

IMPACT OF RESEARCH & DEVELOPMENT ON THE PERFORMANCE OF PHARMACEUTICAL FIRMS: EVIDENCE FROM PAKISTAN

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Abstract. *The goal of this study is to investigate the financial performance of listed Pharmaceutical companies in Pakistan impacted by different board characteristics. These board characteristics are discussed through two theories: agency theory and resource dependency theory. The understudy characteristics include research & development, independent board directors, leverage, CEO/Chair duality, board size and audit committee. The paper used panel regression analysis on eleven (11) firms from a period of 2010 to 2019. The study findings postulate that investment in research & development and audit committee have a significant and positive impact on the performance of firms as per the agency theory. Whereas the characteristics like independent directors, CEO duality, leverage and board size have a negative impact on the performance of the firms. The study helps to clarify the Board's performance relationship and offers academic proof of existing and future governance changes for policymakers in Pakistan. The conclusions add to the literature by presenting fresh and original perspectives into how the existing knowledge of corporate governance and financial performance is applied within a developing context of organizations in Pakistan.*

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1. Introduction

Improved corporate productivity has many beneficial advantages for micro and macro economies. It is particularly fascinating to arrange output according to needs, and significant consideration has been given in literature from various perspectives. However, an organization's corporate governance performance is drastically influenced by the characteristics of each company and department. Previous research studies have demonstrated, a positive effect of R&D activities on business performance (Coad & Rao, 2008).

Extensive studies, however, did not consider the temporal aspect. This research study thus seeks to examine the effect on effectiveness, particularly in terms of impacts, on research and development expenses, of the temporal structure of organizational factors. In terms of developing the value of a company in its temporal structure, specific features are essential for the review of research and development programs. First and foremost, management of the economic growth and competitiveness of an organization takes time. In the near future, the proper use of R&D activities would increase the revenue and market share of a company. Secondly, these practices should contribute to the observation of a distinction between tangible and intangible investments. Tangible costs typically arise over a long period of time as compared with intangible costs. Capital expenses are seen as real expenses in the literature, as compared to R&D expenses. Thirdly, several businesses stress that these operations reflect total constancy. This means businesses focused on innovation are participating and those not involved in research and development are passive (Sultan et al. 2020). The impacts of R&D activities in the short term and the long-term impacts need to be discussed in detail. Finally, the characteristics of an organization may have an important impact on its R&D temporary structure.

For data collection, the sampling data of all pharmaceutical companies available in the Pakistan Stock Exchange (PSX) has been assessed from the period of 2010-2019. The report used research variables such as the Return on Assets (ROA), Research and Development (R&D) expenses, Board Composition, Audit Committee, CEO compensation and CEO duality. We used a regression analysis to assess whether the company's performance is associated with the considered unique variables.

In specific, the researcher studied the effect on business performance of R&D expenses and time lag subsequently. R&D has proved to be a key element in sustaining economic growth and innovation in the new era of rapid technological change. R&D is also one of the most basic models and is always taken into account in a good assessment. Different studies demonstrated that R&D expenditure is a required source of growth in productivity (Griliches,

1981). R&D expenditure reduces the cost of production, promotes an efficient transition of inputs and improves the performance characteristics, allowing businesses to sell new goods (Bernstein & Mamuneas, 2006). In several business organizations, encouraging R&D investment has become a fundamental necessity. Therefore the significance of this study lies in discovering that there are various aspects of the R&D mechanism, we shall debate and explain the meaning, aims, importance, key forms of R&D and methods and techniques for assessing R&D expenses on the efficiency of Pakistan's pharma sector.

The definition of R&D can be split into two. The study is usually carried out to make consistent scientific progress and raise consciousness, while the study outcomes and further information are transformed into an enhanced product or service concept or technique where components, resources, systems, processes or tools are tested before market values commence to enhance product design and understanding of a new product (Zhao, 2002). During the study stage, it is challenging to see whether the goods and services will lead to any potential economic benefits. The IAS 38 Intangible Assets International Accounting Principle also specifies that all expenses inherent in research may not be recorded as immaterial, rather as an intangible value from the output, expense incurred. Research and development's importance derives from the opportunity to encourage the business' economic development since it leads to inventions and the launch of new products to improve a company's competitive edge and prolong its life and role on the market. It is a crucial factor in the process of innovation that can give an organization a strategic edge (Hall & Oriani, 2006) and enable it to be the industry leader. It is the intended premise for the development of new goods, practices and policies, notably from industry and infrastructure.

The most important ongoing investment in terms of expansion of knowledge in research and development. The total domestic research and development cost for each country is defined as the combined R&D expenditure (current and capital) of all businesses, institutes, universities and government laboratories. R&D includes experimental growth, applied evaluations and fundamental assessments (Anagnostopoulou, 2008). It is calculated often by millions of US dollars (Chiang, Lee, & Anandarajan, 2012). Also, R&D is defined by Duncan (1996) as a result of creative activities over a certain amount of time (such as those undertaken in an organization). One of the organizational goals of any institution is not only to support the institution, but also benefits shareholders, staff, and customers (Shaikh et al., 2020), and the institution's vigor to investigate or count on new knowledge is insufficient

and extreme decline is inadequate. It may be more damaging for the organization than for the idea of research and development to invest in, therefore the organization and its external ecosystem are expected to include the requisite costs to individuals, facilities, and industrial goods in the research projects.

2. Literature Review

No theory describes the overall pattern of relations between management board characteristics and corporate performance (Jackling & Johl, 2009). The study of trade governance and associations focused on different theoretical contrasting viewpoints such as agency theory, stewardship theory and resource dependency theory. These contradictory ideas are argued that the corporate governance performance relationship has resulted in an inconsistency in empirical results (Kiel & Nicholson, 2003). Despite these challenges, previous board-specific relationship studies typically focused on agency and resource-dependence hypotheses on their claims (Jackling & Johl, 2009; Ntim, 2016). Agency theory supposes the division of control and ownership as executives have an interest and opportunism and have different priorities and risk preferences, which may create a clash of interests between administration and stakeholders (Shleifer & Vishny, 1997). The theorists of the agency agree that the principal role of the Board is to control managers to protect shareholders against conflicts of interests (Shleifer & Vishny, 1997). The board of directors is argued as an integral system in which executives can control and monitor their welfares at the cost of investor's resources (Darko, Aribi, & Uzonwanne, 2016). The Theory of the Agency proposes a large number of independent external directors, in order to increase the independence of the Board and to efficiently perform its overseeing role, to the Board, and separate the CEO and Chairman of the Board (Donaldson & Davis, 1990). From the point of view of resource dependency, an entity is not resilient because of insufficient funds and needs to grow in accordance with the outside world. The theory of resource dependence claims that the Board of Directors is the backbone of the outside world of the company, since it can capitalize on key factors such as physical and human resources, innovation and information (Kiel & Nicholson, 2003). These tools will improve the efficacy and credibility of the company's strategic decision-making process (Arora & Sharma, 2016; Kiel). The Theory on resource dependency encourages the inclusion of large boards of Directors, professional directors and international directors on board, in order to communicate with the company's external setting (Lückerath-Rovers, 2020).

This study is focused on theories of agency and resource dependency. These theories claim that management features may have a direct effect on the financial performance of the company (Jackling & Johl, 2009). The Boards' essential roles for oversight, consulting and resource provision are often

clarified by both agency and resource dependency theories (Ntim, 2016). The theories relating to agency and resource dependency tend to improve productivity and are most useful in a situation in which the regulatory framework is inefficient. For example, most countries in Asia including Pakistan have a poor regulatory system (Tsamenyi, Enninful-Adu, & Onumah, 2007).

2.1 Independent Variables

2.1.1 Research and development (R&D)

Some investigators have studied the correlation between R&D investment and business performance in the developing countries. The impacts of R&D spending on the performances of firms in the manufacturing industry in Korea have been studied for example by (Chung & Park, 2016). Their results indicate that R&D investment would have a beneficial effect as output profits are increased. The influence of R&D spending on commercial economic output has been investigated in another study by (Vander-Pal, 2019) and the R&D effects on market assessment is very positive. Similarly, the research and development investments of Wang, Du, Koong, and Fan (2017) showed that the success of listed companies in China depends on multiple ways. In fact, firms dependent on R&D capital also see higher returns and equity yields. (Konak & Kendirli, 2014) investigated the impact of investment on company results, although no evidence was found linking research and development and business success. (Ayaydin & Karaaslan, 2014) tried to analyze causes and effective cash flows and found a positive influence on R&D's firm profitability.

The beneficial effect on all transactions has been observed. The effect on corporate R&D was also tested by (Rao, Yu, & Cao, 2013). They acknowledged the considerable impact of R&D expenditures on the financial success of a business, which is an important technological advancement. The beneficial impact of technical skills on R&D progress abroad was further highlighted (Poletti Hughes & Ozkan, 2014). They also noted that R&D and dividends positively but differently affect company valuation (Oh, 2017) conducted detailed analyses of the impact of investment in R & D to give decision-makers a valuable roadmap in business and demonstrated the clear predictor of high levels of research and development. In contrast, (Ahmed, Hilier & Tanusmita, 2011), the research & development activities have a beneficial impact on the assessment of the business sector and (Chen, Nixon, Gupta & Hoshower 2012) the research & development programs have shown that their financial performance and growth capacity are key..

However, research and development and market performance were found unrelated (Bouaziz, 2016). However, Wang et al. (2017) imply that more

market-worthy R&D buyers, meaning companies should concentrate on designing long-term growth policies. In the end spending in R&D was found to be the big factor of productivity. Therefore, two major yet contradictory topics from previous trials were discovered. First of all, research and development had little impact on results and secondly, the direct relationship between research and development and performance. This study therefore attempted to determine the essence of this relationship in the context of developing country like Pakistan.

H1: Research and development positively affect the performance of firm.

2.1.2 International directors

International directors might be autonomous on the off chance that they have no presence affecting their dynamic freedom (Conyon, 2009). On a fundamental level, a huge extent of international directors on the board are contended from a business perspective to energize the freedom of the board and shield proprietor's capital from the irreconcilable situations due to the organizational conflicts (Shleifer & Vishny, 1997).

Notwithstanding, various investigations have welcomed merged reports of the impact on monetary yield of organizations by independent directors. (Bhagat & Bolton, 2013) have, discovered that the organization's monetary presentation is affirmatively affected by free administration. On the other hand, the connection between directors and monetary consequences of organizations was undesirable for (Kumar & Singh, 2012). However the ties among external directors and firm's accomplishment have not been found by Rodriguez-Fernandez (2016).

The CMSA (2002) rules note that at any rate 33% of the board ought to be autonomous non-executive directors. Promoters of Agency theory guarantee that a considerable number of outside directors can productively govern the administration (Jackling & Johl, 2009). Therefore in accordance with agency theory, the hypothesis is as follows:

H2. Independent directors positively affect the firm's performance.

2.2.3 Leverage

Pretty few past analyses have investigated the connection among Leverage and performance of firm. Best case scenario, the results of these investigations are merged. Various researchers found a constructive link between the leverage and performance of organization like (Mangalam; Robb, Fairlie, & Robinson, 2009; Ruland & Zhou, 2005).

In fact, Robb et al. (2009) recommended that leverage paybacks are generous and use of debt financing improves the productivity of firms, as profit

are higher than the normal interest rate on the leverage. A few others like (Fama & French, 1998; Negash, 2020) have set up a negative impact of leverage on the performance of corporation. They asserted that the degree of leverage brings in the agency problems that anticipate a negative link among leverage and benefit. The impact of investment structure on success of firms in Malaysia is inspected by Pratomo and Ismail (2006). They additionally coordinated to the hypothesis of the agency. The impact of capital structure on mechanical effectiveness was analyzed by (Simon-Oke & Afolabi, 2011) and indicated a negative connection between credit money and proficiency. As indicated by Pratheepkanth (2011) the leverage and performance association is negative, which diminishes the performance of organizations by an ascent credit level.

H3: Leverage negatively affects a firm's performance.

2.2.4 CEO Duality

The dual role of CEO can be depicted as a solitary individual's joint jobs of the chief executive officer and chairman of the board. The ineptitude of boards of bankrupt American partnerships, for example, Enron and WorldCom have been accused of CEO duality (Jackling & Johl, 2009). Researchers in favor of agency theory recommend that the dual role of the CEO will permit the CEO to direct the Board for superiors like giving the board restricted information about an association. The Theory recommends that the situation of CEO and COB ought to be separated to increment viable board oversight and forestall the dictatorship of chief executive officers (Mahadeo, Soobaroyen, & Hanuman, 2012). The consistent hypothetical resistance is spoken to by the exact examination of the impact of the CEO duality on the organization's monetary presentation.

Hypotheses from the Agency were endorsed, all of which suggested a negative impact of the CEO duality upon the numerical value of the Company (Kyerboah-Coleman & Biekpe, 2006; Mahadeo et al., 2012). Other research such as (Donaldson & Davis, 1990's) have demonstrated that duality and organizational management have a good relationship. CEO Duality and Corporate Management have not been linked with (Rodriguez-Fernandez, 2016) and (Arora & Sharma, 2016). This paper, therefore, takes the view that CEO Duality will help the tyranny of the CEO, independence the repressed board and therefore minimize the viability of the board in its observational condition.

H4: CEO duality negatively affects the firm's performance.

2.1.5 Board Size

Points of view toward resource dependence cover a more extensive panel or board, as this can fortify associations between the market climate and outer conditions (Lückerath-Rovers, 2020; Tricker, 2012). From the perspective of making a judgment, notwithstanding, small size boards are prescribed to reinforce effective policymaking (Yermack, 1996).

There have been outcomes that an ascent in the size of the board constructively affects monetary outcomes (Jackling & Johl, 2009; Kiel; Kyereboah-Coleman & Biekpe, 2006). In contrast, different investigations have discovered a negative connection between board size and the performance of a firm (Arora & Sharma, 2016; Malik & Makhdoom, 2016).

No relationship was found between the size of the board and the monetary performance of the organization (Ferrer & Banderlipe II, 2012; Tukur & Balkisu, 2014). The Guidelines of the CMSA (2002) encourage the board for improving their presentation to incorporate more prominent abilities. Drawing on the standard of resource dependency, enormous boards may give a corporation better admittance to innovation, for example, abilities and outside capital (Kiel & Nicholson, 2003). The following hypothesis is therefore proposed:

H5: Board size positively affects a firm's performance.

2.1.6 Audit Committee

The Audit Committee keeps a great importance the corporate governance. The audit committee will follow the deficient lead of managers by different observing methods. Some researchers (e.g., Cohen, Gaynor, Krishnamoorthy, & Wright, 2011) contend that the audit committee's autonomy is a basic part of the audit committee Performance.

The trustworthiness of monetary reporting unwavering quality can be upheld by independent review advisory group Process through the oversight of beguiling, conceited practices of directors. Codes of administration globally expect organizations to make and keep up the autonomy of review boards of trustees. Organizations with more impartial review council are less susceptible against the antagonistic impacts of defilement (Beasley & Salterio, 2001). The free review boards of trustees demonstrated that profit control had been mollified by Bukit and Iskandar (2009). The converse connection among autonomy and advantage control of the review board/Audit committee has, likewise, been seen by other researchers (e.g., Abbott, Parker, & Peters, 2002). A number of researchers (e.g., Arslan, Zaman, Malik, & Mehmood, 2014; Nuryanah & Islam, 2011) have noticed that the reliability of review reports and

expanded authoritative productivity were reinforced by the autonomous audit committees.

H6: Audit committee positively affects a firm's performance.

3. Research Design and Methodology

The fundamental reason for this investigation was to analyze whether Research and Development (R&D) spending affects the Pakistani drug organizations performance recorded on the Pakistan Stock Exchange over the long period. As referenced in the introduction the innovative work exercises require quite a while to influence the development and viability of an organization in financial terms. Therefore R&D exercises should prompt enhancements in coming years and augment an organization's sales and share of the overall industry. Consequently to accomplish the target of the investigation and lining up with R&D nature, information about R&D alongside other independent factors like Independent directors (IND), Leverage (lev), Chief Executive Officer Duality (CEOD), Board Size (BS), and Audit Committee (AC) were gathered for the period from 2010 to 2019. The final number of organizations recollected for the examination is 11 organizations. Firms Performance was determined utilizing Return on Asset (ROA) (Bouaziz, 2016).

3.1 Dependent and independent variables explanation

Table 1 *Details about the Variables in the Study*

Variables	Status	Explanation/Formula
Return on Asset (ROA)	Dependent variable	ROA= net Profit/overall assets
Research and Development (R&D)	Independent variable	Expenditure fixed by companies for Research and Development
Independent Directors (IND)	Independent variable	The proportion of international directors to the total number of directors
Leverage (Lev)	Independent variable	Lev=total liabilities/total assets
CEO Duality (CEOD)	Independent variable	Assigned 1 for dual role otherwise 0
Board Size (BS)	Independent variable	BS= All directors in the board of directors
Audit Committee (AC)	Independent variable	Members in Audit committee

The regression models used for the investigation can be seen below:

$$ROA_{it} = \alpha_{it} + \beta_1 R\&D_{it} + \beta_2 Lev_{it} + \beta_3 CEOD_{it} + \beta_4 BS_{it} + \beta_5 AC_{it} + \varepsilon_{it}$$

α is the intercept, β is the coefficient of regression and ε is the error term. In addition, “i” refers business, and “t” period.

3.2 Research Model

Figure 1 shows the model adopted for the purpose of the study.

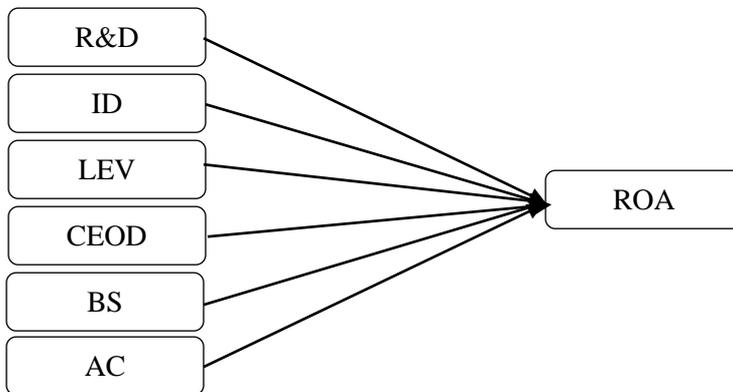


Figure 1 Conceptual Framework of the Study

4. Analysis and Discussion

4.1 Correlation Results

Table 2. Correlation Matrix of all the Variables

	ROA	R_D	IND	LEV	CEOD	BS	AC
ROA	1.00						
R_D	0.34	1.00					
IND	-0.05	0.06	1.00				
LEV	-0.61	-0.35	0.00	1.00			
CEOD	-0.11	-0.03	0.10	-0.11	1.00		
BS	-0.38	-0.22	0.10	0.41	0.18	1.00	
AC	0.30	-0.05	0.00	-0.31	-0.01	-0.17	1.00

Table 2 displays the correlation for the factors under examination. This analysis was done as such as to discover the connection of autonomous factors among themselves and with the reliant variable. For drawing unprejudiced outcomes, it is vital that the factors should not be related with one another. It is obvious from table 1 that none of the factors is profoundly corresponded. The most elevated relationship (0.407) was found between board size and influence.

Notwithstanding, the value of correlation here is inside adequate cutoff points and didn't need the disposal of one or the other variable. R&D is positively correlated with ROA. The correlation value is 0.34 which shows a

week positive correlation. Independent director has a negative correlation with ROA. The value is -0.045 which is very week negative correlation. Leverage has a negative correlation with ROA with a value of -0.61. It shows a strong negative relation. The correlation between CEO and ROA is -0.11, which is very week negative correlation. Board size is negatively correlated to ROA with a value of -0.38 which is weak negative. The Audit committee is positively correlated with ROA. The value is 0.30 which is weak positive.

Table 3. *Variance Inflation Factors*

	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
R_D	0.000	2.03	1.20
IND	0.000	4.16	1.03
LEV	0.002	9.15	1.53
CEOD	0.000	1.51	1.10
BS	0.000	31.48	1.30
AC	0.000	37.69	1.15
C	0.003	84.71	NA

Table 3 shows Variance Inflation Factor that was conducted to check the resistance against the outliers. The results showed that all the VIF value were less than 8, confirming no issues of multi-collinearity.

4.2 Regression analysis and discussion

Table 3. *Pooled Regression, Dependent Variable (ROA)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_D	0.000	0.000	1.938	0.055
IND	-0.003	0.000	-0.414	0.680
LEV	-0.222	0.041	-5.477	0.000
CEOD	-0.026	0.014	-1.852	0.067
BS	-0.005	0.004	-1.121	0.265
AC	0.020	0.011	1.800	0.075
C	0.171	0.055	3.084	0.003
R-squared	0.452			
Adjusted R-squared	0.420			
F-statistic	14.145			
Prob (F-statistic)	0.000			
Durbin-Watson stat	1.33			

After the correlation matrix of the variables the study will run panel regression through Pooled OLS, Fixed effect model and random effect model. Only one model will be selected by comparing the pooled regression with fixed and fixed regression with random regression. Table 4 and table 5 shows the pooled and fixed effect models respectively. To choose between them the study used redundant fixed effect test. It showed significance level of F stat less than 1%, which means that fixed effect model is superior to pooled panel regression as shown in table 6. Then to compare between fixed effect model and random effect model shown in table 5 and 6 respectively, Hausman Test was conducted as shown in table 8. Table 8 for Hausman Test showed a probability value of more than 10% choosing the random effect model as superior to the fixed effect model. The rest of results interpretation will be done through table 7 of random effect model.

Table 5. *Fixed Regression, Dependent Variable (ROA)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_D	0.002	0.00	2.44	0.02
IND	-0.007	0.01	-0.91	0.37
LEV	-0.309	0.06	-5.43	0.00
CEOD	-0.010	0.01	-0.79	0.43
BS	-0.005	0.00	-1.26	0.21
AC	0.015	0.01	1.13	0.26
C	0.212	0.07	3.09	0.00
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.622			
Adjusted R-squared	0.557			
F-statistic	9.574			
Prob(F-statistic)	0.000			
Durbin-Watson stat	1.777			

Table 6. *Redundant Fixed Effects Test*

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.197084	(10,93)	0.0001
Cross-section Chi-square	40.970517	10	0.0000

Table 7. *Redundant Fixed Effects Test*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R_D	0.00***	0.001	1.905	0.060
IND	-0.01	0.005	-1.220	0.225
LEV	-0.27	0.057	-4.727	0.000
CEOD	-0.015	0.008	-1.755	0.082
BS	-0.005	0.003	-1.747	0.084
AC	0.016**	0.007	2.411	0.018
C	0.199*	0.059	3.378	0.001
Weighted Statistics				
R-squared		0.352		
Adjusted R-squared		0.314		
F-statistic		9.307		
Prob (F-statistic)		0		
Durbin-Watson stat		1.633		

*, **, *** denotes significance level of 1%, 5% and 10% respectively.

Table 7. *Correlated Random Effects: Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	1.675	5	0.892

The results for panel random OLS are summed up in Table 6 when using the ROA as the dependent variable. All the results were expressed at the significance level of 1%, 5% and 10%. As shown in Table 6, coefficients of ID, CEOD, Lev and BS were negative, while R&D and the AC showed positive coefficients. As shown in Table 6, clearly, a good, positive relationship exists between R&D and ROA, consistent with the results from Pakistani pharmaceutical companies listed on the Pakistan Stock Exchange. This result is in line with the previous studies of (Wood & Brewster, 2016). The explanation for this may be because of the existence of the under study firms.

The pharmaceutical industry is known as a driven market which needs a great deal of money. In many creative ventures, major pharmaceutical companies have to invest. This helps them to achieve a high market share through efficient utilization of their assets, like in R&D projects and is demonstrated in the form of revenue and increases return on assets. One of the key goals of companies in this field is to better the lives of people and these businesses are dedicated to making scientific developments and inventions to deliver quality goods and services. Therefore it is important to concentrate on investment in R&D projects, technical solutions and goods and services, to ensure, promote and enhance the lives of people across the globe and to

maximize the use of the company's capital. This kind of spending has been shown to lead to higher revenues and to less waste of capital, as expressed in higher profit, and thus increased revenue.

Therefore, H1 cannot be rejected. Next is shown a negative and insignificant link between ID and ROA and H2 is therefore rejected. The results are close to the previous results (e.g., Bhagat & Bolton, 2008; Ferrer & Banderlipe II, 2012). However, the results do not reflect the guidance of CMSA (2002) and (Bhagat & Bolton, 2013). The results do not support the argument from the theory of the agency that a substantial percentage of self-employed external directors are crucial to control or supervise the management of the organization to reduce its costs (Jackling & Johl, 2009).

Independent directors can have a positive effect on the financial performance of the company if the directors are really autonomous and professional. The lack of impartiality will lead to the inconsequential productivity of the independent director because then they will not in a position to control the management effectively (Ferrer & Banderlipe II, 2012). Some directors may not be autonomous, according to (Fulgence, 2014), because the selection process for the directors is not completely transparent in Pakistan.

Since the leverage of the company have been assumed to have a negative and significant impact on their results, we cannot reject H3 on the basis of estimates. The regression result in Table 6, which indicates that a high level of leverage contributes to a lower level of ROA, is negative for an accounting indicator ROA. In addition, due to a conflict of agencies, this would reduce its efficiency if the organization leverages itself too much. These results are in line with the past studies (Fama & French, 1998; Negash, 2020; Pratheepkanth, 2011; Simon–Oke & Afolabi, 2011).

Findings indicate that the relationship between ROA and CEO duality is substantially negative. Therefore the study fails to reject H4. The findings adhere to the CMSA guidelines (2002) and to previous studies (Kyereboah-Coleman & Biekpe, 2006; Shrivastav & Kalsie, 2016). The findings, however, are contradictory to (Donaldson & Davis, 1990).

As per past studies (e.g., Shleifer & Vishny, 1997) assumptions also support Agency recommendations to separate chief executive officer and chairman of board roles because duality adversely affects the independence of the Board by improving CEO consolidation and thus reducing profitability. If you have a duality as CEO, I think you lose essential power, because in your own case it's like the prosecutor and the judge. What we know is, of course, unfair, even though you are doing fairly. It becomes difficult to persuade people that fairness exists.

H5 indicates a positive relation between the size of the board and the financial accomplishments of a company. Next, the size of the board indicates a slight negative correlation to returns. Consequently, H5 is rejected which is line with other researches (Abubakar, Garba, Sokoto, & Maishanu, 2014; Ferrer & Banderlipe II, 2012). In addition, resource dependency and agency theories that advocate large boards are not endorsed (Abubakar et al., 2014). However, the results are not in line with the studies of Jackling and Johl (2009). Moreover according to Kim and Rasheed (2014) a diversity of expert members is of more significance. The findings indicate that a committee cannot be successful if it lacks diverse skills. In case of audit committee the study fail to reject H6, as there is a positive and significant relationship between ROA and AC. These results are in line with previous research (e.g., Arslan et al., 2014; Beasley, Carcello, Hermanson, & Lapides, 2000; Bouaziz & Triki, 2012; Nuryanah & Islam, 2011).

5. Conclusion

This research analyzes the links between six corporate governance frameworks such as (Research & Development, Independent Directors, Leverage, Chief Executive Officer Duality, Board Size, and Audit Committee) and the Return on Assets (ROA) a proxy valuation of the company's value. The study used a sample of 11 companies that are listed on the Pakistan stock exchange from the period of 2010-2019. The analysis was done via multiple panel regression and the technique of regression chosen was ordinary least squares (OLS). The results of the study indicated a positive and significant link for R&D and AC with ROA at 10% and 5% respectively. IND showed a negative insignificant relationship with ROA. Whereas LEV, CEO and BS showed negative and significant relationship with ROA at 1%, 10%, 10% respectively.

6. Recommendations

The analysis provides the policymakers with significant functional consequences. Our findings show Pakistani policy makers that the corporate governance norms of all advanced nations are not relevant to developing nations. Corporate governance standards that have a significant effect on their financial output should be followed by businesses. It is therefore suggested that Pakistan develop corporate governance practices representing its unique business climate to enhance corporate governance.

Through disclosing them as a separate item in the income statement, businesses should clarify the value of their R&D spending. Since research and development investment is a critical factor in improving and retaining market edge. In the Pharmaceutical and other policymaking regulatory bodies, it is envisaged to formulate policies and procedures controlling the R&D spending

mechanism of companies in that industry. This is due to the significant support that R&D brings to this vital sector and to achieving local and global core competencies. The value of engaging in R&D is acknowledged by businesses. As R&D is directly involved in the enhancement and growth of production facilities and work practices, and a benefit is to be made in the immediate future, otherwise in the same time. R&D investment is one of the major indicators of business success and the streamlining of strategic decision-making to ensure the necessary financial security. R&D spending at both technological and social levels will contribute to an improvement in corporate productivity and thus to the broader economy. It can also lead to efficiency gains and can help businesses prevent issues arising out of disappointing performances or inappropriate decisions.

7. Limitations and Future Work

While the study attempted to collect data as fully and accurately as possible, it confronted the constraints of its sample size as well the time period. The results of this study could also not refer to financial institutions, non-listed or state-owned companies or organizations outside of Pakistan. Moreover the sample size in many developed countries is a challenge. In order to increase samples, it should be included in more non-listed companies and state-owned enterprises for future studies. Other important corporate governance frameworks like board skills and gender diversity should be analyzed in context of Pakistan. Moreover the study is only focused return on assets (ROA). In future apart from ROA, return on equity (ROE) and Tobin's q (TOQ) should be included in the study to check the relationships of different corporate governance frameworks with them individually.

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