COLLECTIVE PERSONALITY OF TOP LISTED FIRMS IN AUSTRALIA AND ITS IMPACT ON FINANCIAL AND MARKET PERFORMANCE

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Abstract

This paper examines three research problems. First, what collective personality traits are reflected in CEOs' statements in firms' annual reports? Second, is there any impact of collective personality on financial (ROE – return on equity) and market (TQ – Tobin's Q) performance? Third, whether attributes of CEOs or collective personality makes a greater impact on firm performance? Using the machine learning approach employed by IBM's Personality Insights service, we performed a content analysis of 804 CEO's annual report statements in 402 firms to estimate collective personality scores and adopted hierarchical multiple regression analysis to examine the intended relationships. The study found that collective conscientiousness and agreeableness impact positively on ROE and TQ and collective openness and neuroticism impact negatively on either or both ROE and TQ. Further, the collective personality tends to show a greater impact on ROE and firm size by assets than the impact of CEOs attributes. Besides exploring a relatively less-researched concept, the study highlights the practical value of developing intellectual and human capital through governance practices and leadership towards enhancing firm performance.

Keywords: Collective Personality, Human Capital, Intellectual Capital, Financial Performance, Market Performance

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1. INTRODUCTION

The twenty-first-century knowledge economy is based on digital transformation and intellectual and human capital. To embrace the current trends in these areas, the board of directors is advised to avoid the "fear of missing out" by relying primarily on the "adapt or die" strategy (Bodolica, 2019, p. 5).

The intangible abilities, skills, and knowledge inherent within the organisational structure, culture, systems, and processes contribute towards the intellectual capital of organizations (McCracken, McIvor, Treacy, & Wall, 2017; Mahoney & Kor, 2015). Intellectual capital (IC) is not usually recorded on the balance sheets, and one major source of such unrecorded intangibles is individual personality (Carroll & Tansey, 2000). The constructs such as personality traits, vocational interests, and psychological and academic-related factors that have not historically been associated with human capital represent the non-traditional domain of human capital (Kell, Robbins, Su, & Brenneman, 2018).

This paper explores the concept of the "collective personality" of firms as an aspect of intellectual capital and its association with firm performance. The collective personality represents at least two major constructs of intellectual capital: human capital and organizational capital (e.g., CIC model, 2003). While human capital consists of knowledge, abilities, skills, values, attitudes, and aptitudes, organizational capital refers to culture, structure, experience, information, and learning processes (Martín-de-Castro, Navas-López, López-Sáez, & Alama-Salazar, 2006; CIC, 2003). Information that presents to stakeholders of firms reflects a significant part of this intellectual capital. For example, human and organizational capital act as determinants of recurring patterns of behaviour of multiple organizational members involved in performing organizational tasks (Hofmann & Jones, 2005; Feldman & Rafaeli, 2002) and their outcomes. In line with these evolving trends and developments in knowledge and digital economy, there has been a shift in how intellectual assets are defined and conceptualized (e.g., Cortinovis, Xiao, Boschma, & van Oort, 2017) and therefore managing the intellectual and human capital of the firm has become one of the main tasks in the executive agenda (Bodolica, 2019; Elbahar, 2019; Kell et al., 2018; McCracken et al., 2017; Mahoney & Kor, 2015; Martín-de-Castro et al., 2006). Accordingly, there has been little research investigating how collective construct such as collective personality is measured and its association with profiles of key personnel and firm performance. Specifically, this paper investigates three interrelated problems. First, what collective personality traits are reflected in CEOs' statements published in firms' annual reports? Second, is there any impact of collective personality on financial (ROE – return on equity) and market (TQ – Tobin's Q) performance? Third, whether attributes of CEOs or collective personality makes a greater impact on firm performance?

The rest of the paper is organized as follows. Section 2 reviews the literature and introduces theoretical frameworks and hypotheses. Section 3 describes the research methodology, including the adoption of the machine learning approach. Section 4 presents empirical results and their discussion, and Section 5 concludes.

2. LITERATURE REVIEW

2.1. Collective personality

Hofmann and Jones (2005) refer to the application of personality to the collective level as a collective personality. Hogan's (1991) definition of personality consists of the underlying structures, dynamics, processes, and propensities that bring about certain behavioral regularities. At the collective level, these behavioral regularities are typically referred to as norms, values, organizational practices, and cultures (Feldman, 1984; Hackman, 1992; Feldman & Rafaeli, 2002). For example, Feldman and Rafaeli (2002) defined macro organizational level regularities as "recurring patterns of behaviors of multiple organizational members (a key aspect of a collective) involved in performing organizational tasks" (p. 311), the outcome of which is reflected in regular information presented to stakeholders. We argue that the behaviour of a firm is dependent on the collective personality because "CEOs/leaders influence collective personality and that collective personality is associated with the collective performance" (Hofmann & Jones, 2005, p. 509) because the impact of personality at an individual or collective level is functionally isomorphic.

Stewart (2003) noted that there is some research that describes collectives, using terms similar to those used in the Big Five model of personality. For example, theoretically, the social control aspects (e.g., Hackman, 1992; O'Reilly & Chatman, 1996) are associated with certain collective personalities. They tend to provide stakeholders, including firm executives with guidance, directions, values, and strategic initiatives for the future course of actions. Specifically, conscientiousness and agreeableness should increase the consistency and reliability of performance by ensuring that individuals diligently perform their own roles as well as work with others to integrate their role performance. The social control aspect of collective conscientiousness should also provide smooth integration and coordination among the different roles within the collective (Brotherton, 1991). As the applicability is demonstrated by Hofmann and Jones (2005), we use the Big Five model to investigate the collective personalities of selected firms in Australia.

2.2. Collective and individual personality elements manifested in CEOs statements

In line with our reference to the collective personality, which is the application of personality to the collective level, it describes behaviours, regularities, and functions that occur in the collective as a whole. For example, periodical recording (e.g., daily, weekly, monthly, etc.) summarising and analysing data, information processing, preparing periodical reports are all aspects and inputs of annual reports presented to stakeholders. Morgeson and Hofmann (1999) contended that behavioral routines of individual personality and collective routines are functionally isomorphic. That is, they produce regularized, consistent patterns of behaviors that can be observed and described by others, which can be labelled as an integration of both individual and collective personality. In company annual reports, a CEO's statement shares company vision, values, and organisational practices providing a basis for its patterns of behaviours and regularities through strategies and policies and its progress toward long-term goals (collective performance), reflecting a combination of both individual (e.g., CEO's) and collective personalities. Thus, content analysis of CEOs' statements of the annual

report is performed to understand relevant aspects of collective personalities of firms as they reflect hard to imitate and difficult to quantify intangible resources (e.g., Guthrie, Petty, Yongvanich, & Ricceri, 2004). All these conditions have one thing in common, they seek to discover better ways of utilizing and developing organizational tangible and intangible resources (e.g., human and intellectual capital) towards improving the performance and effectiveness of organizations.

2.3. Use of the Big Five model and CEOs statements

Within the big-five personality framework, it is hypothesised that some key aspects of the collective personality of a firm are reflected in CEOs' statements published in annual reports. Hofmann and Jones (2005) applied a common measure of the Big Five personality at the individual level to the collective as a whole. Second, the collective personality of a firm that is reflected in the CEOs statement of annual reports might be associated with CEOs' characteristics because 1) its CEO who must develop a guiding, overarching philosophy and approach to leadership, which includes corporate policy (strategic planning, structuring, R&D, values, development, and utilisations of resources), and 2) CEOs are responsible for every decision and action of other members of the company, including those decisions and actions of which they are not aware (Kaiser & Hogan, 2007). The Big Five model has proven its validity and usefulness in many disciplines including leadership, coaching, work success, and academic achievement (de Souza & Roazzi, 2017).

2.4. The Big Five personality model and performance

Organizational behaviour literature suggests that leaders' personality and organization effectiveness can best be described through the spectrum of the Big Five personality model (DeNisi, 2015; Barrick & Mount, 1991; Goldberg, 1990), which includes openness, conscientiousness, extraversion, agreeableness, and neuroticism (Barrick & Mount, 1991). Openness to experience involves imagination, intellect, liberalism, adventurousness, and artistic interest (Costa & McCrae, 1992). Conscientiousness refers to competence, self-discipline, orderliness, dutifulness, achievement striving, and self-efficacy (Leutner, Ahmetoglu, Akhtar, & Chamorro-Premuzic, 2014). Extraversion represents sociability, expressiveness, and friendliness (Nadkarni & Herrmann, 2010; Judge, Heller, & Mount, 2002). Agreeableness is the tendency to be accommodating, empathetic, altruistic, and trusting others. It represents a person who agrees, has a positive consensus with others and goodwill (Nadkarni & Herrmann, 2010; Judge et al., 2002). Neuroticism (the opposite of emotional stability) is characterised by negative sentiment, an anxious and depressed person, who causes stress and a negative climate in the group (Park et al., 2015; Costa & McCrae, 1992).

2.5. Direct impact of extroversion, conscientiousness, and openness on firm performance

Personality characteristics recognize how people think, feel, and behave (Ones, Viswesvaran, & Dilchert, 2005) and, therefore, they help explain why

people may be more or less successful (Parr, Lanza, & Bernthal, 2016). Some prior meta-analysis reviews have demonstrated a relatively weak to moderate relationship between extraversion, conscientiousness, openness, and effectiveness (Judge at al., 2002; Lord, de Vader, & Alliger, 1986). For example, the openness trait leads to variations in job performance because leaders who are high on openness tend to deals effectively with resolving conflicts constructively and thereby enhance firm performance (Bing & Lounsbury, 2000). Additionally, DeRue, Nahrgang, Wellman, and Humphrey (2011) found that the Big Five personality traits explained 22 percent variance in leader effectiveness, in which conscientiousness and openness demonstrated a key role. The role of personality traits on leader effectiveness has also been looked at from the negative side as well. For example, Hogan, Hogan, and Kaiser (2010) observe that low on extraversion, conscientiousness, and openness are related to leader derailment. With regard to the relative impact of personality among individual difference variables, the results of a meta-analysis study of Hoffman, Woehr, Maldagen-Youngjohn, and Lyons (2011) indicate that the impact of trait-like characteristics was modest ($r = 0.27$ and 0.26). This evidence tends to suggest that relatively more stable personality traits have a direct effect on leader performance (Hoffman et al., 2011, p. 365). In summary, while recognising some contrasting evidence, a significant amount of research evidence indicates a positive relationship between firm performance and extraversion, conscientiousness, and openness traits of employees and leaders. In this study, we extend these individual personality level arguments to develop argument at collective personality levels (e.g., Hofmann & Jones, 2005; Stewart, 2003). This led us to develop our first three hypotheses as follows.

H1: Collective personality trait of extraversion has a significant positive impact on firm performance.

H2: Collective personality trait of conscientiousness has a significant positive impact on firm performance.

H3: Collective personality trait of openness to experience has a significant positive impact on firm performance.

2.6. Agreeableness and firm performance

Agreeableness is the tendency to be empathetic, accommodating, altruistic, modest, and trusting others. It represents a person who agrees, has a positive consensus, and goodwill (Judge et al., 2002). Their tendency to be cooperative and affiliation might produce effective outcomes (Graziano & Eisenberg, 1997) because they are regarded as preferred and collaborative individuals in a group (Nadkarni & Herrmann, 2010). Leaders who are high on their agreeableness tend to have low scores on passive leadership because they are likely to be available when needed. The results of LePine and Van Dyne's (2001) study also demonstrate contrasting relationships for agreeableness, that is a positive relationship with corporate behaviour and a negative with voice behaviour (both represent the aspects of citizenship performance). The overall evidence suggests a modest positive impact of agreeableness on effectiveness and performance, which led us to formulate our fourth hypothesis:

H4: Collective personality trait of agreeableness has a modest positive impact on firm performance.

2.7. Neuroticism and performance

Individuals who are high in neuroticism tend to experience anger, anxiety, depression, immoderation, and vulnerability (Anwar, Xiao, Fiaz, Ikram, & Younas, 2017; Costa & McCrae, 1992). Leaders with high neuroticism tend to be less effective than emotionally stable leaders (Barrick & Mount, 1991) and tend to experience common psychological ailments (Jeronimus, Kotov, Riese, & Ormel, 2016). According to Bass (1985, p. 173), individuals high in neuroticism should not lead and therefore they should avoid leadership responsibilities. The opposite view is the capacity to adapt to complex and diverse situations and to cope effectively with stress (Judge et al., 2002; Nadkarni & Herrmann, 2010). This evidence led us to suggest that neuroticism will have a negative impact on firm performance.

H5: Collective personality trait of neuroticism has a significant negative impact on firm performance.

A relatively recent research models assume a relatively stronger correlation for proximal measures of effective leadership (Bodolica, 2019; Elbahar, 2019; Hoffman at al., 2011). Given this evidence, some scholars have contended that effective leaders can be developed to some extent (e.g., Hoffman et al., 2011; Kirkpatrick & Locke, 1991). However, a more critical argument is required according to the dynamic nature of leaders' impact in organizations. For example, "more stable personality traits of higher-level leaders affect their performance relative to lower-level leaders because of the latitude and the greatest amount of discretion to make an impact on firm performance" (Kaiser & Hogan, 2011, p. 223). Given this evidence, we argue that the impact of more stable or distal characteristics such as personality traits of CEOs is relatively greater than that of their proximal characteristics on firm performance. Based on this evidence, we establish our last hypothesis as follows:

H6: The relative impact of collective personality is greater than that of CEOs' profiles on firm performance.

3. METHODOLOGY

3.1. Sample

The population of listed companies in Australia is 2217 (Australian Stock Exchange = ASX listed companies, 2019). Using purposive sampling, we selected all the firms listed in the top ASX 500 companies. Accordingly, the sample size was 23% of listed companies. However, the availability of data on key study variables and data refinement resulted in 402 usable cases, representing a usable sample size of 19% of the population.

The sample consisted of seven industry categories. Table 1 indicates that consumer discretionary and staples and industrial and materials sectors are the dominant sectors in the sample. These categories consisted of 203 companies, accounting for a total of 50% of firms in the sample.

Table 1. Sample distribution by industry

	Firms	%	(In millions of AUD)			
			Market cap	Enterprise value	Sales	Total assets
Consumer discretionary & Staples	86	21	7268	7136	8128	5509
Energy & Utility	29	7	9321	12531	5274	11468
Financials	51	13	11629	4292	4739	83655
Health care	32	8	4022	3761	1124	1496
Industrials & Materials	117	29	7120	8657	4022	7321
Information technology & Telecom	47	12	7028	9456	3541	5878
Real estate	40	10	3032	4215	916	4545
Total	402	100.0				

3.2. Measuring personality

An alternative to questionnaire surveying is a novel machine learning approach, backed by an accepted theory of psychology that suggests the human language reflects one's personality, thinking style, and emotional status (Boyd & Pennebaker, 2017). IBM's personality insight service that we use in this study follows the open-vocabulary approach (Arnoux et al., 2017; Plank & Hovy, 2015; Schwartz et al., 2013) to infer personality from language. The open vocabulary approach involves identifying words and phrases that characterise certain personality traits using a large volume of data. Machine learning models employed by the personality insight service have been trained using large corpora of text data from one million Twitter users and their known personality traits identified using surveys. The accuracy of the predicted personality score is expressed in terms of mean absolute error (MAE), which is the average absolute difference between the actual personality trait score obtained from the survey and the predicted score by the machine learning model across one million users. In this study, MAE for Big Five personality traits is 0.12. Full details of the personality insights service can be found on the IBM website (IBM, 2019).

3.3. Validity and reliability of measurements

The validity of the Big Five personality model has been tested globally in more than 70 countries. Therefore, they consisted of acceptable psychometric properties in terms of variables, indicators, and their structures. The novel linguistic approach we used to assess personality is consistent with recent evidence in personality and leadership research. For example, Malhotra, Reus, Zhu, and Roelofsen (2018) adopted a linguistic technique using text spoken by CEOs to estimate personality dimensions. Chatterjee and Hambrick (2007) also adopted a content analysis method using a word-count software to identify variables such as narcissism and extraversion. In a previous section, we have justified the validity of CEOs' statements to examine the variation in firm performance. The discriminating properties were

examined by using neuroticism traits of the Big Five model, which was correlated negatively with dependent variables (Table 6). The associations of personality variables with other conceptually related variables were also found to be consistent with the literature, with few exceptions, which we have discussed and validated in the discussion section. A reflection of this and other related results are presented in Table 4 and Table 6.

3.4. Reliability

As a measure of checking the reliability of the data collection method, we performed the IBM mechanism twice for analysing CEOs' statements for two consecutive years (2016/2017) and the reliability/consistency index was found to be 0.78. The Cronbach alpha coefficients associated with the variables in the Big Five model were also acceptable as they represent 0.8 or above for four indicators (Emotional stability = 0.9, agreeableness 0.8, extraversion 0.8, and conscientiousness 0.8), and 0.6 for openness dimension. Since the high average score on this variable 0.84 and the strong conceptual validity of the Big Five model, we proceeded with further analysis using all the five variables. Further, in compliance with IMB guidelines, we used high order personality scores in our impact analysis.

3.5. Performance and CEO profiles data

We used company websites, annual reports, and Bloomberg database to collect other relevant data on firm performance and CEOs' profiles (e.g., gender, age, education, etc.). For example, the firm performance data was drawn from the Bloomberg database on two performance measures (ROE and TQ). We selected these measures because they represent both financial and market measures of performance. For example, as an accounting performance measure, the ROE has been used extensively in similar research (e.g., Cheung, Naidu, Navissi, & Ranjeeni, 2017; Demerjian, Lev, & McVay, 2012). TQ is a ratio that shows the market value of the firm to its book value. It is a measure of the wealth (value) of a company, and enhancing the shareholder wealth is a primary responsibility of top management teams.

4. RESULTS AND DISCUSSION

As financial (ROE) and market (TQ) performance of firms might be influenced by a number of factors, we used six control variables associated with industry level, firm level, and CEO level in the examination of the impact of collective personality on firm performance. Industry category was entered as dummy variables in the first step of hierarchical regression analysis. Table 4 shows a negative impact of the industry sector (financial) on ROE ($\beta = -0.11$, $P < 0.03$), which was controlled in the second stage of the regression analysis. In addition, the board size, firm size, and the number of NED's were also used as firm-level control variables. For example, Table 4 indicates a positive impact of the number of NEDs ($\beta = 0.18$, $P < 0.01$) and a negative impact of firm size by assets ($\beta = -0.17$, $P < 0.001$) on ROE. Interestingly, the impact of firm size by assets is positive (Table 6) for TQ ($\beta = 0.4$, $P < 0.001$). In addition, CEOs' level of education and experience were also used as control variables in both ROE and TQ models. However, the findings of this study indicate that there is no statistically significant impact of the CEO's level of education and experience on firm performance.

Table 2. Collective personality differences by industry category

Industry category		P1 *Openness*	P2 *Conscientiousness*	P3 *Extraversion*	P4 *Agreeableness*	P5 *Neuroticism*
Consumer discretionary & Staple	Mean	.856	.395	.605	.095	.815
	Std. Deviation	.083	.115	.150	.074	.091
Industrial and Material	Mean	.844	.408	.601	.088	.819
	Std. Deviation	.103	.107	.143	.060	.072
IT and Telecom	Mean	.863	.383	.570	.081	.813
	Std. Deviation	.087	.110	.166	.048	.113
Energy and Utilities	Mean	.819	.402	.587	.089	.799
	Std. Deviation	.115	.112	.167	.045	.093
Financial	Mean	.863	.420	.592	.088	.810
	Std. Deviation	.082	.100	.148	.055	.087
Health care	Mean	.851	.397	.603	.088	.816
	Std. Deviation	.097	.095	.140	.048	.081
Real estate	Mean	.810	.434	.593	.090	.792
	Std. Deviation	.112	.118	.147	.062	.127
Overall	Mean	.846	.405	.595	.089	.812
	N	402	402	402	402	402

Table 2 shows that collective openness and emotional stability (reversed neuroticism scores) of Australian firms are relatively high, their levels of collective conscientiousness and extraversion are moderate with a low level of collective agreeableness.

We also extended our initial descriptive analysis to observe performance data in the sample. Accordingly, the overall average of ROE ranged from 5.27% in 2015 to 10.99% in 2017 with a substantial increase over the three years. In contrast, the overall average of Tobin's Q, the market performance indicator, showed virtually no improvement over the three years despite showing an increase from 1.94% to 2.49% from 2015 to 2016. However, the average Tobin's Q dropped to 1.95% in 2017, which is almost the same level of Tobin's Q that existed in 2015.

Table 3 presents a summary of the result of our analysis for hypotheses testing and the results of the hierarchical regression analysis Model 1

for ROE. The results are presented under two categories, the outcome of controlled variables, which were entered first, and then the outcome of study variables, which are presented from Table 3 to Table 6.

Table 3. Regression Model 1 summary for ROE

Model 1	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	.269[b]	.072	.058	50.13172	.072	5.062	6	390	.000
2	.406[c]	.165	.141	47.86525	.093	8.562	5	385	.000

ANOVA[a]						
Model 1		Sum of squares	df	Mean square	F	Sig.
1	Regression	76324.963	6	12720.827	5.062	.000[b]
	Residual	980143.753	390	2513.189		
	Total	1056468.716	396			
2	Regression	174402.267	11	15854.752	6.920	.000[c]
	Residual	882066.449	385	2291.082		
	Total	1056468.716	396			

a. Dependent Variable: Average ROE.
b. Predictors: (Constant), CEO experience, CEO education, SEc_code2 = Financial, Firm size by assets, Number of NEDs, Board size.
c. Predictors: (Constant), CEO experience, CEO education, SEc_code2 = Financial, Firm size by assets, Number of NEDs, Board size, P5 N-average, P1 O-average, P4 A-average, P2 C-average, P3 E-average.

Table 4. Beta coefficients for controlled and study variables (Model 1 for ROE)

Model 1		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	-1.484	9.818		-.151	.880
	Firm size by assets	-17.917	5.292	-.174	-3.386	.001
	Board size	-1.205	1.726	-.053	-.698	.485
	Number of NEDs	4.632	1.947	.178	2.379	.018
	SEc_code2 = Financial	-17.045	7.624	-.110	-2.236	.026
	CEO education	-3.349	5.220	-.032	-.642	.522
	CEOs experience	7.813	5.085	.076	1.536	.125
2	(Constant)	-32.698	45.171		-.724	.470
	Firm size by assets	-11.864	5.192	-.115	-2.285	.023
	Board size	-.916	1.654	-.041	-.554	.580
	Number of NEDs	4.298	1.878	.165	2.289	.023
	SEc_code2 = Financial	-17.576	7.327	-.113	-2.399	.017
	CEO education	-2.476	5.004	-.023	-.495	.621
	CEO experience	6.709	4.894	.065	1.371	.171
	P1 O-average	-55.637	28.370	-.105	-1.961	.051
	P2 C-average	105.837	26.630	.225	3.974	.000
	P3 E-average	12.606	19.489	.037	.647	.518
	P4 A-average	145.972	49.694	.170	2.937	.004
	P5 N-average	14.661	30.854	.026	.475	.635

The overall impact of 16% variance of ROE is indicated for the collective personality (9%) and controlled variables (7%) of industry, firm level, and CEO attributes. Specifically, the direct effects of collective conscientiousness ($\beta = 0.22$, $P < 0.001$) and collective agreeableness ($\beta = 0.17$, $P < 0.01$) on ROE are all positive, confirming *H2* and *H4*. In contrast, the direct effects of collective openness on ROE is negative ($\beta = -0.10$, $P < 0.01$), accepting the null hypothesis of *H3*. Similarly, *H1* is also rejected as there is no statistically significant impact of collective extraversion on ROE ($\beta = 0.03$, $P < 0.534$). A discussion of these contrasting findings is presented in the next section.

Figure 1. Normal P-P plot of regression standardised residual (Dependent variable: Average ROE)
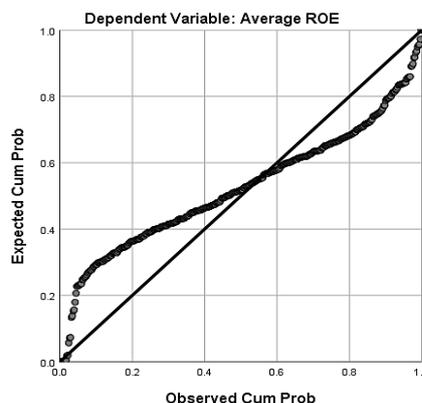
The study also examined the direct impact of collective personality dimensions on TQ. The findings presented in Table 5 and Table 6 indicate both positive and negative impacts. For example, the impact of collective conscientiousness ($\beta = 0.19$, $P < 0.001$) on TQ is positive, supporting *H2* further on market performance too. Similarly, the impact of collective neuroticism on TQ is negative ($\beta = -0.22$, $P < 0.001$), confirming *H5* for TQ. As observed in the case of ROE, the direct effects of collective openness on TQ is also negative ($\beta = -0.11$, $P < 0.01$), accepting the null hypothesis of *H3*.

In *H6*, we argued that the relative impact of collective personality traits was higher than that of profiles of CEOs on firm performance. The results of hierarchical regression analysis presented in Table 3 and Table 5 indicate that the *H6* is accepted for ROE and the null hypothesis is accepted for TQ. Specifically, the impact of overall collective personality on ROE is 9% and that of malleable profiles is 7%, conforming *H6* on ROE. In contrast, the impact of overall collective personality on TQ is 5% and that of malleable profiles is 12%, rejecting *H6* on TQ.

Table 5. Regression Model 2 summary for Tobin's Q

Model 2	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	.334ᵇ	.112	.098	1.92208	.112	8.185	6	390	.000
2	.398ᶜ	.159	.134	1.88297	.047	4.274	5	385	.001

ANOVAᵃ						
Model 2		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	181.422	6	30.237	8.185	.000ᵇ
	Residual	1440.810	390	3.694		
	Total	1622.232	396			
2	Regression	257.186	11	23.381	6.594	.000ᶜ
	Residual	1365.046	385	3.546		
	Total	1622.232	396			
a. Dependent Variable: Average TQ.						
b. Predictors: (Constant), CEO experience, CEO education, SEc_code2 = Financial, Firm size by assets, Number of NEDs, Board size.						
c. Predictors: (Constant), CEO experience, CEO education, SEc_code2 = Financial, Firm size by assets, Number of NEDs, Board size, P5 N-average, P1 O-average, P4 A-average, P2 C-average, P3 E-average.						

Table 6. Beta coefficients for controlled and study variables (Model 2 for Tobin's Q)

Model 2		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	1.496	.376		3.975	.000
	Firm Size by assets	1.377	.203	.340	3.785	.000
	Board size	0.046	.066	.052	.694	.488
	Number of NEDs	-.053	.075	-.052	-.713	.476
	SEc_code2=Financial	.061	.292	.010	.208	.835
	CEO education	-.176	.200	-.042	-.881	.379
	CEOs experience	.113	.195	.028	.580	.562
2	(Constant)	5.199	1.377		3.777	.000
	Firm Size by assets	1.336	.204	331	6.542	.000
	Board size	.034	.065	.038	-.521	.603
	Number of NEDs	-.039	.074	-.038	-.530	.597
	SEc_code2=Financial	.154	.288	.025	.533	.595
	CEO education	-.130	.197	-.031	-.662	.508
	CEO experience	.078	.193	.019	.404	.686
	P1 O-average	-2.270	1.116	-.109	-2.034	.043
	P2 C-average	3.481	1.048	.188	3.323	.001
	P3 E-average	0.478	.767	.035	.623	.534
	P4 A-average	-3.201	1.555	-.095	-1.638	.102
	P5 N-average	-4.716	1.214	-.216	-3.885	.000

Figure 2. Normal P-P plot of regression standardised residual (Dependent variable: Average TQ)
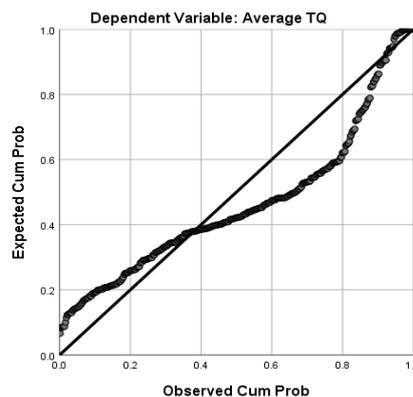
This evidence suggests a very important finding that the impact of collective personality is relatively greater than that of proximal profiles of CEOs on ROE, while an opposite impact is demonstrated for TQ.

The study presents several interesting and important findings. Overall, the collective personality of the Australian firms indicates high openness and emotional stability (reversed neuroticism), moderate conscientiousness and extraversion, and low agreeableness. Although prior research on the "collective personality" of Australian firms is not available in relation to the Big Five model, Zaccaro, Green, Dubrow, and Kolze (2018) stressed that research in organizations must test different sets of attributes with firm performance. We contribute to this end by considering the impact of two major sets of variables, namely, the collective personality of organizations and proximal profiles of CEOs to examine their relative impact on financial and market performance.

As hypothesised, the study found that collective personality dimensions of conscientiousness, agreeableness have a significant positive impact on firm performance (financial and/or market). These are important findings in relation to the concept of collective personality. For example, we contended that conscientiousness and agreeableness should increase the consistency and reliability of performance by ensuring that individuals diligently perform their own roles as well as work with others to integrate their role performance. We argued that one of the key aspects presented in the company annual report is the outcome of such integrated efforts. Accordingly, the social control aspect of collective conscientiousness should also provide smooth integration and coordination among the different roles within the collective (Brotherton, 1991).

Similarly, the study found that collective neuroticism has a negative impact on market performance. Interestingly, it revealed that openness to experience impacted negatively on both financial and market performance. However, an overall positive or negative impact represents a weak to moderate-size impact on firm performance. Previous meta-analytic review on the impact of individual-level personality also indicates weak to a moderate size effect on business success (e.g., Rauch & Frese, 2007; Judge et al., 2002). Although it is not directly comparable as far as the level of analysis is concerned, some previous evidence also available with regard to the negative impact of openness on firm performance. For example, while Najam-us-Sahar (2016) reported a negative relationship between openness to experience and the productivity of banking sector employees ($N = 300$) in Pakistan, Mohan and Mulla (2013) found that openness to experience was negatively correlated with the performance of relatively low complex jobs among Indian executives. One possible explanation for our findings in the Australian sample might be that being too open to experience and challenging traditional values may be imprudent in enhancing firm performance. For example, the opposite low openness is described as "[…] conventional, conservative and prefer familiarity" (Howard & Howard, 1995, p. 6), which suggests that if an individual respects traditions and culture at an organisational and national level, that person

is not too much open, but more conservative. This might suggest that a relatively less open culture and conservative ideology might be more productive at collective personality levels in Australian firms. This might also be a reflection of the assertion that collective personalities of firms might be influenced by the context (e.g., Antonakis, Day, & Schyns, 2012; Hambrick, 2007). In summary, our finding of Australian firms' collective personality traits adds new knowledge to the limited empirical literature on the negative impact of collective openness to experience and neuroticism and the positive impact of collective conscientiousness and agreeableness on firm performance.

Another important knowledge gap we addressed in this study was the relative impact of collective personalities and proximal characteristics of CEOs on financial and market performance. As we hypothesised (*H6*), the findings of this study confirmed that the impact of collective personality traits is relatively greater than that of malleable attributes such CEO's education and experience on firm performance. In light of this evidence, the study supports the contention that individual and collective personalities and proximal attributes of CEOs affect firm performance and that firm performance can be improved through intellectual and human capital (managerial and employees competence or human capital) and leadership and governance policies (management philosophies or infrastructure assets), and governance practices such as assets management, managing board size and NEDs (e.g., Guedes, 2020; Bodolica, 2019; Elbahar, 2019; Kell et al., 2018; Antonakis et al., 2012; Hambrick, 2007; Zaccaro, 2007; Kirkpatrick & Locke, 1991).

5. CONCLUSION

This study was aimed to examine the collective personality traits of listed firms and their impact on financial and market performance. There is a paucity of empirical research attempting to investigate collective personality traits in organizations. We used the contents of CEOs' statements in company annual reports as a proxy for collective personality and to estimate personality scores on the Big Five model. We argued that the behaviour of a firm is dependent on the collective personality because "CEOs/leaders influence collective personality and that collective personality is associated with collective performance" (Hofmann & Jones, 2005, p. 509). As the impact of personality at an individual or collective level is functionally isomorphic, organisational level performance indicators such as ROE and Tobin's Q represent the outcomes of collective personalities of firms in this study.

As hypothesised, the study found that conscientiousness and agreeableness tend to increase the consistency and reliability of financial (ROE) and market (TQ) performance by ensuring that individuals diligently perform their own roles as well as work with others to integrate their role performance. Accordingly, the social control aspect of collective conscientiousness should also provide smooth integration and coordination among the different roles within the collective (Kell et al., 2018; Brotherton, 1991) towards improving the performance of entities.

The finding of this study also contributes to the extension of the Big Five personality theory to explore the collective personality of firms and to deepen our understanding of intellectual and human capital research in organizations. Specifically, the contents of a CEO's statement reflect the outcomes of teamwork (collective performance), and values, and strategic initiatives for the future course of actions. Thus, CEOs' statements reflect both demonstrated and projected behaviours of individuals and teams within organisations (collective personality) and therefore they represent the values, practices, and cultures of organisations (Feldman & Rafaeli, 2002). In particular, the collective behaviours of firms tend to be shaped by employees' and managerial competence (e.g., human capital) and management philosophies (infrastructure assets), which are some key indicators of intellectual capital (e.g., Guthrie et al., 2004).

Further, the study emphasised the role of governance practices such as management of assets, firm size, the board size, NEDs, and leadership development towards improving the financial and market performance. This would also help address some of the contemporary corporate governance needs of organizations such as recruiting and developing socially responsible, ethical, and sustainable human and intellectual capital as they tend to contribute to the development of collective personalities in organizations.

Overall implications of the study deal with new knowledge associated with corporate governance practices and exploring possibilities of developing human and intellectual capital in organizations through collective personalities to improve financial and market performance. As the study found the impact of company size by assets and number of NEDs on boards on financial and market performance, the role of corporate governance practices is reemphasised in relation to the financial and market performance of listed firms. Several scholars have also asserted that key personality traits help organizations and their leaders to acquire necessary skills and competencies (human capital)

(Antonakis et al., 2012), formulate an organizational vision and effective plan for pursuing it, and take necessary steps to implement the vision in reality (Kirkpatrick & Locke, 1991), and thus contribute to the development of infrastructure assets (intellectual capital) and then the effectiveness of organizations (Hambrick, 2007). Given this theoretical and empirical evidence, we argue that collective personality traits might be inherited and developed within organizations (e.g., Hoffman et al., 2011; Kirkpatrick & Locke, 1991) and that such personalities traits can be acquired and developed through intellectual and human capital development and corporate governance practices. Further, as Gahan et al.'s (2016) study of leadership at work in Australia also suggests that the key to long-term competitive advantage and a sustainable economy is to promote transformation in the caliber of leadership and management of Australian firms. This study provides partial support to make these transformations happen as the study variables demonstrated a significant impact (around 17%) of collective personality traits and several corporate governance practices on firm performance.

Despite the intriguing findings and their theoretical and practical implications, this study is not free from limitations. First, we used CEOs' statements in annual reports to quantitatively estimate the collective personality traits in organisations. This approach could further be developed by simultaneously considering both individual and collective statements of top management teams in organizations in future research. Although we observed that the variability of data between the two consecutive years (2016 and 2017) to be low, it might be useful to include data for few more years to understand the change and stability of collective personalities in organizations. Further, mediating and moderating roles of collective personalities on firm performance may be explored in future research. Studies covering a broader geographic area would also be useful for both theory and practice in future research.

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