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## Article

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# Ethics in the age of artificial intelligence: unveiling challenges and opportunities in business culture

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## ABSTRACT

This paper aims to examine the role of organizational culture, mainly ethics, in the field of artificial intelligence. In particular, it investigates the contribution of ethics in implementing artificial models developed for financial decision making in organizations. The research methodology is based on developing an artificial model using a ready dataset from a developed country, Poland, which includes financial ratios of bankrupt and non-bankrupt companies, and then testing this model on a self-developed dataset of bankrupt companies in a developing country, Lebanon. However, the research suffers one limitation related to gathering accounting and financial data necessary to build new datasets in Lebanon which in turn should open up future lines of research. Nevertheless, the ultimate goal was to conclude if the same model would be reliable in both cultures due to its dependence on objective measures and criteria (i.e. financial ratios) or if specific factors (e.g. organizational culture/ethics) might act as barriers facing the optimal utilization of AI algorithms and models in Lebanese organizations. The empirical findings revealed that the absence of ethical organizational conduct, high level of corruption, and poor official governance are major examples of the obstacles confronting the rewarding application of AI in Lebanon.

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## KEYWORDS

Artificial intelligence; organizational culture; ethics; prediction; finance

## SUBJECTS

Finance; Business, Management and Accounting; Information Technology

Human mental and cognitive capabilities are inherently limited and governed by different kinds of biases. Artificial Intelligence (AI) enables top managements to process enormous data sets easily and quickly, while they have to reflect their own judgments and experience on the various choices of decisions AI would propose. AI does not nullify the importance of human presence and intervention in the decision-making process. Colson (2021) argues that corporate values, strategies of organizations, and statements of organizational vision are few examples of the kind of information that only corporate culture has the privilege to transmit. This fact makes it clear that AI could not embrace all types of information critical to make well-informed business decisions. This shows the extent to which the cooperation and interference between AI and human minds is vital to make wise and concise decisions at organizations.

Moreover, many researchers study the strong correlation between organizational culture and the optimization of technology (e.g. IS, AI) and reinforcement of numerous organizational aspects. Tsai defines organizational culture as the collection of common values and beliefs shared among employees in an organization (2011). For instance, it is argued by Smeureanu and Diab that modern technology and information systems play a significant role in encouraging information sharing and ameliorating the quality of information exchanged through boosting corporate internal culture (2019). Furthermore, researchers have been exploring the influence of organizational culture on the capability of organizations to perform effective corporate governance. An organizational culture where top managements lead actively and by example the ethical compliance and conduct would assist in protecting the core goals of business governance of IT strategies and projects (Smeureanu & Diab, 2020). Smeureanu and Diab confirm that an organizational culture reaching a far extent of ethical information technology (IT) compliance would probably lead to a high degree of IT governance (2020).

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## Significance of study

AI lays various benefits in the modern word and impacts directly and/or indirectly different business and non-business sectors; Harvard Division of Continuing Education (HDCE) states that AI is being effectively used in many business applications such as data analytics, automation, or customer service where organizational efficiency and streamlined business operations are a sample of the outstanding outcome of AI (2021). Since AI has been deeply involved in societies' daily life, for instance finance and healthcare, the business ethics concept has become a sensitive issue. Colback explains that two-thirds of finance firms are applying data analysis in fraud detection or achieving IT efficiencies for example (2021).

In addition, Talebnia et al. argue that the financial reports of organizations are already being presented honestly and at high quality too (2011). Marr (2021) explores the business functions that are ready to use AI where he claims that AI will help professionals in committing fewer accounting errors as well as free-up finance professionals from routine tasks, and therefore will be able to concentrate on much more important and deeper duties. Marr also states that natural language processing will enable organizations to obtain real-time status of financial data and information. On the other hand, Musa (2019) alarms that a serious threat stands in the way of maintaining the goal of achieving fair representation of an organization's financial status; he says that ethical bankruptcy in accounting practices has been weakening the quality and relevance of financial reporting as demonstrated in latest organizational scandals.

Following the literature available on the role of business ethics in optimizing the traits of AI algorithms and models by top managements in Lebanon, the authors could not find any relevant research investigating such role. This fact motivated the authors to try to examine the significance of ethics, as a core element of organizational culture, in designing and/or testing artificial models for organizations. Therefore, they aspire to provide the Lebanese business community with an empirical study raising its knowledge about the main obstacles prohibiting business leaders from implanting AI in their organizations business life.

## Literature review

There exists a wide array of fields, topics and issues which could be inspected in order to achieve the fundamental objective of this research. Consequently, the research stream is directed specifically towards financial analysis. The analysis of an organization's financial position is commonly conducted using Financial Key Performance Indicators (KPIs) as these KPIs are vital in supporting the managerial decision-making process. Such analysis covers the main financial statements that are: the balance sheet, income statement, cash flow statement and annual report. Stobierski defines KPIs as the metrics used by organizations to evaluate and audit the corporate financial health like profitability, liquidity, solvency, and valuation (2020).

Furthermore, the prevalent embracement of modern Information Systems (IS) including the Enterprise Resource Planning (ERPs) systems and financial software (SW) has dramatically improved the financial reporting and analysis and accordingly supported senior financial professionals in making delicate decisions. Also, the emergence and rapid prominence of Data Science and AI has obliged financial executives to upgrade the financial packages, techniques and instruments they traditionally rely on to maintain the overall financial health and assets of their organizations. This matter of fact requires effective cooperation between IT or IS and business executives as long as both parties converge on the organization's common interest. Smeureanu and Diab (2019) conclude that *Efficient and effective communication between business and IT* is the number one enabler of Strategic Business-IT Alignment in the surveyed big organizations and the number two in small and medium-sized enterprises (SMEs).

Meanwhile, the bankruptcy of Enron in 2001, Lehman Brothers in 2008, Thomas Cook in 2019 and a long list of big companies worldwide highlights the major risks connected with unethical conduct of senior staff. Such an unethical behavior can result in reputational damage, eroded employee morale, weakened trust in organization, and many other severe consequences (Epley & Kumar, 2021). Similarly, Kenton emphasizes that governments, not only organizations, are responding to collapses and ethical

scandals in order to ensure investors a high level of protection against fraudulent financial reporting by corporations (2020). Epley and Kumar add that explicit values and cultural norms are critically needed to build an ethical organizational culture. In particular, they claim that clearly stated principles, rewarding ethics using incentives, and incorporating ethics into day-to-day operations are some pillars of an ethical corporate culture (2021).

Going strictly to AI, some researchers called for a global response to ethics in AI. The vision is summarized in that an international body will be needed to identify the international standards against which ethical and moral conflicts should be resolved. In parallel, HDCE elaborates that neglecting to generate ethical algorithms or models could have catastrophic repercussions so that international standards, if set, should ensure an ethical AI application (2020). This is completely compatible with the definition of business ethics extended by the Corporate Finance Institute to be *'The moral principles that act as guidelines for the way a business conducts itself and its transactions'* (Updated 2021).

Based on the aforementioned, the research questions should be as follows:

1. How does corporate culture impact the effective integration of AI into business decision-making?
2. What is the role of business ethics in designing, testing, and implementing AI models within corporations?
3. How could the adoption of AI models influence the transparency and integrity of financial reporting at corporations?

## Methodology

To attain concrete evidence on the role of organizational culture in the field of AI algorithms and models, the researcher attempts to start from a business community enjoying the characteristics of an occidental culture, located in a developed country (Poland), and to end at a distinct business community having the features of oriental culture, situated in a developing country (Lebanon). Hence, a dataset available online at: <https://www.kaggle.com/c/companies-bankruptcy-forecast/data> is used. This dataset includes data extracted from financial statements of thousands of Polish companies. The data was collected from Emerging Markets Information Service (EMIS) which is database containing information on emerging markets around the world (UCI Machine Learning Repository). The bankrupt companies have been subject to consecutive 12 years of financial analysis but the running companies have been analyzed on a range of consecutive 6 years.

The big majority of those companies 98% is still doing business (i.e. not bankrupt) while a very small percentage 2% has become bankrupt. This pushed the researcher to randomly reduce the number of non-bankrupt cases in order to minimize the risk of having unbalanced data. Such kind of data often facilitates the task of algorithms in recognizing the correct outcome and eventually there are 896 non-bankrupt companies and 203 bankrupt ones. The dataset is an Excel file containing answers or attributes of 64 financial ratios; examples are: net profit/total assets, working capital/total assets, sales/inventory, and operating expenses/short-term liabilities. This file is considered as input to finding out rational correlation among the independent variables (i.e. 64 attributes) and the dependent variable (i.e. Class: bankrupt/non-bankrupt). The final target is to arrive at an artificial model enabling top managements to predict the financial future of their organizations, whether they are going to witness financial stability or menaces such as prospective bankruptcy.

## Lebanese business community

Trying to test the outputs of the Polish Dataset in the Lebanese business context, the authors decided to contact a network of connections within their personal and professional network in order to compose a big dataset of organizations. The search was for organizations which declared its bankruptcy during the past 5 years and others which are still running in Lebanon, since such types of data are not publicly declared or available in Lebanon except for the companies listed in Beirut Stock Exchange. This is due to the lack of transparency and the inactivity of *The Right to Information* that has been ratified

by the Lebanese authorities and that is enshrined in the International Covenant on Civil and Political Rights (ICCPR).

In this stage, another dilemma related to the common accounting practices appeared; it is the *Double Book* adoption widely prevalent among most companies in Lebanon. This practice, embraced by ineffective governance at official side and the spread of bribery, means that a top management decides to have two completely different ledgers, one for the purpose of reporting and declarations to official tax authorities and another one for managerial reporting. In other words, the first forms a major type of fraud involving manipulated financial data presented to escape of laws and regulations leading to reduced tax payments. However, the second contains the real and precise data based on which the financial executives receive authentic financial statements and reports necessary to make important decisions and to be presented to banks and other financial institutions for borrowing purposes. This dilemma dramatically shifted the focus of the authors from possessing the target data into persuading the participants to provide the real data as this process needed to secure them an extremely high degree of anonymity as an example.

The search persisted for a period of 3 months behind the scenes in an attempt to reach either directly and/or indirectly the targeted organizations so as to collect the needed data. At this point, 79 SMEs agreed to engage in the survey whereas no any big organization did; the Central Administration of Statistics in Lebanon asserts that 93–95% of organizations operating in Lebanon are SMEs with an annual turnover less than 16.5 million USD. Such dominance of SMEs satisfied the researcher to proceed with this additional test despite his initial objective of having larger participation.

The ultimate goal is to apply the artificial model tested in the Polish context on the dataset formed in the Lebanese context. At the end, it would be concluded if the same model is reliable in both cultures due to its dependence on objective measures and criteria (i.e. financial ratios) or if specific factors (e.g. organizational culture/ethics) act as barriers facing the optimal utilization of AI algorithms and models in Lebanese organizations.

## Data analysis and results

The dataset consisting of Polish companies was uploaded into SPSS and analyzed using Neural Networks, Multilayer Perceptron, as a modeling tool aiming to minimize error and ensure accurate predictions for a better decision making. This results in excellent accuracy percentages 95.4% in *Training* and 96.7% in *Testing* in '0' i.e. not bankrupt companies; whereas the accuracy percentages are 76.2% and 64.3% in *Training* and *Testing* consecutively in '1' i.e. bankrupt companies (Table 1). The coming subsection 'Limitations' describes the cause behind the later percentages. 70% of the data was trained and 30% was tested and the Percent Incorrect Predictions of the Testing Dataset was 8.9% which, in turn, refers to 91.1% overall accuracy of the model. It means that the model was successful in predicting the status or class of 91.1% of the tested companies either going to declare bankruptcy or to continue operating (Table 2).

Out of the 64 attributes, 44 ones have positive or negative correlation with the dependent variable *Class* while the sig values of the relationships between them were less than 0.01 which means high significances. Also, 28 attributes out of the 44 ones have correlation among each other higher than or equal to 0.9 which implies 90%+ dependency. The means of the 44 attributes in the cases of bankrupt companies are far from those of the running companies to a very large extent. The mean of the attribute X3 (working capital/total assets), for example, is  $-0.5343$  for the bankrupt companies while it is  $+0.0183$

**Table 1.** Accuracy Rates of Training and Testing (Source: SPSS).

Classification				
Sample	Observed	Predicted		Percent Correct
		0	1	
Training	0	596	29	95.40%
	1	35	112	76.20%
	Overall Percent	81.70%	18.30%	91.70%
Testing	0	262	9	96.70%
	1	20	36	64.30%
	Overall Percent	86.20%	13.80%	91.10%

Dependent Variable: class.

**Table 2.** Overall accuracy rate of the model (Source: SPSS).

Model summary		
Training	Cross Entropy Error	174.947
	Percent Incorrect Predictions	8.30%
	Stopping Rule Used	1 consecutive step(s) with no decrease in error <sup>a</sup>
	Training time	0:00:01.55
Testing	Cross Entropy Error	83.013
	Percent Incorrect Predictions	8.90%

Dependent Variable: class.

<sup>a</sup>Error computations are based on the testing sample.

for the non-bankrupt ones, for X7 (EBIT/total assets) the mean is  $-0.0204$  at the bankrupt ones and  $+0.0075$  at the non-bankrupt ones, etc.

The obtained neural network links the financial attribute 'X58, total costs/total sales', through H(1:9), to Class = 0 (i.e. non-bankrupt companies) (normalized importance = 100%), then 'X35, profit on sales/total assets', through H(1:8), to Class = 0 (normalized importance = 79.2%), 'X56, sales – cost of products sold/sales', through H(1:2), to Class = 0 (normalized importance = 24.5%), 'X7, EBIT/total assets', through H(1:1), to Class = 0 (normalized importance = 23.5%), and lastly 'X3, working capital/total assets', through H(1:4), to Class = 0 (normalized importance = 23.5%), etc. Yet, neural network connects 'X20, inventory\*365/sales', through H(1:5), to Class = 1 (i.e. bankrupt companies) (normalized importance = 23.4%) and 'X24, gross profit (in 3 years)/total assets', through H(1:3), to Class = 1 (normalized importance = 43.4%).

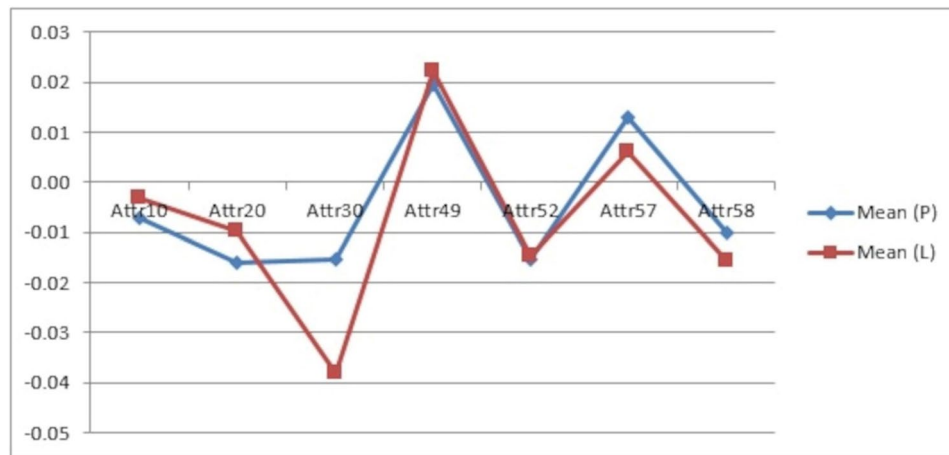
### Lebanon situation

The authors submitted the 79 companies an Excel file including the same 44 attributes which proved to have positive or negative correlation with the dependent variable *Class* (0=non-bankrupt, 1=bankrupt). Two months passed where they, at its end, were successful in receiving back complete responses from 17 organizations, incomplete responses from 3 ones and no response from 59 ones. Actually, it was not a surprise as the 79 companies were probably frightened of any possibility that the real data could be exposed and then put them under prosecution, despite all the efforts exerted to reassure them. Nevertheless, the 17 companies were all bankrupt with null participation from any active company. Also, they did not send the data directly but they circulated it following a complicated long chain in order not to become 'victims' as per their description. This matter of fact represents a constraint hindering the application of the same Polish model on these Lebanese organizations to validate its accuracy in predicting the Class of companies (i.e. bankrupt or not).

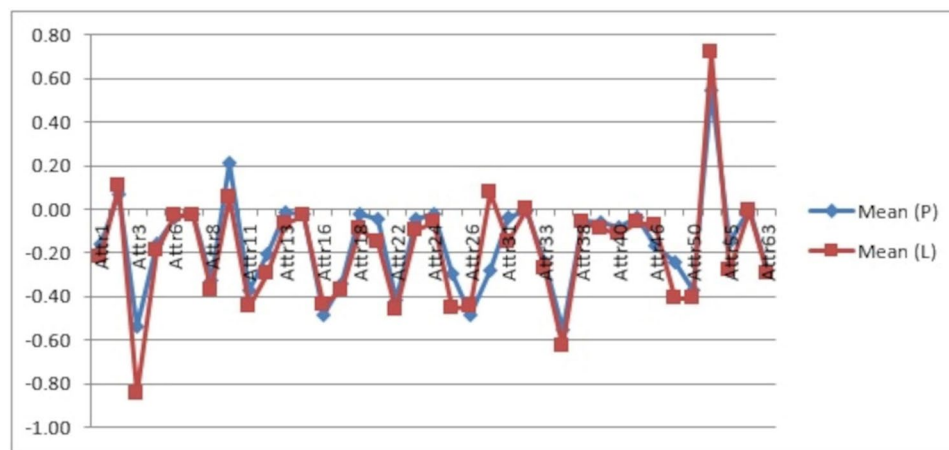
Therefore, a decision was made to upload the gathered data of the 17 companies into SPSS and to determine the means of the 44 attributes to confirm its classification as deserved to be bankrupt based on the model concluded from the Polish experience or not. The findings display that the 17 companies were found to share means closer to those of the Polish bankrupt organizations in 37 attributes (e.g. financial attribute X16, gross profit+depreciation/total liabilities; X17, total assets/total liabilities) and share means closer to the Polish still operating ones in 7 attributes (e.g. financial attribute X49, EBITDA/sales; X52, short-term liabilities\*365/cost of products sold). This led to confirm the belonging of the 17 Lebanese organizations to the class of bankrupt ones.

Connecting the findings of those Lebanese companies to the results of Polish neural network, the financial attribute X52 'short-term liabilities\*365/cost of products sold' is the nearest attribute to that of the Polish dataset followed by X49 'EBITDA/sales', X20 'inventory\*365/sales', X57 'current assets – inventory – short-term liabilities/sales – gross profit – depreciation', X10 'equity/total assets', X58 'total costs/total sales' and then X30 'total liabilities – cash/sales' compared to the class of the Polish non-bankrupt companies (Class = 0) (Figure 1). Matched with the Polish bankrupt companies (Class = 1), the financial attribute X63 'sales/short-term liabilities' is the nearest attribute to that of the Polish dataset followed by X26 'net profit+depreciation/total liabilities', X16 'gross profit+depreciation/total liabilities', X17 'total assets/total liabilities', X22 'profit on operating activities/total assets', X50 'current assets/total liabilities', X33 'operating expenses/short-term liabilities' and the remaining 30 financial attributes come after (Figure 2).





**Figure 1.** Lebanese (L) Financial Ratios (Y-axis) close to Polish (P) non-bankrupt Companies (Source: self-developed).



**Figure 2.** Lebanese (L) Financial Ratios (Y-axis) close to Polish (P) Bankrupt Companies (Source: self-developed).

While previous research has dramatically explored the advantages of AI in organizational settings, including its function in fraud detection, minimizing human mistakes, and improving operational performance, there has been a remarkable gap in the literature regarding the impact of organizational ethics on AI optimization. The current literature predominantly emphasizes the effective impacts of AI implementation, often overlooking the critical interplay between ethical conduct and technological efficacy. This paper addresses this gap with the goal of demonstrating that poor ethical practices can extensively void an organization's capability to fully leverage AI technology. By moving the focal point from the benefits of AI to the ethical prerequisites for its effective implementation, this study presents a novel perspective that underscores the significance of maintaining fine ethical requirements for a successful and responsible deployment of AI systems which is largely absent in the current discourse. By examining the ethical dimensions that influence AI optimization, this study not only enriches the literature available on AI in organizations; however, it also offers practical and empirical insights for leaders and policymakers aiming to maximize AI benefits while retaining ethical integrity. This contribution thereby fosters a more holistic approach to AI utilization that balances technological benefits with ethical responsibility.

## Limitations

The authors extracted the dataset from the financial statements of Polish companies where 203 companies were bankrupt and 896 companies were non-bankrupt; the dataset includes 64 financial ratios or attributes analyzed too. That number of Polish bankrupt companies made the available data biased in a way that Artificial Neural Networks confronted distraction in making correct predictions resulting in



64.3% accuracy in *Testing* for the bankrupt companies. However, the researchers believe that these drawbacks and consequently the accuracy rates could be much higher if a larger number of bankrupt companies was available in future.

Looking at the Lebanese business context, the lack of transparency and the wide adoption of *Double Book* render the access to accurate financial data more complex compared to the regulated and transparent business environment in Poland. This was reflected in the small number of companies responding to the participation invitation (17 companies) in Lebanon which negatively affected the performance of AI models. Moreover, the lower accuracy prediction rate for the Lebanese bankrupt companies contrasting the relatively higher rate in Poland further clarified this limitation. However, testing the same model on two different datasets in Lebanon and Poland let the study underscore the generalizability of AI models but taking into account the cultural context upon the deployment of such models. Nevertheless, the reliability and credibility of similar models necessitate huge efforts to improve the capability of accessing data in Lebanon and other countries suffering from unregulated business environments. Those models could become more robust in case they come to be applied in various cultural contexts eventually rendering them more effective in prediction capacity. Other things being constant, this is going to stay disappointing especially when reviewing the accelerated reliance and extensive application of these kinds of models in business decision-making, R & D, innovation, initiating startups, or strategic planning globally.

## Conclusions

This research seeks to rely on a ready dataset, available online, including financial ratios of 1099 bankrupt and non-bankrupt Polish companies in order to generate, train and test, an artificial model. This model proved to be successful in predicting the expected future status of companies, either bankrupt or not, at 91.1% accuracy rate. Thereafter, the researchers were able to build a small dataset in Lebanon and, then, tested the same model on this dataset achieving 100% accuracy rate using descriptive statistics (i.e. means) and not the AI algorithm unfortunately.

Findings also show that unethical managerial practice, high level of corruption and poor governance at government level are major examples of the barriers confronting the implementation of AI in Lebanon. These barriers are often fostered by the ruling weak organizational culture and unhealthy or unethical environment which discourage most of organizational members of behaving ethically due to different reasons such as not opposing top managers and therefore not to lose their jobs.

This paper should alert executives and officials to the significance of encouraging and supporting strong and effective governance as well as ethical behavior on leveraging the employment of artificial intelligence in the Lebanese business environment. Over and above, this study should open the door for other scholars to widen the research about organizational culture so as to explore other possible obstacles threatening AI optimization in Lebanon or other similar cultures, social or organizational. For instance, a promising research can employ AI models on a dataset composed of data collected from public companies, forced by law to publish their financials, and compare the resulting output with the output of other companies that often do not announce its financial results like SMEs. Similar future studies should enrich the theoretical framework serving as guidelines for performing more powerful conceptual basis.

Finally, the current research is expected to raise the flag concerning the significance of accurate prediction of organizational financial health and potential bankruptcy in supporting managements to take preventive measures for avoiding any threat to its sustainability or survival. Furthermore, the multinational organizations that conduct a variety of business activities in contradicting cultural, social and business environments around the globe are expected to allocate bigger attention since ethics and culture cannot be detected via software or even AI models. This could not be done without hard work and persistence from the side of public policy makers in developing countries such as Lebanon.

## Author contributions

Bassel Diab was involved in the analysis and interpretation of data, revising the paper critically for intellectual content, and the final approval of the version to be published.

Mohammad El Hajj was involved in the conception and design and drafting of the paper.  
Both authors agree to be accountable for all aspects of the work.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## About the authors

**Bassel Diab** holds a PhD degree in Economic Informatics from the Bucharest University of Economic Studies (ASE), Romania. He is currently a university lecturer at Rafik Hariri University, Lebanon. His research work focuses on the correlation between information systems and business decision making including corporate culture and ethics.

**Mohammad El Hajj** holds a PhD degree in management sciences and a postgraduate degree in management research from the University of Poitiers-France. He is an associate professor of Finance at USEK University and the Lebanese University-Lebanon. His research area focuses on market finance, corporate governance and FinTech.

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## Data availability statement

The data from the Polish business community that support the findings of this study are available in UCI Machine Learning Repository at <https://archive.ics.uci.edu/dataset/365/polish+companies+bankruptcy+data>/DOI: 10.24432/C5F600.

Due to the nature of this research, participants of this study at the Lebanese business community did not agree for their data to be shared publicly, so supporting data is not available.

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