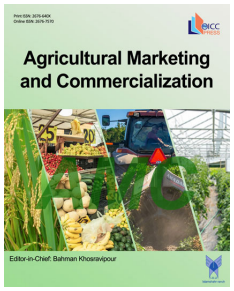

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Investigating the Impact of Commercial Credit and Government Subsidies on the Relationship between Digital Financing and Innovation of Companies Listed on the Tehran Stock Exchange

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Original Research

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Abstract:

The present study investigated the impact of commercial credit and government subsidies on the relationship between digital financing and innovation of companies listed on Tehran Stock Exchange. The spatial scope of the research covered companies listed on the Tehran Stock Exchange, and the temporal scope targeted the interval between 2015 and 2021. A total of 154 companies were selected based on systematic omission. According to the categorization of studies based on their nature and methods, the present applied research was a descriptive quest following a cause-and-effect methodology and using the library method for data collection. The data of the sample companies were collected by reference to financial statements, explanatory notes, and the monthly journal of the Tehran Stock Exchange. The multivariate regression test run in the EViews software was employed to confirm or reject the respective hypotheses. The results revealed a significant relationship between digital financing and independent organizational innovation and the contribution of commercial credit to the association between companies' independent innovation and digital financing. Likewise, government subsidies impacted the relationship between digital financing and independent innovation of companies.

Keywords: Digital Financing, Independent Organizational Innovation, Commercial Credit, Government Subsidies

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Introduction

Numerous researchers and experts have studied company financing behaviors due to their practical impacts on company management and performance and even the whole economy. One of the salient domains of literature has focused on identifying determinants that direct companies to select their financing strategies (Anderson et al., 2017). Although the actual impacts of certain company features, e.g., size, profitability, cash flow, and growth opportunities, have been confirmed through experiences, whether these company features completely explain financing decisions or not lies in an aura of ambiguity (Graham et al., 2015). On the other hand, the circumstances of the macro economy and the policies governments implement to change commercial environments wherein companies operate are paramount. For instance, monetary policies pivotally impact the external financing and discount rate of investment projects. On the one hand, the contractionary monetary policy raises the interest rate and, thus, the leverage cost, and on the other hand, higher discount rates lower the investment rate and the demand for external financing (Pindado et al., 2017). Many theoretical and empirical studies have examined and uncovered different reasons for companies'

financing decisions. The traditional theory of capital structure, e.g., the equilibrium theory (Miller, 1977), agency theory (Jensen & Meckling, 1976), and hierarchy theory (Myers & Majluf, 1984), inform about the roles of corporate-level characteristics in the financing decisions of companies. Researchers and activists have long perceived that company size, growth opportunities, and profitability capacity are closely associated with the financing of companies. Considering the impact of the company size, the equilibrium theory asserts that large companies tend to reduce the costs of bankruptcy and enjoy more diverse portfolios with relatively simpler access to credit markets. The hierarchy theory also explains that large companies are less likely to face information asymmetry. Accordingly, it is predicted that a company's size positively influences its financing. Previous empirical studies also reflect congruent results (Karpavisios & Yu, 2019).

Theoretical foundations

After undergoing fast growth, the economy now experiences high-quality development, of which innovation is the main driver. Digital financing is the artery for preserving and developing the real economy and significantly contributes to companies' independent innovation. The perfectness of the digital financial system is directly associated with the success or failure of independent organizational innovation. At the same time, commercial credit, as an external financing approach, can withdraw enterprises' financing constraints and sponsor their innovative practices. Hence, the benefits of digital financing development and its extensive application can influence companies' use of commercial credit and, thus, their innovation. The private marginal innovative return of companies' independent innovation may demotivate companies to innovate if falling behind society's. In such conditions, a visible hand is necessary for solving this phenomenon (Gayo et al., 2018). For this purpose, government subsidies can directly decrease the budget deficit for companies and send them positive signals to gain more interest in investing in the market. Therefore, they absorb further external capital to promote their independence and innovation. Thus, by impacting independent innovation, digital financing positively influences companies' development and high-quality economic growth (Li et al., 2022). Innovation is the engine for the high-quality economic growth of China, and digital financing is its fuel. However, the conventional financial development system is inadequate and uneven. It is mainly reflected in several aspects, e.g., the salient information asymmetry in the financial market, insufficient financial supply in underdeveloped regions, and high financing cost of companies, and has seriously restricted the sustainable development and transformation of China's economic structure. Digital financial development has broken the boundaries of conventional financial services, lowered the costs of information asymmetry in conventional financial services, removed temporal and geographical limitations, and extended the coverage and depth of digital financial services. With a financial spillover effect, digital financing can somehow promote the reconfiguration of the conventional financial system. This creatively overturns the pricing model of conventional credit through credit data and transparency, gradually develops macro data warehouses and algorithms, reinforces companies' soft information, and improves their commercial credit. As a form of external financing, commercial credit can decrease financing constraints ahead of enterprises, support their innovation, and, hence, consciously improve their commercial credit. Enterprises use commercial credit in two ways: First, when companies have the privilege of cash discounts for early repayments during the credit period, they receive indirect benefits that raise the cash flow of their independent, innovative investment. Second, when companies are deprived of cash discounts for repayments on due dates, they benefit from delayed interest-free cash flows, which reduce the limitations of the R&D innovation cash flow during the credit period (Zhang et al., 2018). Thus, commercial credits are granted to R&D projects when a company highly demands R&D innovation. According to the theory of alternative financing, companies can employ commercial credit to compensate for their financing deficits (Lo et al., 2011) and promote their independent, innovative activities when they face difficulty receiving credit from banks (Li et al., 2022). Digital financing development directs governments to assess companies' features precisely, determine the objective of subsidies accordingly, and promote companies' independent innovation. Governments employ the financial advantages of digital financing and apply new information technology to diminish information asymmetry between the government and companies, improve the mobility and security of actual subsidy utilization, reduce companies' hedonistic behavior (Lee, 2020), and promote organizational innovation. In addition, in parallel with the signaling theory, government subsidies send positive signals to external investors, make them more inclined to raise their contribution to stock investments (Takalo et al., 2010), and reduce companies' financing and financial costs. Government subsidies bestow accelerated and continuous innovation to companies and cater to sponsorship for obtaining new technologies and equipment mainly by lightening financial pressures and reducing innovation risks to supplying budget for independent innovation. Direct forms of subsidies are subsidies for sustainable jobs, patent costs, personnel training, and brand financing. These subsidies can enhance profit directly and encourage enterprises to utilize mid-term and long-term credits (Kaboni, 2017). This declines companies' internal financial pressure for innovation by financing external debts. Considering what was discussed, the present research investigated digital financing, commercial credit, and independent innovation in the companies listed on the Tehran Stock Exchange.

Research hypotheses

H1: Digital financing is significantly related to independent organizational innovation.
H2: Commercial credit impacts the relationship between digital financing and independent innovation of companies.
H3: Government subsidies influence the relationship

between digital financing and independent innovation of companies.

Research background

Azizi et al. (2022) investigated the link between membership in business groups and commercial credit by emphasizing financial limitations and the competitiveness of product markets in companies listed on the Tehran Stock Exchange. They found that companies affiliated with business groups were relatively less dependent on the external capital market and financing than independent companies and could pay the interest of permanent stocks. Thus, they could access simpler finances and higher commercial credit. This study examined the relationship between membership in business groups and commercial credit by foregrounding financial constraints and the competitiveness of product markets in companies listed on the Tehran Stock Exchange. The results revealed a direct association between membership in business groups and commercial credit. Besides, the competitiveness of product markets and financial limitations strengthened and weakened this relationship, respectively.

Sotodeh (2021) examined the moderating role of organizational culture in the relationship between accounting information systems and the operational performance of small- and middle-size companies in the Asaluyeh Special Zone. He argued that company managers attempted to reinforce accounting information systems with respect to organizational culture and better contribute to the company's performance by clarifying its information. This was also a topic addressed by Wang Dangha in 2020. Hence, the researcher evaluated this topic and tested its hypotheses in Iran and investigated the moderating role of organizational culture in the relationship between accounting information systems and the operational performance of small- and middle-sized companies in the Asaluyeh Special Zone. The cross-sectional data were collected by questionnaires in 2021. Organizational culture, accounting information systems, and operational performance were the variables of this research. The statistical sample selected based on Morgan's table constituted 162 accounting experts, employees, and managers, as well as financial specialists, in these companies. The research was an applied and descriptive survey that examined the validity and reliability of its data using the Kolmogrov-Smirnov test of normality and a one-sample t-test run in the SPSS 20 software. The results displayed that organizational culture moderated the relationship between accounting information systems and operational performance in the small- and middle-size companies in the Asaluyeh Special Zone. Thus, the indices of organizational culture, e.g., participation, instability, missions, and adaptability, can impact the link between accounting information systems and the operational performance of small- and middle-size companies, help innovate and develop emerging technologies, and facilitate recording accounting information.

In their study entitled 'Companies finance resources and executive functions: Impact of strategic ownership and financial restatements, Papadaki et al. (2023) examined a sample of European markets and claimed that these study documents could predict changes in external financing, both in legal (stockholders) and debt forms, and future executive functions (profitability and cash flows). In terms of future

Table 1. Measurement tool and the approach to measuring research variables and model

Row	Variable	Symbol	Operational definition
		Dependent variable	
1	Independent organizational innovation	Innov	Total assets/R&D costs (Li et al., 2022)
		Independent variable	
2	Digital financing	Indext	The sum of cryptocurrencies and bitcoins used for financing is employed to measure this variable (Traous et al. 2021)
		Moderating variables	
3	Commercial credit	TC	Accounts payable-bonds payable + accounts receivable/total assets (Li et al., 2022)
4	Government subsidies	SUB	(Public assistance +1) LN (Li et al., 2022)
		Control variables	
5	Financial leverage	LEV	The ratio of total debts to total assets
6	Profit (Return on Assets)	ROA	Pre-tax revenues divided by total assets
7	Company size	SIZE	Natural logarithm of total assets: The total assets of the company (Ln)
8	Growth opportunity	MB	The ratio of the market value to the book value of stockholders' salaries (companies with higher ratios access more growth opportunities than others.)

profitability, stock financing (debt) is particularly growing for the benefit of large companies (companies with high values). Notably, a corporate environment with qualified legal information, shown despite accounting restatements, strengthens the relationship between external financing and executive functions due to examining the investors or loaners of companies that have lately restated their financial reports. In addition, strategic ownership in the company does not considerably influence the relationship between financing profitability and executive functions but may reinforce the positive impacts of stock financing on future executive cash flows. Likewise, financial analysists' predictions of executive profitability and cash flows reflect the influence of external financing shifts on future executive functions while depicting a financing-tied systematic inefficiency, especially for companies that have recently restated their previous chief financial outcomes. Finally, by controlling the existing information of analysts' prediction wonders, we can assert that the market is totally efficient and incorporates the impacts of stock investment and debt changes into the stock price.

Li et al. (2022) empirically examined the effect of digital financing development on companies' independent innovation, commercial credit transfer mechanism, and government subsidies using the data of companies listed on the Shanghai and Shenzhen Stock Exchange in the 2012-2020 interval. The results uncovered that digital financing development significantly improved independent corporate innovation, and commercial credit and government subsidies mediated (or moderated) the relationship between digital financing and independent innovation of companies. They also moderated the effect of the various dimensions of digital financing on independent innovation in companies. Lastly, the heterogeneity analysis reflected that the effect of digital financial innovation incentives was stronger for private and small- and middle-sized companies.

The regression model

Model 1 for confirming H1:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{SIZE}_{it} + \beta_3 \mathrm{LEV}_{it} + \beta_4 \mathrm{ROA}_{it} + \beta_5 \mathrm{MTB}_{it} + \varepsilon_{it}$$

Model 2 for confirming H2:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{TC}_{it} + \beta_3 \mathrm{TC} * \mathrm{Index}_{it} + \beta_4 \mathrm{SIZE}_{it} + \beta_5 \mathrm{LEV}_{it} + \beta_6 \mathrm{ROA}_{it} + \beta_7 \mathrm{MTB}_{it} + \varepsilon_{it}$$

Model 3 for confirming H3:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{SUB}_{it} + \beta_3 \mathrm{SUB} * \mathrm{Index}_{it} + \beta_4 \mathrm{SIZE}_{it} + \beta_5 \mathrm{LEV}_{it} + \beta_6 \mathrm{ROA}_{it} + \beta_7 \mathrm{MTB}_{it} + \varepsilon_{it}$$

(Li et al., 2022)

Research method

Panel data collection and analysis were employed for this study. The data required to estimate other variables were collected from the Rahavard Novin Software and the website of the Financial Information Processing Center of Iran (FIPIRAN) and sorted by the EXCEL 2013 software. The panel data method, where time series data (examined years) and cross-sectional data (examined companies) are mixed, was used to test the hypotheses. Panel data are often applied to raise the number of observations, increase the degree of freedom, reduce heteroskedasticity, and investigate variations dynamically. To estimate the efficiency of the regression model with panel data, we should select one of the joint-effects, fixed-effects, and random-effects models using proper tests. First, the Lin-Levine test was used to determine if the time series (X_t) was a stationery (a loading ratio of zero) or divergent (a loading ratio of one) process. Similar to examining the stationariness of variables, we, here, needed to employ a suitable approach for the panel data. Thus, we used the ARCH statistic to examine group heteroskedasticity in the residuals of the regressive fixed-effects model. Likewise, the F-Limer and Haussmann tests were utilized to determine the panel data and select fixed effects or random effects. The adjusted Coefficient of Determination (Adjusted R^2) was used to picture the explanatory power of the explanatory variables, the t statistic was employed to examine the significance of the variables, and the Fisher-F statistic was utilized to investigate the general adequacy of the model. Notably, the statistical analyses were run in the EXCEL and EVIEWS software.

Results

Descriptive statistics

Descriptive statistics summarize, describe, and explain the chief characteristics of data. They present diverse data in tables and measure different indices in a domain. This type of statistics summarizes data, displays them in tables, and estimates numerical criteria for obtaining the central tendency and dispersion values.

Stationarity test

A time series variable is stationary when its mean, variance, and autocorrelation coefficient remain constant over time. Stationarity can be weak or strong. Yet, the weak condition is usually examined. A series is strongly stationary if all moments are constant over time and is weakly stationary if the first- and second-order moments are constant over time. This research employed the Lin and Levine test to examine stationarity. The null hypothesis of the test indicates the unit root of the variables.

Considering the table above, the null hypotheses on the non-stationarity of all variables are rejected, and all examined variables are stationary at the 0.05 level.

F-Limer test

For the panel data, it should be determined if cross-sections (companies in this research) are different (heterogeneous)

Table 2. Central tendency and dispersion indices of every variable

Variable	Independent organizational innovation	Company size	Government subsidies	Commercial credit	Digital financing	Growth opportunity	Financial leverage	Profit (Return on Assets)
Mean	0.606	14.262	1.064	0.642	2.005	0.633	0.561	0.172
Median	0.606	14.069	0.952	0.639	1.883	0.277	0.560	0.127
Maximum	1.567	19.106	6.232	3.351	5.023	22.800	1.252	1.622
Minimum	0.147	10.352	0.170	0.014	1.828	0.158	0.111	0.077
Standard deviation	0.197	1.451	0.546	0.276	0.949	1.808	0.186	0.218
Skewness	0.385	0.788	3.669	2.281	0.520	8.197	-0.078	1.203
Kurtosis	4.123	4.044	28.105	22.558	3.246	88.317	2.890	9.975

Table 3. Lin and Levine test

Variable		Statistic	Sig.
Independent organizational innovation	Innov	-3.6251	0.0007
Digital financing	Indext	-5.1655	0.0023
Commercial credit	TC	-7.5139	0.0014
Government subsidies	SUB	-3.4817	0.0069
Financial leverage	LEV	-6.3518	0.0021
Profit	ROA	-2.6895	0.0057
Company size	SIZE	-7.6891	0.0051
Growth opportunity	MB	-3.6891	0.0000

***Sig. = 0.05**

Table 4. F-Limer test results of the research model

F-Limer	Statistic	df	Sig.
1	2.175837	(101,405)	0.0000
2	4.117748	(101,405)	0.0000
3	5.822158	(101,405)	0.0000

or homogeneous. For this purpose, we should load statistical data and run the estimation by the conventional OLS approach (pooling data), or the panel data method is suitable? The F-Limer test can be employed to determine heterogeneity among cross-sections. The null hypothesis of the F statistic is based on section homogeneity (statistical pooling data). If the null hypothesis is rejected, its alternative hypothesis on the section heterogeneity is accepted (statistical panel data). Table 3 presents the results of the F test.

Considering the results of the F-Limer test, the null hypothesis on the pooled data is rejected, and the data are paneled since the estimated probability is below 0.05.

Haussmann test

Having determined that the cross-sections are heterogeneous, individual differences can be considered, and the panel data method is suitable for model estimation, we should discover whether the estimation error results from sectional variation or arises over time. For this purpose, fixed and random effects are used to consider such errors. The null hypothesis of the Haussmann test is based on the randomness of the estimated errors. The results of this test are displayed in Table 5.

Examining heteroskedasticity

This section estimates the heteroskedasticity rooted in the different features of the companies. We have group-wise heteroskedasticity if the variance is homogenous within the sectional units but heterogeneous across the units. Like examining the stationarity of the variables, we should apply a suitable approach to the panel data. Thus, we employ the Breusch-Pagan test to examine group-wise heteroskedasticity in the residuals of the regressive

Table 5. Haussmann test results of the research model

Haussmann	Statistic	df	Sig.	Result
1	3.087119	3	0.3784	Random-effects
2	10.139229	3	0.0174	Random-effects
3	6.108042	3	0.1065	Random-effects

Table 6. Breusch-Pagan test for model heteroskedasticity

ARCH	Statistic value	df	Sig.
1	6676.304	5151	0.000
2	10999.53	5151	0.000
3	8182.803	5151	0.000

*Sig = 0.05

Table 7. Testing the regression and significance of Model 1

Variable		Estimated coefficients	Estimation deviation	T statistic	Sig.
Intercept		0.098	0.071	1.388	0.1926
Digital financing	Indext	0.098	0.087	2.416	0.0496
Company size	SIZE	0.212	0.006	5.537	0.0002
Financial leverage	LEV	0.036	1.098	1.238	0.2414
Profit (Return on Assets)	ROA	1.360	0.0078	-2.2419	0.0255
Growth opportunity	MTB	-0.0175	0.101	-1.224	0.2464
Durbin-Watson		R^2	Adjusted R^2	F statistic	Sig.
2.3		0.76	0.73	32.48240	**0.001

random-effects model. Table 6 displays the results of the Breusch-Pagan test for heteroskedasticity.

Considering Table 6, the F-value of the test is significant at the 0.05 level. Hence, the heteroskedasticity hypothesis is confirmed, and the research has a Generalized Least Square (GLS) model.

Testing the research model

Model 1 for confirming H1:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{SIZE}_{it} + \beta_3 \mathrm{LEV}_{it} + \beta_4 \mathrm{ROA}_{it} + \beta_5 \mathrm{MTB}_{it} + \varepsilon_{it}$$

Considering the tables above, the Durbin-Watson statistic equals 2.3 in Model 1 and indicates the lack of correlation between model errors since its value falls into the 1.5-2.5 range. The adjusted R^2 value of this test equals 0.73, implying that the independent and control variables in the present models can predict 73% of the variance in the dependent variable. Likewise, due to the significance of the F-statistic at the 0.05 level, we can claim that the research model is statistically fit and significant.

H1: Digital financing is significantly related to independent organizational innovation.

The estimated coefficient of the digital financing variable in the table above indicates its positive and significant relationship with independent organizational innovation at the 0.05 error level. Simply stated, since the estimated p-value for the coefficient of this independent research variable is <0.05, digital financing has a significant relationship with independent organizational innovation.

- Testing the second research model

Model 2 for confirming H2:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{TC}_{it} + \beta_3 \mathrm{TC} * \mathrm{Index}_{it} + \beta_4 \mathrm{SIZE}_{it} + \beta_5 \mathrm{LEV}_{it} + \beta_6 \mathrm{ROA}_{it} + \beta_7 \mathrm{MTB}_{it} + \varepsilon_{it}$$

Considering the tables above, the Durbin-Watson statistic equals 2.4 in Model 2 and indicates the lack of correlation between model errors since its value falls into the 1.5-2.5 range. The adjusted R^2 value of this test equals 0.61, denoting that the independent and control variables in the present models can predict 61% of the variance in the dependent variable. Besides, due to the significance of the F-statistic at the 0.05 level, we can argue that the research model is statistically fit and significant.

H2: Commercial credit impacts the relationship between

Table 8. Testing the regression and significance of Model 2

Variable	Estimated coefficients	Estimation deviation	T statistic	Sig.
Intercept	0.083	0.078	1.063	0.3104
Digital financing	0.381	0.086	4.404	0.0000
Commercial credit	0.058	0.036	1.614	0.1071
Digital financing*Commercial credit	0.008	0.013	0.627	0.5309
Company size	0.702	0.0860	8.161	0.0000
Financial leverage	-0.312	0.096	-3.231	0.0152
Profit	-0.036	0.007	-5.062	0.0004
Growth opportunity	0.006	0.006	1.053	0.3148
Durbin-Watson	R^2	Adjusted R^2	F statistic	Sig.
2.4	0.67	0.61	6.921548	**0.004

Table 9. Testing the regression and significance of Model 3

Variable	Estimated coefficients	Estimation deviation	T statistic	Sig.
Intercept	0.070	0.070	1.0003	0.3386
Digital financing	0.031	0.007	4.201	0.0015
Government subsidies	0.202	0.033	5.990	0.0000
Digital financing*Government subsidies	0.036	0.007	5.155	0.0003
Company size	0.007	0.006	1.179	0.2632
Financial leverage	-0.113	0.091	-1.236	0.2421
Profit	-0.431	0.088	-4.882	0.0012
Growth opportunity	0.095	0.080	1.178	0.2634
Durbin-Watson	R^2	Adjusted R^2	F statistic	Sig.
2.2	0.68	0.67	8.709630	**0.002

digital financing and independent innovation of companies. The estimated coefficient of the digital financing*commercial credit variable in the table above indicates the presence of its positive and significant relationship with independent organizational innovation at the 0.05 error level. Since the estimated p-value for the coefficient of this independent research variable is <0.05, commercial credit influences the relationship between digital financing and independent organizational innovation. Thus, H0 is rejected, and the alternative hypothesis (H2) is confirmed.

H3: Government subsidies influence the relationship between digital financing and independent innovation of companies.

Model 3 for confirming H3:

$$\mathrm{Innov}_{it} = \beta_0 + \beta_1 \mathrm{Index}_{it} + \beta_2 \mathrm{SUB}_{it} + \beta_3 \mathrm{SUB} * \mathrm{Index}_{it} + \beta_4 \mathrm{SIZE}_{it} + \beta_5 \mathrm{LEV}_{it} + \beta_6 \mathrm{ROA}_{it} + \beta_7 \mathrm{MTB}_{it} + \varepsilon_{it}$$

Considering the tables above, the Durbin-Watson statistic equals 2.2 in Model 3 and indicates the lack of correlation between model errors since its value falls into the 1.5-2.5 range. The adjusted R^2 value of this test equals 0.67, indicating that the independent and control variables in the present models can predict 67% of the variance in the dependent variable. Besides, due to the significance of the F-statistic at the 0.05 level, we can assert that the research model is statistically fit and significant.

H3: Government subsidies influence the relationship between digital financing and independent innovation of companies.

The estimated coefficient of the digital financing*government subsidies variable in the table above indicates its positive and significant relationship with independent organizational innovation at the 0.05 error level. Since the estimated p-value for the coefficient of this independent research variable is <0.05, government subsidies influence the relationship between digital financing and independent organizational innovation. Thus, H0 is rejected, and its alternative hypothesis (H3) is confirmed.

Suggestions

Suggestions based on the results of testing the research hypotheses

Digital financing is significantly associated with independent organizational innovation. Potential and de facto investors are suggested to evaluate and compare companies' independent organizational innovation by investigating their financing structure and considering its impact on different parts of cash flow statements to predict future (probable) problems, growth, and recession.

Commercial credit influences the relationship between digital financing and independent innovation in companies. Creditors are recommended to examine the company's capital structure before and after giving away commercial credits and consider its impact on its independent innovation. Accordingly, they can relatively ensure charging their money and, hence, reduce the risk of giving credits.

Government subsidies impact the relationship between digital financing and independent organizational innovation of companies. It is suggested that government subsidies be exploited. In this relation, the business unit's effective utilization of government subsidies in creating cash flows is analyzed.

Suggestions for future studies

The researchers suggest replicating this study for new years to examine how the research variables interrelate in new intervals. Future studies are also recommended to investigate the contribution of economic factors, e.g., inflation, amount of liquidity, exchange rate, and oil and gold prices, as internal and external financial restrictors, to independent organizational innovation. Likewise, assessing the role of international sanctions, as paramount factors influencing companies' financial limitations, in the independent organizational innovation of companies is suggested.

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Availability of Data and Materials: The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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