

# Using Partial Least Squares Structural Equation Modeling (PLS-SEM): Mediation between Strategic Management & Performance

Ibrahim Kamal Abdul Rahman<sup>a</sup>, Md. Mamun Mia<sup>b\*</sup>, <sup>a,b</sup>Universiti Kuala Lumpur Business School, 50250 Kuala Lumpur, Email: <sup>b\*</sup>[mamun.contact@yahoo.com](mailto:mamun.contact@yahoo.com)

This study explores the uses of partial least squares in structural equation modelling as a strategic management method on business performance. The aim is to explore whether strategic management helps to improve business performance indirectly. The study uses a quantitative approach. The source of data collection is questionnaires surveyed from ready-made-garment manufacturers in Bangladesh by a cluster sampling technique. Development of a hypothesis-testing conceptual framework of strategic management model shows the mediating role of leadership style suggesting significance the business performance. The output shows that strategic management helps to improve the sustainability of company performance by strategic management traits of leadership style in the form of a partial mediation. It reveals that the mediating role of leadership style which helps to improve business performance through an understanding of leadership style attention harmonised towards business performance statistically significant.

**Key words:** *Strategic Management, Business Performance, Leadership Style, Structural Equation Modelling.*



## **Introduction**

Strategy is a term with many meanings, all of which are applicable and suitable to those who are charged with setting strategy as their businesses goals (Gandossy, 2003). The strategy is advising the managers on analysing their competitors in terms of the business structure, forecasting movements, evolving competitive strategies, and selecting new businesses (Belton, 2017). However, traditional pragmatic techniques are not adequate to establish causal effect with high confidence, as experiments have the potential to be used more broadly in strategy research (Chatterji, Findley, Jensen, Meier, & Nielson, 2016). Economic success needs constant awareness of the environment under which the company may lose or generate value, and a company's effectiveness reflects its long-term business performance and interactions within manufacturing and participants (Lloret, 2016).

The greatest advantage of research in strategic management theory is the hands-on method which allows researchers to discover main areas of management including strategic leadership style and business performance (Pitt & Koufopoulos, 2017). Strategic management has developed widely to help managers to make long-term decisions in a competitive platform.

### ***Research Aim***

The aim of this study is to discover if strategic management helps to improve business performance indirectly using partial least squares in structural equation modelling.

### ***Research Objective***

The use of partial least squares structural equation modelling is concerned with the achievement of developing this framework.

## **Literature Review**

In this section, literature review has discovered the majority of recent and relevant particularly in the strategy area .

### ***Strategic Management***

Strategic management often aims to empirically create a causal relationship between an exogenous and endogenous variable such as business performance (Chatterji et al., 2016). While strategic deals have developed in recent years as common and essential structural vehicles for business performance, surprisingly little is known about how joint activities are

structured and managed within these authority structures (Albers, Wohlgezogen, & Zajac, 2016). Strategic management helps strategic leaders to generate planning, managing and analysing approaches to business performance. The process of assessment establishment and capture depends on the set of business characteristics and the nature of production (Gallus & Frey, 2016). Strategic management in operation examines up-to-date thinking in this fast-moving area, where businesses continuously face ongoing and increased amounts of competition (Brown, 2018).

Therefore, strategic management plays an important role in business analysis because it openly addresses a key force in business analysis framework - competitive challenge - and how that force both impacts and is impacted on by the other services (Phillips & Moutinho, 2017). Strategic management shines a light on measures that actually matter, such as value for the business (Phillips & Moutinho, 2017). However, strategic management refers to strategic plans and processes that seek reliable competitive advantage with the main value of environmental sustainability (Stead & Stead, 2017).

### ***Leadership Style***

Leadership style in circular business reproductions based on remanufacturing and reuse potentially create significant budget savings as well as essential reductions towards environmental impact (Linder & Williander, 2017). The role of strategic leadership is dominant by strategic management is mediated by leadership style influence over business performance (Hermano & Martín-Cruz, 2016). A fundamental issue in leadership study concerns the impact of leadership style in the pattern of attitudes that leaders hold and behaviours they demonstrate (Anderson & Sun, 2017). Leadership holds different features behaviour such as directing, motivating and guiding to manage people. Whereas, a great leader can change the firm's environment while at the same time inspire social change. Therefore, leadership style can influence business performance positively.

Empirical research has revealed significant positive impact of leadership style on job satisfaction of various institutions, where servant leadership style has been found to have the highest positive significant impact on job satisfaction (Alonderiene & Majauskaite, 2016; Anderson & Sun, 2017). However, leadership style has a significant positive and mediating effect on managerial style into business performance (Nguyen et al 2017). Moreover, suitable leadership styles and human resource practices have determined needs to be adopted in organisations to effect performance (Popli & Rizvi, 2016). Therefore, existing works of literature have explored the positive effect of leadership style on the innovation environment from a group perspective (Xie et al., 2018). Leadership style should more flexible and reliable because autocratic leadership style is to be more dominant and display a significant



negative relationship with employee motivation, whereas democratic and relaxed leadership styles are shown to positively predict business performance (Fiaz et al 2017).

### ***Business Performance***

Sustainable business practices are essential to a company's business goal and existence as a strategy of targeted and continuing actions afford economic benefits (Lloret, 2016). The capacity to quickly and successfully move into new business simulations is the main source of sustainable competitive advantage and key influence to progress the business' sustainability performance (Geissdoerfer, Vladimirova, & Evans, 2018). Therefore, the ground of performance measurement has changed rapidly during the last few years with the growth of new measurement frameworks and methodologies, such as leadership style, balanced scorecard, performance prism, value-added economics, economic profit, activity-based costing, and self-assessment techniques (Del-Río-Ortega et al. 2019). However, business performance depends on engagement with others and gaining competitive advantage through establishing metrics as well as performing to effectively measure and improve the influence of engagement initiatives on overall business performance (Tanwar, 2017).

### ***Hypotheses and Conceptual Framework***

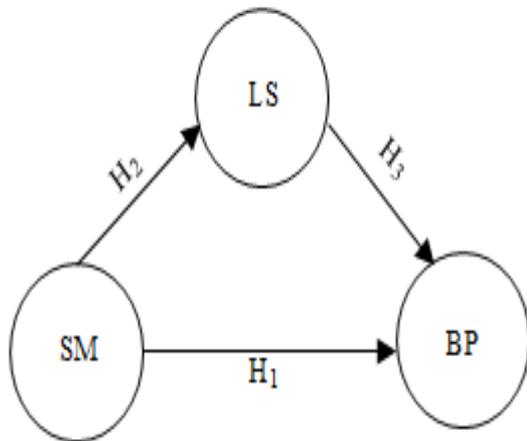
The hypotheses generated from the above literature focus on the relationship between constructs as the following figures indicate .

H<sub>1</sub>: SM → BP

H<sub>2</sub>: SM → LS

H<sub>3</sub>: LS → BP

**Figure 1.** Conceptual Framework



*Note: SM = Strategic Management; LS = Leadership Style; BP = Business Performance*

## **Methodology**

In this study, the methodology is conducted by the positivism-philosophy and quantitative survey method. The following subsections elaborate independently for research design, sampling technique, respondents and the data management process.

### ***Research Design***

The research design is based on a quantitative technique to obtain have the report from a collection of data analysis to validate the literature by partial least squares structural equation modelling (PLS-SEM) analysis.

### ***Sampling Technique and Respondents***

Sampling technique surveyed by cluster sampling method in the area of Savar in Bangladesh. The target population is based on ready-made-garment manufacturers. The target respondents were managers from top-level management.

### ***Data Management Process***

Data collection process management is followed by a survey questionnaire and data reorganized by screening and error checking. However, before entering the main analysis, a reliability test was conducted to ensure Cronbach's alpha each measured variable is reliable and supports PLS-SEM for the path analysis. Moreover, in this study data execution was performed by SPSS and Smart-PLS.

### *Partial Least Squares using Smart-PLS*

Partial least squares (PLS) have been executed to develop the model by predicting from independent variables influenced by dependent variables. The theory is usually initiated by a research question, which can originate from the phenomenon of attention, variations or limitations of the existing theory (Makadok, Burton, & Barney, 2018). However, partial least squares structural equation modelling (PLS-SEM) is regularly used for research in strategic management (Hair et al. 2012).

### **Data Analysis**

The following table has displayed an item matrix for the constructs of strategic management, leadership style and business performance. The measurement items of each variable have achieved more than a cut-off point, whereas it is desirable for Cronbach's alpha >0.70 to continue testing (Cronbach, 1951; Jr., Matthews, Matthews, & Sarstedt, 2017). However, alpha is the top choice among all circulated reliability coefficients (Cho & Kim, 2015).

**Table 1: Descriptive Statistics**

Scale items	$\mu$	$\sigma$	Corrected-Item-Total Correlation	Cronbach's alpha ( $\alpha$ )	No of items
SM1	3.95	0.834	0.58	0.81	94
SM2	4.21	0.774	0.68	0.76	94
SM3	4.30	0.774	0.64	0.78	94
SM4	4.41	0.782	0.69	0.76	94
LS1	4.03	1.000	0.71	0.87	94
LS2	4.46	0.812	0.54	0.90	94
LS3	4.17	1.000	0.82	0.84	94
LS4	4.33	0.943	0.85	0.83	94
LS5	4.32	0.895	0.74	0.86	94
BP1	4.23	0.710	0.42	0.91	94
BP2	4.34	1.000	0.80	0.83	94
BP3	3.84	1.000	0.76	0.84	94
BP4	4.12	1.000	0.78	0.84	94
BP5	3.95	1.000	0.80	0.83	94

The above table shows corrected item-total correlations greater than 0.30 that is desirable in order to validate items. However, the mean values have achieved about to 4.0 which has indicated significant agreement on respondent agreement between measured variables. Moreover, the standards deviation shown of each item was close to 1, which is a high

standard deviation which reveals that numbers are more protracted. Therefore, the total number of items is 94 sample size executed in this study.

Nevertheless, the following table displays the matrix of construct reliability and validity for three variables namely, exogenous variable, mediating variable, and endogenous variable. Each variable alpha is  $>0.70$  which is more than desirable (Hair, et al., 2014).

**Table 2:** Matrix of Construct Reliability and Validity

	<b>Cronbach's Alpha</b>	<b>rho_A</b>	<b>Composite reliability</b>	<b>Average Variance Extracted (AVE)</b>
Business performance	0.87	0.888	0.910	0.674
Leadership style	0.89	0.900	0.919	0.696
Strategic management	0.83	0.827	0.885	0.658

The above table shows the average variance extracted (AVE) which has achieved the desired values  $>0.50$ , where AVE required minimum  $\geq 0.50$  indicated the consequence of each estimator (Aimran, et al., 2017). However, AVE has achieved the amount of variance, which has captured a variable association to the amount of variance causing measurement error. The next table indicates collinearity statistics (VIF) and R-square of the constructs. Variance Inflation Factor (VIF) and tolerance are both broadly used measures of the degree of multicollinearity of the exogenous variable with the other exogenous variables in a regression model (O'Brien, 2007). First of all, VIF has achieved acceptable value from 1 to 3 or less than 5 (Jr. et al., 2017; O'Brien, 2007), which is accepted by the range and there is no collinearity issue between them.

**Table 3:** Collinearity statistic (VIF) values for the internal model with  $R^2$

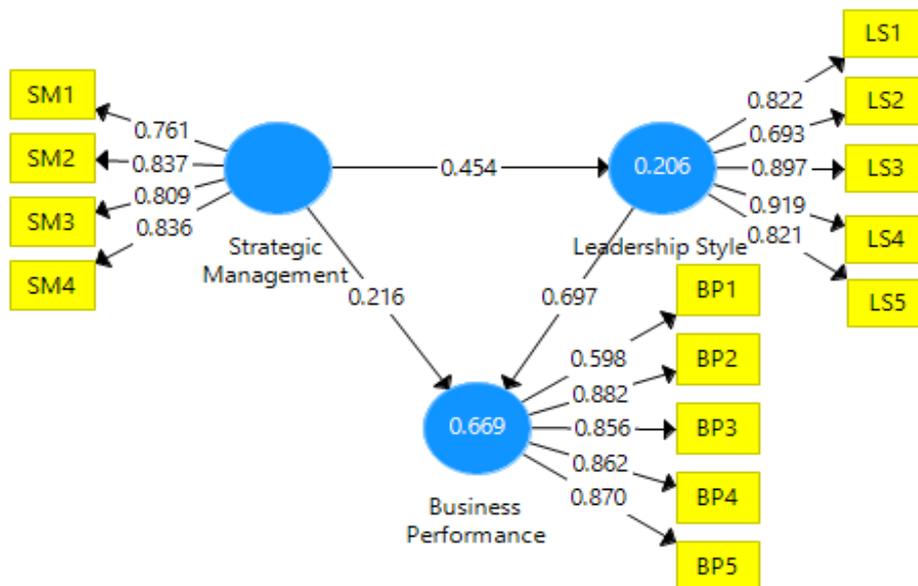
	<b>Business performance</b>	<b>Leadership style</b>	<b>Strategic management</b>	<b><math>R^2</math></b>
Business performance	0.000	0.000	0.000	0.699
Leadership style	1.260	0.000	0.000	0.206
Strategic management	1.260	1.000	0.000	-

R-squared ( $R^2$ ) value indicates the goodness-of-fit measures in the regression model by percentage in the dependent variable influenced by the independent variable (Hair, 2017).  $R^2$  can be any value between 0 and 1, and it represents the proportion of variance in the outcome variable which is explained by the sample predictor variables (Miles, 2014). However, from the above table  $R^2$  value of business performance has achieved almost 70% influenced by strategic management and leadership style. The rest has influenced 0.301 that

is 30% (1-0.699) by other causes. Leadership style has been influenced almost 21% by strategic management, where the rest is influenced by 79% (1-0.206) of other constructs. Therefore, business performance has been influenced more than leadership by predicting variable of strategic management.

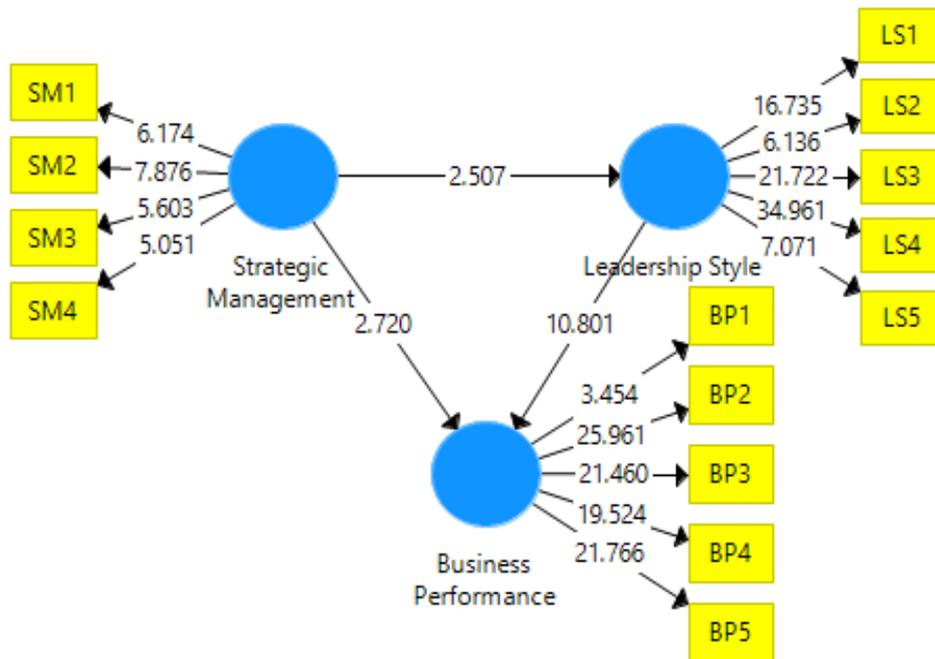
The following diagram shows the factor loading of measured variables as  $>0.50$ , which is displayed as a coefficient ( $\beta$ ) that is standardized regression with statistical significance.

**Figure 2.** Factor loadings of PLS-Algorithm model



The next diagram has identified the coefficient path between critical ratio variables (t-statistics) by bootstrapping. The first relationship between strategic management and business performance is statistically significant as t-statistics is 2.720, which is  $>1.96$  cut-off point and the p-value is 0.007. However, point  $\geq 1.96$  is desirable with the p-value  $\geq 0.05$  statistically acceptable (Joe F. Hair et al., 2017). However, the second relationship between strategic management and leadership style are identified, where t-statistics is 2.507, while p-value is 0.012 that is acceptable at point  $>1.96$  and the p-value  $<0.05$ . The relationship between the mediating variable of leadership style and business performance has executed output t-statistics is 10.801 at the p-value is 0.000, which is a strongly significant relation. Moreover, the entire factor loadings have achieved t-statistics  $>1.96$  with p-value is  $<0.05$ .

**Figure 3.** Path coefficient (t-statistics) of bootstrapping model



Therefore, the following table shows the path coefficient bootstrapping between direct and indirect relationships among variables. Using partial least squares (PLS) path modelling and demonstrations, the discrepancy of PLS path coefficient estimates in the case of reflective measurement can have opposing consequences for hypothesis testing (Dijkstra & Henseler, 2015).

**Table 4:** Path coefficients' bootstrapping and specific indirect effects

	t-statistics	p-value	Remark
Strategic management → Business performance	2.72	0.007	H <sub>1</sub> accepted
Strategic management → Leadership style	2.51	0.012	H <sub>2</sub> accepted
Leadership style → Business performance	10.80	0.000	H <sub>3</sub> accepted
Strategic management → Leadership style → Business performance	2.437	0.015	Partial mediation accepted

The first hypothesis of H<sub>1</sub> has been accepted between strategic management and business performance executed by bootstrapping. The second hypothesis H<sub>2</sub> is also statistically

significant due to p-value and t-value between strategic management and leadership style. However, the relationship between leadership style and business performance has been strongly accepted among the constructors of hypothesis H3.

Therefore, specific indirect effects relationships between strategic management and business performance of mediating variable of leadership style strongly supports partial mediation. Thus, specific indirect effects have identified by t-statistics and the p-value, accordingly 2.437 and 0.015. However, both values have reached t-value  $>1.96$  and the p-value  $<0.05$  respectively. Therefore, the model has been empirically identified with partial mediation.

### **Discussion and Conclusion**

The study's aim is to examine partial least squares in the variance-based structural equation model to the guidelines in strategic management perspective by created by Smart-PLS. However, a capability is a set of understanding, tools, and technique process management which are performed strategically by Smart-PLS to develop the model significantly. Therefore, the, analysis was carried out in Smart-PLS to demonstrate the effect of strategic management on business performance that is observed positively and statistically significant engaged with partial mediation relationship. However, decision-makers within the firm are keen to expand the development cycle to emphasise leadership style. Moreover, the chosen leadership style ensures increased proactivity and significance for business performance. Therefore, the results have identified statistically significant and positive partial relationships between predictors on business performance.

Manufacturers can increase returns by developing in different loops of leadership style when directing, motivating, leading a group of employees. In this study, closely examined limitations have only been detected in one city. It is also important to determine this information in for the rest of manufacturers as well. Further studies with covariance-based structural equation modelling (CB-SEM) can be jointly measured and confirmed to test and validate the structural equation model regarding the measurement and structural model.

## REFERENCES

- Aimran, A. N., Ahmad, S., Afthanorhan, A., & Awang, Z. (2017). The assessment of the performance of covariance-based structural equation modeling and partial least square path modeling. In *AIP Conference Proceedings* (Vol. 1842).
- Albers, S., Wohlgezogen, F., & Zajac, E. J. (2016). Strategic Alliance Structures: An Organization Design Perspective. *Journal of Management*, 42(3), 582–614.
- Alonderiene, R., & Majauskaite, M. (2016). Leadership style and job satisfaction in higher education institutions. *International Journal of Educational Management*, 30(1), 140–164.
- Anderson, M. H., & Sun, P. Y. T. (2017). Reviewing Leadership Styles: Overlaps and the Need for a New ‘Full-Range’ Theory. *International Journal of Management Reviews*, 19(1), 76–96.
- Belton, P. (2017). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*.
- Brown, S. (2018). *Strategic Operations Management*. *Strategic Operations Management*. <https://doi.org/10.4324/9781315123370>
- Chatterji, A. K., Findley, M., Jensen, N. M., Meier, S., & Nielson, D. (2016). Field experiments in strategy research. *Strategic Management Journal*, 37(1), 116–132.
- Cho, E., & Kim, S. (2015). Cronbach’s Coefficient Alpha. *Organizational Research Methods*, 18(2), 207–230.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.
- del-Río-Ortega, A., Resinas, M., & Ruiz-Cortés, A. (2019). Business Process Performance Measurement. In *Encyclopedia of Big Data Technologies* (pp. 416–422).
- Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS Quarterly: Management Information Systems*.
- Fiaz, M., Su, Q., Amir, I., & Saqib, A. (2017). Leadership styles and employees’ motivation: Perspective from an emerging economy. *The Journal of Developing Areas*, 51(4), 143–156.



- Gallus, J., & Frey, B. S. (2016). Awards: A strategic management perspective. *Strategic Management Journal*. <https://doi.org/10.1002/smj.2415>
- Gandossy, R. (2003). Journal of Business Strategy. *Journal of Business Strategy*, 24(1), 29–33.
- Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production*.
- Hair, J. F. J., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage Publications, Inc.
- Hair, Joe F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal Multivariate Data Analysis*, 1(2), 107–123.
- Hair, Joseph F., Sarstedt, M., Pieper, T. M., & Ringle, C. M. (2012). The Use of Partial Least Squares Structural Equation Modeling in Strategic Management Research: A Review of Past Practices and Recommendations for Future Applications. *Long Range Planning*. <https://doi.org/10.1016/j.lrp.2012.09.008>
- Hermano, V., & Martín-Cruz, N. (2016). The role of top management involvement in firms performing projects: A dynamic capabilities approach. *Journal of Business Research*, 69(9), 3447–3458.
- Jr., J. F. H., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, 1(2), 107.
- Linder, M., & Williander, M. (2017). Circular Business Model Innovation: Inherent Uncertainties. *Business Strategy and the Environment*, 26(2), 182–196.
- Lloret, A. (2016). Modeling corporate sustainability strategy. *Journal of Business Research*, 69(2), 418–425.
- Makadok, R., Burton, R., & Barney, J. (2018). A practical guide for making theory contributions in strategic management. *Strategic Management Journal*, 39(6), 1530–1545.
- Miles, J. (2014). R Squared, Adjusted R Squared. In *Wiley StatsRef: Statistics Reference Online*. <https://doi.org/10.1002/9781118445112.stat06627>
- Nguyen, T. T., Mia, L., Winata, L., & Chong, V. K. (2017). Effect of transformational-



leadership style and management control system on managerial performance. *Journal of Business Research*, 70, 202–213.

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, 41(5), 673–690.

Phillips, P., & Moutinho, L. (2017). Contemporary issues in strategic management. In *Contemporary Issues in Strategic Management* (pp. 1–296). <https://doi.org/10.4324/9781315674827>

Pitt, M., & Koufopoulos, D. (2017). *Essentials of Strategic Management*. *Essentials of Strategic Management*. <https://doi.org/10.4135/9781526435736>

Popli, S., & Rizvi, I. A. (2016). Drivers of employee engagement: The role of leadership style. *Global Business Review*, 17(4), 965–979.

Stead, J. G., & Stead, W. E. (2017). *Sustainable strategic management*. *Sustainable Strategic Management*. <https://doi.org/10.4324/9781351276320>

Tanwar, A. (2017). Impact of Employee Engagement on Performance. *International Journal of Advanced Engineering, Management and Science*, 3(5), 510–515.

Xie, Y., Xue, W., Li, L., Wang, A., Chen, Y., Zheng, Q., ... Li, X. (2018). Leadership style and innovation atmosphere in enterprises: An empirical study. *Technological Forecasting and Social Change*, 135, 257–265.