant interest and excitement in attempting to explain why and how markets can be inefficient."

Ricciardi's work (2008, cited by Hernández 2009: pp. 11–12) indicates that numerous experimental studies and reviews based on individual risk-taking behavior have made it possible to powerfully document findings such as the following:

Gender: women are more conservative than men; that is, they tend to take fewer risks.

- Marital status: single individuals are more likely to make risky decisions than married people
- Age: Young people are more inclined to seek out risks than older people
- Level of education: people with higher levels of education demonstrate a greater propensity or tendency to take risks.

From the study of behavioral finance, it can be established that human beings shape their expectations based on a series of events they interpret as trends and, as a result, make decisions that, in essence and within their own risk tolerance, yield a specific outcome.

"Daniel Kahneman and Amos Tversky are recognized as the cornerstones of behavioral economics, thanks to their pioneering research on cognitive biases and prospect theory. Their studies demonstrated that human decisions are rarely purely rational, and they offered models to predict more realistic economic behaviors." (Torres, S., 2023–2024, paragraph 8)

Finance has established itself as a field of study of interest to various theorists from multiple areas of knowledge, due to its interdisciplinary nature and its ability to integrate analytical, technological, and quantitative tools. In this sense, advances in smart technology have permeated everyday activities, ranging from domestic applications to specialized processes, incorporating mathematical models and algorithms that, although not always visible to the average user, form part of their operational functioning. Similarly, in the financial sphere, these tools take on strategic relevance when applied to scenario modeling, asset valuation, and, particularly, risk management and mitigation. Thus, the convergence of finance and technology not only broadens the disciplinary scope but also strengthens decision-making under conditions of uncertainty.

In this regard, various scholars in the field have documented their research interests regarding the use of smart technology in financial diagnostics, and the Scopus database reflects this trend in an interesting way.

RESEARCH INTEREST IN THE TOPIC OF FINANCIAL DIAGNOSTICS AND SMART TECHNOLOGY: ANALYSIS USING THE SCOPUS DATABASE

To identify the level of academic interest in financial diagnosis and smart techno-

logy, a systematic search was conducted in the *Scopus* database on February 25, 2026. For this purpose, the advanced search tool was used, applying a Boolean equation designed to conceptually delimit the subject of study. Likewise, the temporal criterion was set to include scientific articles published between 2020 and 2026, in order to analyze recent output and obtain empirical evidence that would allow for the identification of research trends within the scientific community during that period. The search equation was as follows:

TITLE-ABS-KEY (("smart technolog*" OR "intelligent technolog*" OR "artificial intelligence" OR AI OR "machine learning" OR "deep learning" OR "big data" OR "data analytics" OR "intelligent systems") AND ("financial diagnos*" OR "financial analysis" OR "financial health" OR "financial performance" OR "financial distress" OR "financial risk assessment" OR "bankruptcy prediction")) AND PUBYEAR > 2019 AND PUBYEAR < 2027 AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON"))

The results shown from the search query are:

827 documents focused on the aforementioned topics. In Figure 2, the peak reflecting researchers' interest in the topic occurs in 2025 with 356 scientific articles, followed by 2024 with 168 articles; in this regard, interest among theorists shows a 47% increase from 2024 to 2026; if the trend continues in 2026 with 55 papers written in a two-month period (given the search date for this study), it would imply that by the end of the 12 months of 2026, researchers' interest in the topic would decline, with 330 articles written and a 7% decrease in publication.

Among the results shown by the Scopus database upon requesting the corresponding statistical analysis, two authors stand out: Ben Jabeur, S. and Carmona, P., with an average of 5 articles.

Among universities, Christ University in India stands out with a total of 10 publications.

The analysis presented by country to contribute to the discussion reveals that China, the United States, and India lead with 140, 125, and 120 scientific publications, respectively

Regarding the focus of study by research subject area, Business and Economics are the main areas that form the basis of this research study, accounting for 30.8% and 26.8%, respectively.

RESULTS

An advanced search conducted in Scopus on February 25, 2026, yielded a total of 827 documents published between 2020 and 2026 in the fields of business and economics.

The temporal analysis shows sustained growth, peaking in 2025 with 356 publications, followed by 2024 with 168 articles. Between 2024 and 2025, a 47% increase is observed. During the first two months of 2026, 55 publications were recorded, projecting approximately 330 articles by the end of the year, implying a possible estimated decrease of 7% compared to the previous year if the trend remains constant.

In terms of productivity by author, Ben Jabeur, S. and Carmona, P. stand out,

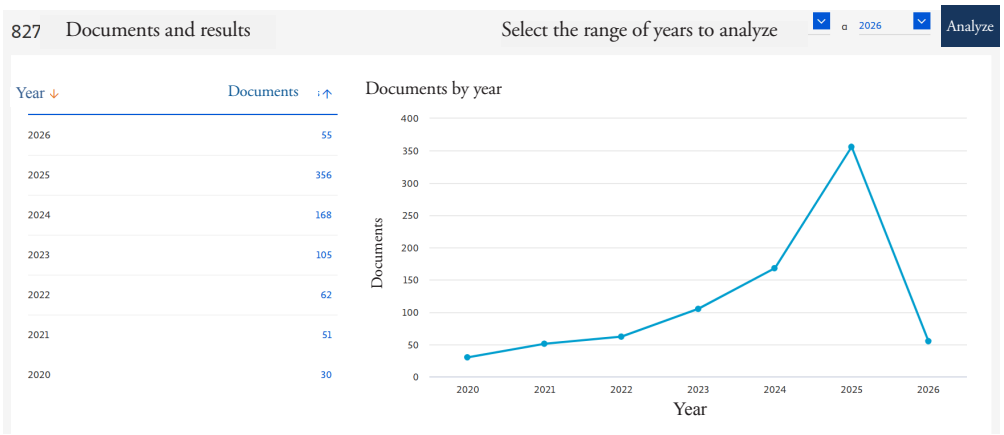

Figure 2. Documents found in the Scopus database

Source: Scopus database (February 25, 2026)

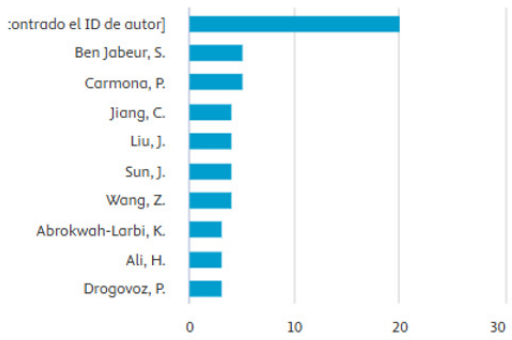

Figure 3. Documents by author

Source: Scopus Database (February 25, 2026)

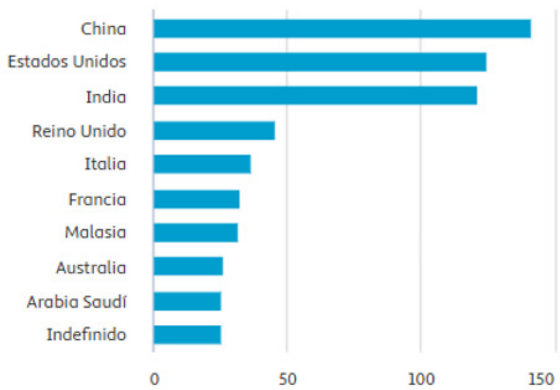

Figure 4. Documents by country/territory

Source: Scopus **Database** (February 25, 2026)

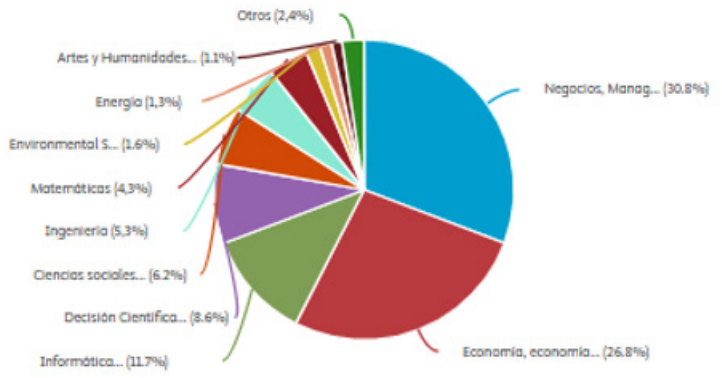

Figure 5. Documents by research area

Source: Scopus Database (February 25, 2026)

with an average of five publications each. At the institutional level, Christ University (India) leads with ten scientific publications. By country, China (140), the United States (125), and India (120) account for the highest academic output.

Regarding subject areas, Business accounts for 30.8% of the documents and Economics for 26.8%, highlighting the prominence of the subject within the field of economic administration.

- The reviewed studies show a predominance of methodologies based on:
- Machine learning for insolvency prediction
- Classification models for credit risk assessment
- Financial performance analysis using deep learning algorithms
- Intelligent systems for monitoring corporate financial health

DISCUSSION AND OPPORTUNITIES FOR RESEARCH

The results confirm that financial diagnostics are undergoing a methodological transformation driven by intelligent technology. While traditional models are based on assumptions of efficient market rationality, the new tools allow for the incorporation of more dynamic and adaptive predictive analytics.

The significant increase in publications during 2024–2025 reflects a growing interest in integrating artificial intelligence into strategic financial processes. However, significant challenges remain:

- Interpretability issues in complex models
- Ethical risks associated with the automated use of data
- Limited integration between algorithmic models and behavioral variables

- Need for comparative longitudinal studies between developed and emerging economies.

The following are proposed as opportunities for future research:

- Hybrid models that integrate behavioral finance and artificial intelligence
- Studies on the regulatory impacts of the use of financial algorithms
- Analysis of the effect of automation on managerial decision-making.

CONCLUSIONS

The study shows that financial diagnosis has evolved from traditional approaches based on classical market and investment theories toward models supported by intelligent technology. The theoretical review confirms the validity of classical financial fundamentals, but also the need to complement them with behavioral approaches and advanced technological tools.

The bibliometric analysis demonstrates significant growth in scientific interest in the integration of artificial intelligence and financial analysis, particularly in the contexts of risk assessment and bankruptcy prediction. The geographic concentration of academic output indicates technological leadership in specific economies, which opens opportunities to expand research in emerging contexts.

The convergence of financial diagnosis and smart technology constitutes a strategic and expanding line of research, with high potential to strengthen business decision-making under conditions of uncertainty and increasing complexity

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