Journal of System Management (JSM)
Online ISSN: 2538-1571, Print ISSN: 2322-2301
**11(2), 2025, pp. 141-156**

Received: 15/09/2024
Accepted: 28/11/2024

**RESEARCH ARTICLE** **Open Access**

# Presenting a Model to Investigate the Impact of Intangible Capitals Management on Credit Scoring of Companies Considering the Role of Risk Management Framework, Communication and Performance

Pardis Fooladi[1], Mohsen Amini Khozani[2*], Zohreh Hajiha[3], Shadi Shahverdiani[4]

**Abstract**

In today's global business environment, the concept of "Intangible Capital" has become a crucial tool for enhancing both the value and credibility of firms. Intangible capital encompasses non-physical assets such as intellectual capital, intellectual property, brand reputation, and employee skills, all of which play a vital role in economic growth and organizational performance. This research aims to provide a comprehensive evaluation of the impact of intangible capital on various dimensions of credit profile, including qualitative, quantitative, intellectual, and investment indicators. Additionally, the study explores the mediating role of company performance and the moderating role of risk management frameworks and political connections. To achieve this, the research employs Partial Least Squares Structural Equation Modeling (PLS-SEM), a robust approach that facilitates a detailed analysis of the complex relationships among the variables. Data were collected through surveys, enabling a quantitative assessment of the impacts and interdependencies. The findings reveal that intangible capital has a positive and significant effect on the different dimensions of credit profile.

**Keywords:** intangible capital, credit scoring, performance, risk management framework and political communication.
Jel: E22, E51, L25, G32, P33

## Introduction

Intangible assets, including intellectual capital, brand value, and intellectual property, can significantly influence credit scoring. These assets often serve as indicators of a company's potential and stability in generating future profits, directly impacting how creditors assess its creditworthiness. A strong base of intangible capital may signal lower risk, thereby improving a company's credit score. Firms endowed with substantial intangible assets are less likely to default, as these assets contribute to stable cash flows and help maintain and enhance competitive advantages (Amat et al., 2017). Moreover, intangible assets can profoundly impact company performance in various ways. For instance, innovation, research, and development can lead to the creation of new technologies and products, improving a company's performance over time. A strong brand can significantly bolster financial and market performance by increasing customer loyalty and enabling superior pricing strategies (Tahat et al., 2018). Additionally, the skills, experience, and knowledge of a company's workforce—collectively known as human capital—are vital for operational excellence and innovation. Effective and unique organizational processes can become valuable sources of competitive advantage,

1.PhD student, Department of Financial Management, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran
2*.Assistant Professor, Department of financial Management, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran. (Corresponding Author: amini_k_m@yahoo.com)
3. Professor, Department of Accounting, South Tehran Branch, Islamic Azad University, Tehran, Iran
4. Assistant Professor, Department of financial Management, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran

further enhancing firm performance (Hazan et al., 2021).

Political connections can influence the qualitative aspects of credit scoring, affecting the cost of debt and financial stability. In the context of intangible assets like reputation and relationships, political connections may enhance the perceived credibility of a company. Conversely, a robust risk management framework is essential for effective credit risk assessment. Research suggests that efficient internal controls and risk management practices can significantly reduce credit risk, a critical factor in credit evaluations (Akwaa-Sekyi et al., 2017).

Despite the increasing prominence of intangible assets, there remains a significant gap in the literature regarding their comprehensive impact on credit scoring, particularly in the presence of moderating and mediating variables such as company performance, risk management frameworks, and political connections. Existing studies tend to focus on individual components of intangible assets, often neglecting the interplay between these factors and their combined effect on creditworthiness. Moreover, while the significance of risk management frameworks in improving financial stability is widely recognized, little attention has been given to their moderating role in the relationship between intangible assets and credit profiles. Similarly, political connections, which can provide firms with access to resources and regulatory advantages, may also introduce inefficiencies, highlighting the need for a nuanced understanding of their impact within this context.

This study aims to address these gaps by developing a comprehensive model to assess the impact of intangible assets on the credit scoring of companies listed on the Tehran Securities Exchange. The research seeks to systematically evaluate how intangible assets influence different dimensions of credit profiles, including qualitative, quantitative, intelligence, and capital indicators. Additionally, it examines the mediating role of company performance, which represents the operational and financial outcomes driven by intangible investments, and the moderating roles of risk management frameworks and political connections. By integrating these variables, the proposed model captures the multifaceted relationships that shape a company's creditworthiness.

The findings of this research are expected to make significant contributions both theoretically and practically. From a theoretical perspective, the study enriches the existing body of knowledge by providing a holistic framework that incorporates the interplay of intangible assets, company performance, and external moderating factors. Practically, the results will offer actionable insights for corporate managers, enabling them to strategically invest in intangible assets, implement robust risk management protocols, and leverage political connections effectively to enhance their credit profiles. Furthermore, these findings can guide policymakers in designing regulatory frameworks that promote transparency and fair evaluation of intangible assets in credit assessments, ensuring a more sustainable and competitive financial ecosystem.

## Theoretical foundations and research background

### Theoretical foundations

Intangible capitals have become an integral part of companies' assets, particularly over the past three decades. Their definition stems from their distinction from physical capital, characterized by their "absence of physical presence" or "intangibility" (Alsamawi et al., 2020). From another perspective, the lack of physical presence makes it more challenging to establish and protect ownership of intangible assets, which can often be replicated, typically through electronic or verbal means, by reiterating ideas or data without physical possession. As a result, intangible assets often receive special protections through intellectual property rights, trademark laws, and non-compete clauses (Crouzet et al., 2022).

Although credit itself is as old as business, the history of credit scoring is relatively brief, spanning only six decades. In response to the exponential growth in credit demand, financial institutions have developed automated credit risk assessment systems, employing various methods to evaluate customers (Abdou and Pointon, 2011). Today, credit risk has become one of the most critical issues in the banking industry. While this risk cannot be entirely eliminated in practice, understanding its causes can help mitigate it as much as possible (Salari et al., 2019). Credit assessments typically involve comparing the applicant's characteristics with those of previous applicants who received credit and successfully repaid it. This comparison forms the basis of an automatic system that facilitates credit granting decisions with high accuracy, thus reducing the likelihood of defaults (Blochlinger and Lippold, 2006). The primary principle behind credit assessment is to evaluate an applicant's profile against historical data of borrowers who demonstrated the ability to repay their debts (Amat et al., 2016).

Performance is defined as the effectiveness and efficiency with which Intelligent Automation technologies enhance the execution of knowledge-based and service-oriented tasks. This includes improvements in speed, accuracy, overall productivity, and the capacity to handle complex cognitive tasks that traditionally required human intervention. Intelligent Automation not only streamlines repetitive tasks but also significantly contributes to strategic business value by optimizing processes and enabling more informed decision-making (Coombs et al., 2020).

An effective risk management framework is vital for balancing risk acceptance and reduction, thereby creating value for an organization. By implementing a structured approach, companies can ensure alignment with international standards and best practices, helping minimize the impact of potential risks (Blair et al., 2024). Additionally, risk management aims to mitigate the adverse effects of activities through proactive measures, forecasting potential issues, and planning strategies to avoid them (Sadri et al., 2024).

Political connections can significantly enhance a company's market capitalization and access to resources, providing a competitive advantage. Research suggests that while political connections can improve performance, they may also introduce inefficiencies, particularly in state-owned enterprises, due to political interference. In general, political connections, when managed effectively, can serve as valuable assets for improving corporate financial performance (Prasetyo and Nasution, 2022).

**2-2- Research background**

Temba et al. (2024) examined the influence of credit risk management (CRM) approaches on the financial performance of commercial banks in Tanzania. Their findings indicated that risk assessment and approval processes, the quality of credit processes and controls, the adequacy of recovery procedures, and risk monitoring through capital adequacy, efficient use of equity, and asset quality all positively affected banks' performance. In another study, Ahadi Serkani et al. (2022) explored the complex relationships between fraud, financial management decisions, and the factors that influence these dynamics using Structural Equation Modeling (SEM). They developed a comprehensive model to understand how fraud influences financial management decisions, highlighting the critical roles of trust and political communication in this context. Paidar et al. (2021) aimed to prioritize the dimensions, components, and indicators of the intellectual capital model in state-owned banks using the competency approach of managers. This study provided a structured model for enhancing intellectual capital in state banks by focusing on the most critical dimensions and indicators, guided by the competencies of their managers. Sadeghnia and Setayesh (2020) investigated the impact of integrating information systems (IS) on the financial performance of companies listed on the Tehran Stock Exchange (TSE), considering

the mediating roles of performance. They highlighted the importance of integrating information systems to achieve better financial outcomes through improved cost management and quality performance.

Jory et al. (2020) examined the relationship between government economic policy uncertainty (EPU) and its implications for trade credit policies and firm value among U.S. public companies. They provided valuable insights into how firms adjust their financial strategies in response to economic policy uncertainty and the complex effects of these adjustments on their overall value. In another study, Tahat et al. (2018) investigated the impact of intangible assets on the financial and market performance of companies. Supporting both market-based and resource-based theories, they suggested that investments in intangible assets are crucial for long-term wealth creation. Yilmaz (2018) examined the prevalence and influence of companies connected to political figures or institutions and found that, while political communication can benefit companies, it is influenced by the regulatory environment and the overall transparency of the economic system. Amat et al. (2017) presented a study that applied a credit scoring model to help financial institutions evaluate credit applications, emphasizing the social implications of a reliable credit scoring system, which can increase trust in financial institutions' assessments, especially after financial crises.

Additionally, Chan et al. (2011) explored the relationship between financial distress and its determinants. They identified a significant positive relationship between company size and financial distress, a positive relationship between the interest coverage ratio and financial distress, and a negative relationship between operating profit growth and financial distress. Furthermore, Jarrow and Turnbull (2000) studied the intricate relationship between market risk and credit risk, highlighting that these risks are inherently related and cannot be fully separated. They outlined two primary methods for pricing credit risk instruments: the structural approach and the reduced-form approach.

## Hypothesis development and Conceptual model

This section first examines the accuracy and validity of the relationships between the research variables, which form the basis for the hypotheses presented in the "Hypothesis Development" section. Next, we will detail the dimensions of the research variables and introduce the articles and sources used in designing the questionnaire. Finally, the conceptual model of the research will be presented in the form of a diagram.

## Hypothesis development

### The impact of Intangible capitals on performance:

Intangible capitals have been shown to significantly influence a firm's performance by enhancing its financial stability and reducing default risk. Investments in intangible assets drive productivity growth, although studies highlight that intangible asset face greater financial constraints due to informational asymmetries and difficulties in valuing collateral, often relying more on internal financing. An empirical analysis conducted across 32 countries and 30 industries from 1990 to 2014 revealed that financial development significantly impacts labor productivity, particularly in sectors reliant on intangible assets. Policies that enhance financial structures, promote competition, and strengthen legal frameworks can alleviate financial constraints, thereby boosting productivity in these sectors (Demmou et al., 2019).

### The impact of Performance on the relationship between intangible capitals and firm value:

Financial performance influences firm value through intellectual capital disclosure, meaning firms with strong financial performance are more likely to disclose their intellectual capital, which in turn enhances their overall firm value. This disclosure acts as a mediator, legitimizing the firm's success

and providing a competitive edge. By transparently sharing information about their intellectual assets, companies can improve investor confidence, reduce information asymmetry, and ultimately achieve higher market valuations (Keter et al., 2024).

**The effect of Risk management framework on the relationship between intangible assets and credit profile:**

The Institute of Internal Auditors (2020) presented a comprehensive framework for internal auditors to evaluate the effectiveness of their organization's credit risk management processes. The study indicated that risk management affects several key variables, including the stability and predictability of financial outcomes, the likelihood of adverse events, and overall financial performance. Effective risk management practices help mitigate financial losses and operational disruptions, thereby enhancing the firm's credit rating and access to capital.

**The effect of Risk management framework on the relationship between intangible assets and credit profile:**

A study in Indonesia revealed a positive and significant relationship between intellectual capital and firm performance. Firms with higher levels of intellectual capital, such as human, structural, and relational capital, tend to perform better financially. The study also explored the moderating role of political connections in this relationship. Companies with strong political ties are better positioned to leverage their intellectual assets, gaining advantages such as easier access to resources, favorable regulations, and enhanced market opportunities (Cahyono & Ardianto, 2024).

**Combination of research variables**

The composition and factors of the research variables are presented in the following table:

Table 1.

*Combination of research variables*

| latent variables | observed variables | researcher (date) |
|---|---|---|
| Intangible Capitals | Intellectual Capitals | Pulic (2000) |
| | Other Intangible Assets | John F. Tomer (2008) |
| Credit Profile | Quality Indicators | Erzae et al. (1396) |
| | Intelligence Indicators | Tjøstheim & Stephens (2022) |
| | Quantitative Indicators | Erzae et al. (1396) |
| | Capital Indicators | Nhan Huynh et al. (2024) |
| Company Performance | Control and Evaluation | Shobhit Seth (2024) |
| | Confusion and Financial Fantasies | |
| | Resilience | |
| | Development Strategies | |
| Risk Management Framework | Risk governance | David Kindness (2024) |
| | Risk reporting and monitoring | |
| | Risk reduction | |
| | Risk measurement and assessment | |
| | Risk identification | |
| Political Connections | Power Liquidity | Al-dhamari & Ku Ismail (2015) |
| | Political Influence | |
| | Dependence of board members on power | |

## Conceptual model

Therefore, the conceptual model can form as follow:

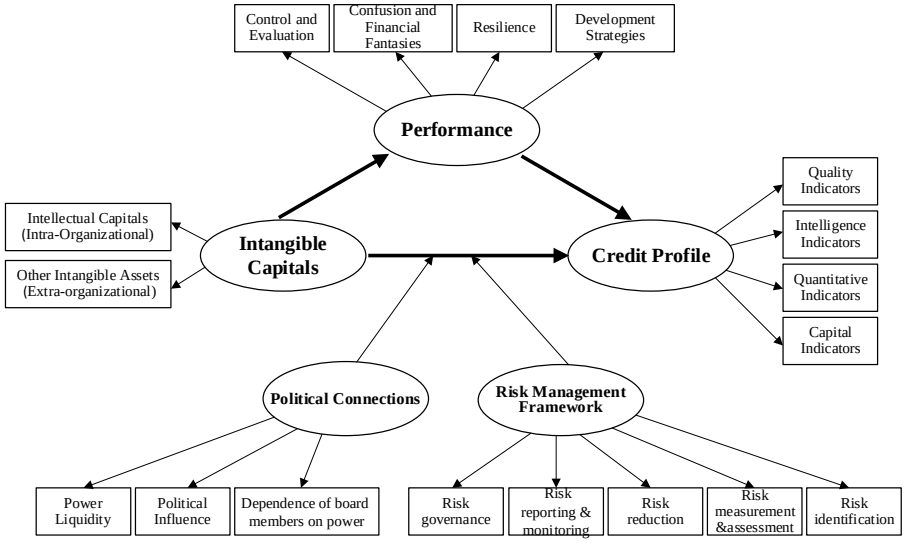


Figure 1. *Relationship of research variables based on structural equation model*

## Methodology

The present study is applied research in terms of orientation, field research in terms of history, a survey in terms of data collection, and quantitative in terms of methodology. It is also correlational, as it measures the relationships between variables, and cross-sectional in terms of data collection time. The study aims to propose a comprehensive model of the impacts of intangible capitals on the credit scoring of companies listed on the Tehran Securities Exchange. It explores these impacts, including moderating and mediating factors, through a survey approach. Data were collected using questionnaires.

The statistical population of the research consists of 378 respondents, selected from managing directors and board members of listed companies, academic faculty members in economics and finance, heads, deputies, and specialists from credit units working in private banks, as well as financial managers and experts. The sample size was determined using Cohen's sampling method.

In addition, a literature review and theoretical foundations were utilized to identify intangible capitals in credit scoring for companies listed on the Tehran Securities Exchange. The study also examines the effect of two categories of moderating and mediating variables—namely, the risk management framework, political communication, and company performance—on the relationship between intangible capitals and credit assessment.

Hypotheses were tested using questionnaire data, localized based on the financial structures and capacities of the companies under study. The questionnaire was designed based on the assumptions and questionnaires from valid articles and expert opinions. Validity and reliability of the questionnaire were also evaluated. Data analysis was performed using path analysis with the PLS-SEM method, utilizing Smart-PLS 4.1.0.6 software for data processing. The questionnaire included multiple-choice questions, with the exception of those related to the respondent's identity, which were semi-open. Each multiple-choice question offered five answer options on a Likert scale: strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), and strongly disagree (1 point). Data processing was conducted using PLS and Smart-PLS 4.1.0.6 software.

## Research Findings

### Demographics

A total of 378 participants took part in the study, consisting of 306 males (80.96%) and 72 females (19.04%), with men representing the majority of respondents. Regarding educational qualifications, 11.90% of respondents held a bachelor’s degree, 37.31% had a Ph.D., and the majority, 50.79%, held a master’s degree. In terms of occupational

classification, the respondents were predominantly from three categories: “financial institutions” (43.65%), “banks” (18.25%), and “stock exchange” (14.29%).

**Descriptive Analysis**

In this section, we present the descriptive statistics of the variables based on data extracted from the questionnaires. As shown in Table 1, “intangible capitals” has the highest average value among the research variables, with a mean of 4.241, while the lowest average is associated with political connections, with a mean of 3.827.

Table 2.
*Descriptive statistics of variables*

| Variable | Mean | Quart. 1 | Median | Quart. 3 | Standard Deviation | Skewness |
|---|---|---|---|---|---|---|
| Credit Profile | (0.007) | 4 | 0.024 | 5 | 0.613 | (0.250) |
| Intangible Capitals | 0.000 | 4 | 0.015 | 5 | 0.576 | 0.000 |
| Performance | 0.000 | 4 | (0.019) | 5 | 0.712 | 0.066 |
| Political Connections | 0.000 | 4 | (0.002) | 4 | 0.911 | (0.530) |
| RMF | 0.000 | 4 | 0.058 | 5 | 0.773 | (0.604) |

**Reliability of the model**

In this step, two indicators are used to check the reliability of the model: the composite reliability criterion (CR) and Cronbach's alpha coefficient criterion. Cronbach's alpha is a classic indicator for reliability analysis that provides an estimate of reliability based on the internal correlation of items, with an appropriate value being greater than 0.7. The composite reliability criterion (CR) has advantages over the Cronbach's alpha method. Its superiority lies in the fact that the reliability of structures is not calculated in absolute terms but according to the correlation of their structures with each other. Additionally, for its calculation, indicators with higher outer loading are more important. In general, both of these criteria are used to better measure the reliability of the model.

**Composite reliability (CR)**

This criterion was introduced by Werts et al. (1974). If the composite reliability value for each construct is higher than 0.7, it indicates appropriate internal reliability for measurement models, while a value less than 0.6 indicates the absence of reliability (Nunnally, 1987). It is important to mention that composite reliability in structural modeling is considered a better measure than Cronbach's alpha because, in calculating Cronbach's alpha coefficient for each construct, all indicators are included in the calculations with equal importance. In contrast, for calculating composite reliability, indicators with higher outer loading are more important. The reported composite reliability value for each of the hidden constructs of the research model is as described in the following table:

Table 3.
*Composite reliability values*

| Variable | Composite reliability |
|---|---|
| Credit Profile | 0.879 |
| Intangible Capitals | 0.865 |
| Performance | 0.840 |
| Political Connections | 0.850 |
| Risk Management Framework | 0.862 |

**Cronbach's alpha coefficient**

Cronbach's alpha coefficient is a factor whose value ranges from 0 to 1, with a value higher than 0.7 indicating acceptable reliability (Cronbach, 1951). However, Moss et al. (1998) have introduced a value of 0.6 as the threshold for Cronbach's alpha coefficient in the case of variables with a small number of questions. In the table below, the value of this coefficient is estimated for each of the factors:

Table 4.
*Cronbach's alpha values*

| Variable | Cronbach's alpha |
|---|---|
| Credit Profile | 0.816 |
| Intangible Capitals | 0.701 |
| Performance | 0.748 |
| Political Connections | 0.738 |
| Risk Management Framework | 0.800 |

According to the table above, the Cronbach's alpha coefficient for all the desired structures is higher than 0.7, which indicates the appropriate reliability of the model.

**Validity**

To check validity, two criteria of "convergent validity" and "divergent validity" are used as follows.

**Convergent validity**

Convergent validity examines the degree of correlation between each construct and its questions (indices). The higher the correlation, the more favorable the fit. One common measure to establish convergent validity at the construct level is the average variance extracted (AVE). An AVE value greater than or equal to 0.5 indicates that, on average, the structure explains more than half of the variance of the corresponding indicators. If AVE is less than 0.5, it indicates that, on average, there is more error in the items relative to the variance explained by the constructs (Gefen and Straub, 2005). The table below presents the value of this coefficient for each of the structures.

Table 5.
*Average extracted variance values*

| Variable | AVE |
|---|---|
| Credit Profile | 0.645 |
| Intangible Capitals | 0.761 |
| Performance | 0.569 |
| Political Connections | 0.654 |
| Risk Management Framework | 0.559 |

**Divergent validity - Fornell-Larcker criterion**

To check the divergent validity of the measurement model, the Fornell-Larcker criterion is used. According to this criterion, acceptable divergent validity of a model indicates that a construct in the model interacts more with its indicators than with other constructs. According to Fornell and Larcker (1981), divergent validity is at an acceptable level when the AVE for each construct is greater than the shared variance between that construct and other constructs in the model. Divergent validity is the third criterion for examining the fit of measurement models, addressing two issues:

1. Comparing the degree of correlation between the indicators of a structure with that structure versus the correlation of those indicators with other structures.
2. Comparing the correlation of a structure with its indicators versus the correlation of that structure with other structures

In Smart-PLS software, this is checked using a matrix that contains the values of correlation coefficients between constructs and the square root of AVE values for each construct. The model has acceptable divergent validity if the numbers included in the main diagonal are greater than their underlying values (Davari and Rezazadeh, 2013). The values on the main diagonal of the matrix are replaced with the square root of the variance values described in AVE, and the following table is presented.

Table 6.
*Fornell and Larcker after placing the square root values of AVE*

| Variable | Political Connections | Intangible Capitals | Performance | Credit Profile | RMF |
|---|---|---|---|---|---|
| Political Connections | 0.809 | | | | |
| Intangible Capitals | 0.383 | 0.873 | | | |
| Performance | 0.518 | 0.701 | 0.754 | | |
| Credit Profile | 0.629 | 0.570 | 0.691 | 0.803 | |
| RMF | 0.516 | 0.651 | 0.753 | 0.718 | 0.747 |

**Inferential Analysis**

Conventional models in structural modeling consist of two parts: measurement models, which show how the latent variables are explained, and structural models, which show how the latent variables are linked to each other. Measurement models specify the relationships between indicators (observed variables) of a construct (latent variable) and that construct. The review of the research model is done in three stages. In the first step, the outer model of the research is examined. In the second stage, the inner model is examined, and the third stage is devoted to the examination of the overall research model.

**Evaluation of the model (outer model)- Outer loadings of the dimensions of variables**

To evaluate the structural equation models, we first evaluate the outer model. In this evaluation, the relationship between indicators (observed variables) and latent variables (hidden) is analyzed through calculated outer loadings. In this step, the outer loadings related to the measured indicators of each variable are examined. Outer loadings higher than 0.4 are desirable, and indicators with outer loadings lower than 0.4 should be removed. Ideally, outer loading values should be more than 0.7, but values in the range of 0.4 to 0.7 are also acceptable. The initial outer loading model is as follows:

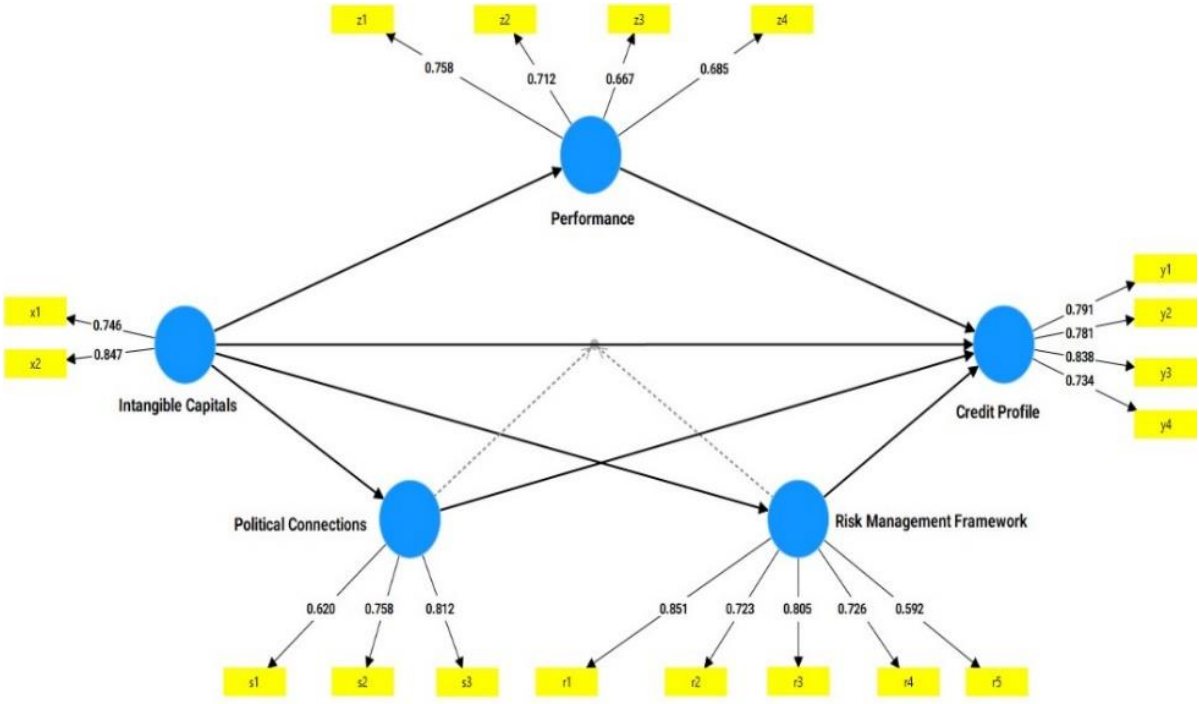


Figure 2. *Model for measuring outer loadings (outer model)*

**Evaluation of the structural model (inner model):**

Here, we examine the relationship between latent variables through the path coefficients. The coefficients of the structural model can be compared to each other. If the path coefficient of one structure is larger than the other one, it indicates a greater effect on the endogenous structure. Path coefficients have standardized values between -1 and +1; If the estimated path coefficients are close to +1, it indicates a positive relationship between two constructs, and if they are close to -1, it indicates a negative relationship between the two constructs. It is also possible to evaluate the direct effects and indirect effects that are applied by means of mediating structures.

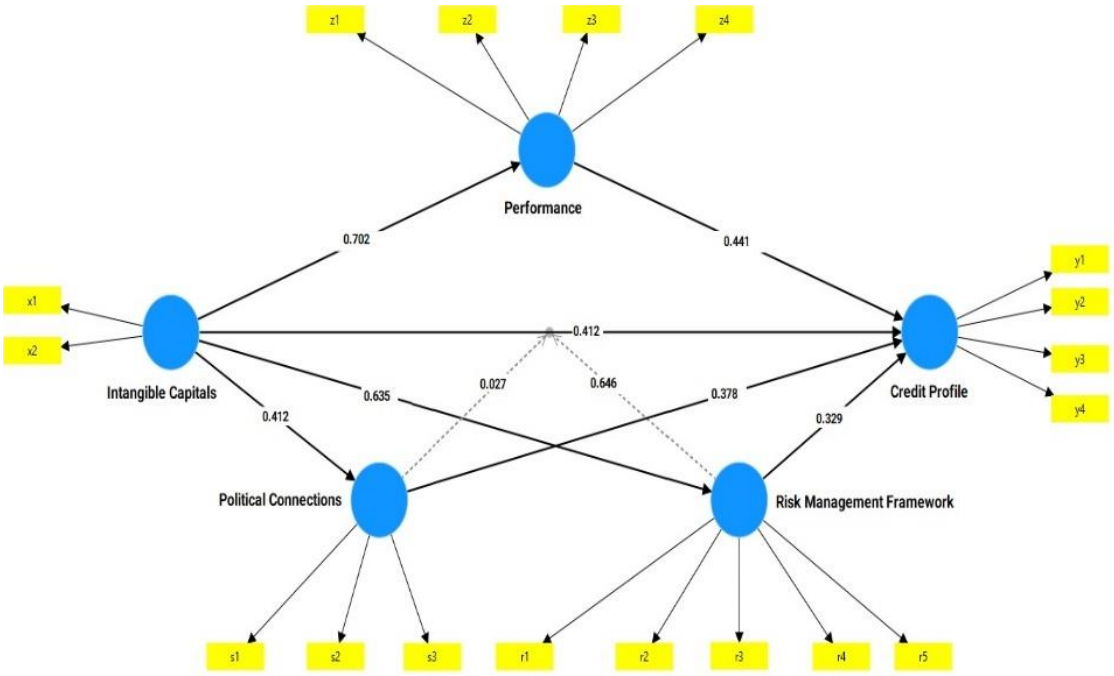


Figure 3. *Path coefficients measurement model (inner model)*

In this figure, intangible capitals and credit profile have a direct relationship with the severity of 0.412; But there is another indirect relationship through the performance of the company, which is calculated from the multiplication of two effects of 0.702 and 0.441, i.e., 0.310. To calculate the total effect of intangible capitals on the credit profile, the sum of two direct and indirect effects, i.e., 0.722=0.310+0.412, should be considered. Although the direct effect of intangible capitals on the credit profile is not very strong, its total effect is relatively significant considering the mediating variable.

**T-student test**

In this section, significant coefficients are extracted based on t-student (t-values). Since according to the table below, the t-values for the claim made in this research are more than 1.96, therefore, their significance is confirmed at the confidence level of 95%.

Table 7.
*t-student (t-values)*

| Relation between Variables | T statistics (O/STDEV) |
|---|---|
| Political Connections → Credit Profile | 5.428 |
| Intangible Capitals → Political Connections | 5.55 |
| Intangible Capitals → Performance | 17.804 |
| Intangible Capitals → Credit Profile | 1.966 |
| Intangible Capitals → Risk Management Framework | 13.346 |
| Performance → Credit Profile | 1.957 |
| Risk Management Framework → Credit Profile | 3.16 |

**Coefficient of Determination**

The coefficient of determination is a number between 0 and 1 that measures how well a statistical model predicts an outcome. In other words, it is a statistical measurement that examines how differences in one variable can be explained by differences in a second variable when predicting the outcome of a given event. Calculating it allows us to determine how confident we can be in the model. The important point is that the value of the coefficient of determination is calculated only for the dependent (endogenous) variables of the model; for

exogenous factors, the value of this criterion is zero. The higher the value of the coefficient of determination related to the endogenous structures of a model, the better the fit of the model. Chin (1998) considers three values -0.19, 0.33, and 0.67- as criteria for weak, medium, and strong values of the fit of the structural part of the model, respectively, by means of the coefficient of determination criterion.

Table 8.
*Coefficient of determination of the model*

| Variable | $R^2$ |
|---|---|
| Model | 0.423 |

**Predictive quality ($Q^2$)**

The second indicator of the predictive power of the model is the predictive quality index, or $Q^2$. This criterion, introduced by Stone and Geisser (1975), determines the predictive power of the model in endogenous constructs. They believed that models with acceptable structural fit should be able to predict the endogenous variables of the model. This means that if the relationships between the structures are correctly defined in a model, the structures have a sufficient impact on each other, thereby correctly confirming the hypotheses. The blindfolding technique is used to calculate the $Q^2$ index in Smart-PLS software (Chin, 1998). This measure determines the predictive power of the model. Models with an acceptable structural fit should be able to predict indicators related to the endogenous constructs of the model. Henseler et al. (2009) proposed three values -0.02, 0.15 and 0.35- to indicate the weak, medium, and strong predictive power of the structure or endogenous structures of the model with reflective indicators (Davari and Rezazadeh, 2013).

Table 9.
*Prediction quality of the model*

| Variable | $Q^2$ |
|---|---|
| Model | 0.357 |

**Goodness of Fit criterion**

The Goodness of Fit (GOF) criterion is developed as a general measure of model fit for structural equation models. Wetzels et al. (2009) introduced three values of 0.01, 0.25, and 0.36 as weak, medium, and strong values for GOF, respectively.

Table 10.
*The average geometric mean of the coefficient of multiple determination of the model*

| Variable | GOF |
|---|---|
| Model | 0.388 |

According to the obtained value of GOF in Table 8 as 0.388, the good fit of the model is confirmed.

**Structural equation model fit**

This research focuses on data analysis using inferential statistics methods, considering the following hypotheses. The hypotheses are designed to explain the main research question: "How to represent a comprehensive model of the impacts of intangible capitals on the credit scoring of companies listed on the Tehran Securities Exchange?"

**$H_1$:** *"intangible capitals" has a significant impact on "credit profile".*

Table 10 provides the path analysis results of $H_1$:

Table 11.
*The result of $H_1$*

| Path | Path Coefficient | Result |
|---|---|---|
| Intangible Capitals → Credit Profile | 0.412 | Supported |
| Significance level 5%<br>Source: research findings | | |

According to the table above, the value of the path coefficient is 0.412, indicating a significant relationship. Additionally, the t-value obtained in Table 6 is 1.966, which, when compared with the significance level of $\alpha$=0.05, confirms that this relationship is significant. In general, it can be said that the

first hypothesis is supported at a significance level of 0.05.

**$H_2$:** *"Performance" significantly mediates the relationship between "intangible capitals" and "credit profile".*

Table 11 reports the path analysis of $H_2$:

Table 12.
*The result of $H_2$*

| Sobel statistic | Result |
|---|---|
| 2.275 | Supported |
| Significance level 5% | |
| Source: research findings | |

According to Table 11 and the Sobel test, the mediating variable has a significant effect (a value higher than 1.96). Additionally, the t-value obtained in Table 6 indicates a significant relationship. In general, it can be said that the mediator was found to be significant, supporting H2.

**$H_3$:** *"Risk management framework" significantly moderates the relationship between "intangible assets" and "credit profile".*

Table 12 shows the path analysis of $H_3$:

Table 13.
*The result of $H_3$*

| Path | Path Coefficient | Result |
|---|---|---|
| Intangible Capitals → Credit Profile Risk Management Framework moderation | 0.646 | Supported |
| Significance level 5% | | |
| Source: research findings | | |

According to the table above, the value of the path coefficient is 0.646, indicating a significant relationship. Given the t-value obtained in Table 6, which is 14.089, and comparing it with the significance level of α=0.05, this relationship is significant. Therefore, H3 is supported.

**$H_4$:** *"political connections" significantly moderates the relationship between "intangible capitals" and "credit profile".*

Table 13 provides the path analysis results of $H_4$:

Table 14.
*The result of $H_4$*

| Path | Path Coefficient | Result |
|---|---|---|
| Intangible Capitals → Credit Profile Political Connections moderation | 0.027 | Not Supported |
| Significance level 5% | | |
| Source: research findings | | |

According to the table above, the value of the path coefficient is 0.027, which does not indicate a significant relationship. Additionally, the t-value obtained in Table 6, which is 0.41, when compared with the significance level of α=0.05, shows that this relationship is not significant. Consequently, H4 is not supported.

## Discussion and Conclusion

This study aimed to develop a comprehensive model to assess the impacts of intangible capitals on the credit scoring of companies listed on the Tehran Securities Exchange. The analysis of the model is presented in four parts: Statistical Analysis, Scientific Analysis, Managerial Insights, and Future Directions.

### Statistical Analysis

To address the primary research question, a comprehensive analysis of the variables influencing the relationship between intangible capitals and credit profiles was conducted with an exploratory approach. The model was tested using structural equation modeling (SEM), based on the collected data. Four partial hypotheses were examined within this framework.

The analysis of the main hypothesis revealed a significant impact of intangible capitals on the credit profile, with a direct path coefficient of 0.412 and a t-value of 1.966. This supports the view that intangible capitals play a substantial role in shaping a company's creditworthiness. According to the second hypothesis, the company's performance acts as a significant mediator in the relationship between intangible capitals and credit profiles, as confirmed by a Sobel

statistic of 2.275. The third hypothesis, which examines the moderating effect of the risk management framework, also found significant results, indicating that a strong risk management system strengthens the relationship between intangible capitals and credit profiles. However, the fourth hypothesis, which postulated that political communication moderates this relationship, was not supported. The path coefficient for political communication was 0.027, and the t-value was 0.41, which is not statistically significant.

**Scientific Analysis**

The research findings suggest that investments in intangible assets positively affect both current and future financial performance. These assets help firms adapt to dynamic market conditions, contributing to sustained growth and a competitive advantage. Furthermore, a robust risk management framework is essential for enhancing a firm's financial stability and creditworthiness. By systematically identifying, assessing, and mitigating risks, firms can protect their capital and earnings, leading to more stable and predictable financial outcomes. Companies with effective risk management practices are likely to experience higher performance metrics, such as return on assets (ROA) and return on equity (ROE).

From a scientific perspective, this study affirms that incorporating mediating and moderating variables is crucial for understanding the complex dynamics between intangible capitals and credit profiles. The research confirms that performance significantly mediates the relationship between intangible capitals and credit profiles. Additionally, the moderating effect of the risk management framework aligns with expectations, underscoring the importance of risk governance in shaping the creditworthiness of firms. However, the expected moderating effect of political communication was not supported by the data.

To further explain these relationships, the performance component of "control and evaluation" showed the strongest relationship with the credit profile, suggesting its key role in linking intangible capitals to credit scores. In terms of political communication, the component "the dependence of board members on power" better explains the influence of political ties on the relationship between intangible capitals and credit scoring. Among the elements of the risk management framework, "risk governance" was identified as the most influential factor in mediating the relationship between intangible capitals and credit profiles.

Additionally, this study operationalized the impact of intangible capitals on four components of a company's credit profile: the quantitative index, qualitative index, intelligence index, and capital index, while accounting for the roles of mediating and moderating variables.

**Managerial Insight**

The article provided a managerial perspective on the relationship between intangible capitals and company credit scoring and underscored the critical role in which, intangible assets play in enhancing a company's credibility and stability, influencing key indicators such as performance, risk assessment, and overall credit profile. Notably, the article emphasized the importance of a robust risk management framework and political connections and suggested that while intangible assets significantly contribute to firm stability and creditworthiness, the presence of a strong risk management framework can substantially moderate this relationship, thereby enhancing the reliability of credit assessments. Furthermore, the findings offered practical guidance for managers aiming to improve their company's creditworthiness. By investing in intangible assets and strengthening risk management protocols, companies can enhance their competitive edge, reduce borrowing costs, and improve access to capital. This approach also involves leveraging performance as a mediating factor

to enhance credit profile. In the following, 7 approaches are recommended for managers to use:

**Approach 1: Leveraging Intangible Capitals for Enhanced Credit Scoring**

Managers should recognize the strategic importance of intangible capitals, in enhancing a company's credit profile. By investing in and effectively managing these non-physical assets, firms can improve their qualitative and quantitative credit indicators. Additionally, fostering a culture of continuous learning and innovation among employees can enhance intellectual capital, leading to improved operational efficiencies and competitive advantages. Managers should therefore prioritize the development and integration of intangible capitals into their overall business strategy to achieve sustainable growth and favorable credit assessments.

**Approach 2: Integrating risk management framework alongside political communication and external communication strategies**

The role of a robust risk management framework cannot be overstated when it comes to leveraging intangible capitals for credit scoring. Furthermore, political connections and external communication strategies should be managed carefully to protect and enhance the company's reputation. By integrating risk management with the strategic management of intangible capitals, firms can safeguard their assets, maintain operational resilience, and ultimately improve their credit profile. This holistic approach enables managers to navigate uncertainties while capitalizing on the strengths of their intangible assets.

**Approach 3: Establishing Metrics for Intangible Asset Valuation**

Managers should develop clear metrics to evaluate the value and impact of intangible assets on overall business performance and creditworthiness. This could involve creating key performance indicators (KPIs) that specifically measure the effectiveness of brand reputation, employee engagement, and innovation initiatives. By quantifying the contributions of intangible assets, managers can better communicate their value to stakeholders, including investors and credit rating agencies. Regularly assessing these metrics will also help in making informed decisions about where to allocate resources for maximum impact on credit profile.

**Approach 4: Enhancing Stakeholder Engagement and Communication**

Effective communication with stakeholders about the company's intangible assets and risk management strategies is crucial. Managers should develop a comprehensive communication plan that highlights the significance of these assets in driving business success and mitigating risks. This includes engaging with investors, customers, and employees to build a shared understanding of the company's value proposition. By fostering transparency and trust, firms can enhance their credibility and improve their overall credit assessments.

**Approach 5: Fostering Innovation and Adaptability**

To maintain a competitive edge, managers should cultivate a culture of innovation and adaptability within the organization. This involves encouraging employees to contribute ideas and solutions that leverage intangible assets for business growth. Managers can implement programs that reward innovative thinking and provide resources for experimentation. By staying ahead of market trends and adapting to changes, companies can enhance their intangible capital and strengthen their creditworthiness.

**Approach 6: Building Strategic Partnerships**

Managers should seek to establish strategic partnerships that can enhance the value of intangible assets. Collaborating with other firms, research institutions, or industry organizations can provide access to new technologies, expertise, and markets. These partnerships can amplify the impact of a company’s intangible assets, such as intellectual property and brand reputation, while also sharing the risks associated with innovation and market entry. By leveraging external resources, firms can improve their competitive positioning and credit profile.

**Approach 7: Conducting Regular Risk Assessments**

Regular risk assessments are essential for identifying potential vulnerabilities related to intangible assets. Managers should implement a systematic approach to evaluate risks associated with intellectual property, brand reputation, and human capital. This includes assessing external threats, such as market competition and regulatory changes, as well as internal factors, such as employee turnover and operational inefficiencies. By proactively addressing these risks, managers can protect their intangible assets and enhance the company's overall creditworthiness.

By incorporating these additional approaches, managers can further strengthen their strategies for leveraging intangible assets and risk management, ultimately leading to improved credit ratings and financial stability.

**Future Directions**

1) Considering the prioritized dimensions of intangible capitals in this research, future studies could investigate the effect of other dimensions of intangible capitals on the credit profile of companies.
2) It is suggested that future research should explore whether other factors, apart from the mediating and moderating variables considered in this study, have an effect on this relationship and how this effect manifests.
3) It is recommended that the comprehensive model presented in this research be tested in different industries within Iran's capital market and compared with the results of this study.

## References

Abdou, Hussein & Pointon, John. (2011). Credit Scoring, Statistical Techniques and Evaluation Criteria: A Review of the Literature. Int. Syst. in Accounting, Finance and Management. 18. 59-88. DOI:10.1002/isaf.325.

Ahadi Serkani, S.Y., Atarasadim M. & Amini khouzani, M. (2022). Comprehensive Systematic Model of Fraud and Decisions in Financial Management: A Structural Equation Modeling Approach Subject Areas: Business Strategy. Journal of System Management. DOI:10.30495/JSM.2022.1968673.1693.

Akwaa-Sekyi, Ellis & Moreno, Jordi. (2017). Internal controls and credit risk relationship among banks in Europe. Intangible Capital. 13. 25. DOI:10.3926/ic.911.

Al-dhamari, R. & Ku Ismail, K. (2015). Cash holdings, political connections, and earnings quality: Some evidence from Malaysia. International Journal of Managerial Finance. 11. 215-231. DOI:10.1108/IJMF-02-2014-0016.

Alsamawi, Ali & Cadestin, Charles & Jaax, Alexander & Guilhoto, Joaquim & Miroudot, Sébastien & Zurcher, Carmen. (2020). Returns to intangible capital in global value chains: new evidence on trends and policy determinants. DOI: 10.1787/4cd06f19-en.

Amat, Oriol & Manini, Raffaele & Antón Renart, Marcos. (2017). Credit concession through credit scoring: Analysis and application proposal. Intangible Capital. 13. 51. DOI: 10.3926/ic.903.

Blair, G., Woodcock, H., Pagano, R., & Endlar, L. (2024). Constructing a Risk Management Framework to Protect the Organization. Journal of UTEC Engineering Management, 2(1), 113–124. DOI:10.36344/utecem. 2024.v02i01.010.

Blöchlinger, A. & Leippold, M. (2006) Economic benefit of powerful credit scoring. Journal of Banking & Finance, Volume 30, Issue 3, P 851-873, ISSN 0378-4266, DOI, 10.1016/j.jbankfin.2005.07.014.

Cahyono, S. & Ardianto, A. (2024) Intellectual Capital, Political Connection, and Firm Performance: Exploring from Indonesia. Risks, 12, 105. DOI:10.3390/risks12070105.

Chan, Thim & Choong, Yap & Nee, Chai. (2011). Factors affecting financial distress: The case of Malaysian public listed firms. Corporate Ownership and Control. 8. 345-351. DOI:10.22495/cocv8i4c3art3.

Chin, Wynne & Marcoulides, G. (1998). The Partial Least Squares Approach to Structural Equation Modeling. Modern Methods for Business Research. 8.

Coombs, C., Hislop, D., Taneva, S. & Barnard, S. (2020). The strategic impacts of Intelligent Automation for knowledge and service work: An interdisciplinary review. The Journal of Strategic Information Systems. 29. DOI: 10.1016/j.jsis.2020.101600.

Crouzet, N., Eberly, J., Eisfeldt, A., & Papanikolaou, D. (2022). Intangible capital,

non-rivalry, and growth. Available at SSRN. DOI:10.2139/ssrn.4264886.

Davari, A., & Rezazadeh, A. (2013). Structural equation modeling with PLS. Tehran: Jahad University, 215(2), 224.

David, P. A. (2000). Knowledge, capabilities and human capital formation in economic growth (No. 01/13). New Zealand Treasury Working Paper.

Demmou, L., I. Stefanescu & A. Arquie (2019) Productivity growth and finance: The role of intangible assets - a sector level analysis. OECD Economics Department Working Papers, No. 1547, OECD Publishing, Paris, DOI: 10.1787/e26cae57-en.

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. Communications of the Association for Information systems, 16(1), 5. DOI:10.17705/1CAIS.01605.

Jarrow, R. & Turnbull, S. (2000). The Intersection of Market and Credit Risk. Journal of Banking & Finance. 24. 271-299. DOI:10.1016/S0378-4266(99)00060-6.

Jory, S., Khieu, H., Ngo, T. & Phan, H. (2020). The Influence of Economic Policy Uncertainty on Corporate Trade Credit and Firm Value. Journal of Corporate Finance. 64. DOI:10.1016/j.jcorpfin.2020.101671.

Keter, C. K. S., Cheboi, J. Y., & Kosgei, D. (2024). Financial performance, intellectual capital disclosure and firm value: the winning edge. Cogent Business & Management, 11(1), 2302468, DOI:10.1080/23311975.2024.2302468.

Nunnally, J.C. (1978). An Overview of Psychological Measurement. In: Wolman, B.B. (eds) Clinical Diagnosis of Mental Disorders. Springer, Boston, MA. DOI: 10.1007/978-1-4684-2490-4_4.

Paidar, A., Shafiee, M., Avazzadeh, F. & Valipour, H. (2021). Predicting Banks' Financial Distress by Data Envelopment Analysis Model and CAMELS Indicators Subject Areas: Business Strategy. Journal of System Management. DOI:10.30495/jsm.2022.1966338.1681.

Pan, Sabrina. (2022). Effects of the Growth of Intangible Capital Value on Firms. American Journal of Industrial and Business Management. 12. 1552-1563. DOI:10.4236/ajibm.2022.1210085.

Prasetyo, K., & Nasution, D. (2022). Are political connections beneficial or harmful toward firms' performance? A meta-analysis approach. Corporate Governance: The International Journal of Business in Society, 22(5), 901-921. DOI:10.1108/CG-07-2021-0256.

Robert A. Jarrow & Stuart M. Turnbull (2000). The Intersection of Market and Credit Risk. Journal of Banking & Finance. 24. 271-299. DOI:10.1016/S0378-4266(99)00060-6.

Sadeghnia, M. & Setayesh, M.H. (2021). The Effects of Information System Integration on Financial Performance Mediated by Cost Performance and Quality Performance: An SEM-based Analysis. Journal of System Management. DOI:10.30495/jsm.2021.678902.

Sadri, N., Modiri, M., Fathi Hafshjani, K. & Valmohammadi. C. (2024). Supply Chain Risk Management Analysis based on Resilience Capabilities (Comprehensive Structural Interpretive Modeling Approach) Subject Areas: Entrepreneurship and Innovation. Journal of System Management. Online ISSN: 2538-1571, Print ISSN: 2322-2301.

Salari, A., Vakilifard, H. & Talebnia Surendranath, G. (2019). The Comparison of Applying a Designed Model to Measure Credit Risk Between Melli and Mellat Banks Subject Areas: Business Strategy. Journal of System Management. DOI:20.1001.1.23222301.2019.5.4.13.0.

Tahat, Y.A., Ahmed, A.H. & Alhadab, M.M. (2018). The impact of intangibles on firms' financial and market performance: UK evidence. Review of Quantitative Finance and Accounting. 50. DOI:10.1007/s11156-017-0657-6.

Temba, G.I., Kasoga, P.S. & Keregero, C.M. (2024). Impact of the quality of credit risk management practices on financial performance of commercial banks in Tanzania. SN Business & Economics. 4. DOI:10.1007/s43546-024-00636-3.

The Institute of Internal Auditors (2020). Auditing credit risk management. Retrieved from: https://www.theiia.org.

Tjøstheim, T. A., & Stephens, A. (2022). Intelligence as accurate prediction. Review of Philosophy and Psychology, 13(2), 475-499. DOI:10.1007/s13164-021-00538-5.

Yilmaz, İ. (2018). Politically Connected Firms: A Review. International Journal of Management Economics and Business. 14. DOI:10.17130/ijmeb.2018445671.