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An eye for artificial intelligence: Insights into the impact of strategic leadership on intellectual capital of administrative leaders in King Saud University

نظرة في الذكاء الاصطناعي: رؤى حول تأثير القيادة الاستراتيجية على رأس المال الفكري للقيادات الإدارية في جامعة الملك سعود

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Written by:
Abdullah M. Almanie[1]
https://orcid.org/0000-0002-8769-0002

Abstract

The aim is to investigate the impact of strategic leadership on intellectual capital of administrative leaders in King Saud University. The study is a cross-sectional descriptive research. It utilizes a quantitative approach. It will prove the cause and effect relationship between strategic leadership and intellectual capital. The statistical population of this research was faculty members of King Saud University (n=220 people) in the academic year 2024-2025. Strategy development has an impact on human capital and structural capital (components of intellectual capital), while it does not affect the customer capital component. Strategy implementation affects the human capital and structural capital components of intellectual capital, while it does not affect the customer capital component. Strategy evaluation affects human capital and structural capital; While it does not affect the customer's capital component. According to the results of the implementation of the strategy evaluation step, it can increase human capital and structural capital in the university. According to the results of the structural equation model presented, the generality of the study was confirmed and the impact of the stages of the strategic management process on the components of intellectual capital was high. Intellectual capital (human, structural and customer) is a category whose emergence, improvement and preservation in organizations requires time and precise long-term planning.

Keywords: Artificial intelligence, strategic leadership, intellectual capital, administrative leaders.

الملخص

هدفت الدراسة الى معرفة أثر القيادة الاستراتيجية على رأس المال الفكري للقيادات الإدارية بجامعة الملك سعود. الدراسة وصفية عبر قطاعية ،تستخدم المنهج الكمي، تبحث فى العلاقة السببية بين القيادة الاستراتيجية ورأس المال الفكري. المجتمع الإحصائي لهذا البحث هو أعضاء هيئة التدريس بجامعة الملك سعود (220 شخصًا) في العام الدراسي 2024-2025. يؤثر تطوير الاستراتيجية على رأس المال البشري ورأس المال البنائى (مكونات رأس المال الفكري)، في حين أنه لا يؤثر على مكون رأس مال العميل. يؤثر تنفيذ الاستراتيجية على رأس المال البشري ورأس المال البنائى لرأس المال الفكري، في حين أنه لا يؤثر على مكون رأس مال العميل. يؤثر تقييم الاستراتيجية على رأس المال البشري ورأس المال البنائى ؛ في حين أنه لا يؤثر على مكون رأس مال العميل. وفقًا لنتائج تنفيذ خطوة تقييم الاستراتيجية، يمكن أن تزيد من رأس المال البشري ورأس المال البنائى في الجامعة. وفقًا لنتائج نموذج المعادلة البنائية المقدم، تم تأكيد عمومية الدراسة وكان تأثير مراحل عملية الإدارة الاستراتيجية على مكونات رأس المال الفكري مرتفعًا. رأس المال الفكري (البشري والبنائى والعميلي) هو فئة يتطلب ظهورها وتحسينها والحفاظ عليها في المنظمات الوقت والتخطيط الدقيق على المدى الطويل.

الكلمات المفتاحية: الذكاء الاصطناعي، القيادة الاستراتيجية، رأس المال الفكري، القادة الإداريون

[1] Full professor, Educational Administration, College of Education, King Saud university, Saudi Arabia. WoS Researcher ID: LUY-6817-2024 - Email: abdullahalmanie05@gmail.com

Introduction

Strategic leadership and Intellectual Capital

The modern era is witnessing many rapid and multiple developments and changes, as a result of the revolution in information, communications and technology and the speed of their updating. Today's educational institutions belong to this rapid environment (Konca & Hakyemez-Paul, 2021; Tut et al., 2021). With the passage of the first two decades of the twenty-first century, events have followed one another, which has made it difficult for educational institutions to control or monopolize intellectual capital, because the era that these institutions are currently living in is the era of the renaissance of science and knowledge.

As a result of the pressures imposed by these events, educational institutions had to shift towards new institutional patterns that are flexible and focus on science, thought, and intangible assets, or what is called intellectual capital, in generating value (Akyol & Ulutaş, 2021). Intellectual capital represents a set of experiences, skills, talents, processes, structures, work systems, procedures, and a network of relationships that an institution possesses, which can be employed to achieve its goals efficiently and effectively (Al-Eissa & Alshhry, 2020; Mehralian et al., 2024).

Strategic leadership (Silman, 2015) occupies a very important role in the development of education and the development of human resources in educational institutions (Mohamed Mostafa, 2014), as these institutions face multiple challenges in dealing with the various changes of the era (Akyol & Ulutaş, 2021), which require them to develop capabilities and bring about continuous change in line with the nature of the changing and complex environment and the nature of the competitive environment, and this requires leadership with a strategic vision and ability to assign knowledge to serve organizational goals (Rajbhandari, 2017).

The universities that are located on the pyramid of this confrontation are considered the cornerstone in building societies (Turhan & Güneyli, 2022), making their civilization and confusing their strategic future, as they are the top of the educational system, which bears the greatest role in facing these changes, in exchange for their intellectual human and technical capabilities. University institutions play the role entrusted to them in producing knowledge through scientific research in priority areas for economic and social growth locally and globally, especially in areas that are considered strategic (Śliwerski, 2016).

The goal of strategic leadership is not to repeat past successes; rather, its main goal is to overcome unexpected situations and solve environmental problems. It is clear that achieving the long-term goals of strategic leadership in universities is not possible except under the shadow of successful organizational knowledge management. One of the vital and strategic requirements of management in leading universities is access to outstanding human resources (dean, vice-chancellor, professors, staff, and students) armed with up-to-date organizational knowledge and information to achieve the main tasks of management and strategic decision-making (Mutiu & Yinka Calvin, 2022). The university contains a system of human resources with knowledge that have professional characteristics and, in a word, are considered the most key part of the organization's capital, which the science of managing this capital has called intellectual capital in recent decades (Tjahjadi et al., 2024).

Applications of Artificial Intelligence in Leadership

AI is becoming increasingly important for leaders in today's business world. Successful leaders are realizing the need to adopt an approach that focuses on both people and technology. In this context, AI technologies can make significant contributions to strategic and operational decision-making processes for leaders (Tjondronegoro et al., 2022). AI-based systems can support leaders to make more conscious, effective and accurate decisions. In addition, thanks to recent technological developments, AI is transforming leadership practices and representing a new era called "Leadership 4.0" (Hai & Van, 2021). AI-supported analysis tools can provide leaders with in-depth information about employee performance, motivation and engagement, so leaders can better understand the unique needs of each team member and personalize their management style to create a more collaborative and satisfying work environment (Buck & Morrow, 2018).

The integration of AI into leadership, decision-making and strategic management has begun to attract significant attention in recent years. As organizations attempt to adapt to rapidly changing markets, the role

of AI in shaping leadership styles, improving decision-making processes, and driving strategic initiatives has become a focal point in academic and professional discussions (Quaquebeke & Gerpott, 2023).

Problem Statement

Universities are the arenas of science and technology production and the scientific support for the economic, political and social growth of societies. Awareness of these matters requires serious attention to universities, their vision and mission, the style and method of goal setting and the way of planning and implementing these goals. And for success in these dimensions, serious attention should be paid to the individuals involved in them as the intellectual capital of universities. Today, the words workforce or human resources are no longer applied to the individuals of the organization, but they are considered as human capital. This belief stems from the extraordinary value added of intellectual capital in the organization. The need for universities today is to take measures to best utilize these capitals and to utilize their potential for planning and managing the future of organizations.

Literature on strategic leadership and intellectual capital is rare, and by reviewing it, one can realize the lack of attention paid by researchers to the discussion of strategic leadership in universities and the study of only some aspects of its process with intellectual capital. This has established the necessity of a coherent study in this field, and the present study has examined this issue.

Literature Review

The role of strategic leadership in intellectual capital

Leadership theories and research have a long history, but recently the role of leadership in knowledge management has begun to be articulated (Mutiu & Yinka Calvin, 2022). Organizational leaders can be effective in knowledge transfer processes (Aishah & Nor, 2022). They are not afraid of rapid change; in fact, they have embraced learning programs and know that effective management is not a matter of having more knowledge, but of knowing how to apply it. Therefore, leadership is a science and more than an art (Aishah & Nor, 2022). Strategic leadership plays an important role in promoting organizational knowledge, organizational performance, organizational effectiveness, organizational learning, organizational culture, creating insight, and managing knowledge and information (Mutiu & Yinka Calvin, 2022). Leadership, unlike influencing employee behavior, inspiring, and improving human relations, is considered to be a driver of communication between the components of intellectual capital management (Tyson, 2020).

In this competitive world, it is no longer appropriate to adhere to traditional leadership styles. Instead, it is necessary to pursue the missions of universities by having broad and deep perspectives and using strategy-oriented management. Among the leadership styles that can contribute significantly to the success of universities in today's organizational world of ups and downs is strategic leadership. Kebede et al. (2024) considers strategic leadership as integrated decisions and activities for developing effective strategies, implementing, controlling and evaluating results. Strategic leadership is integrated decisions and activities for developing effective strategies, implementing and controlling their results; therefore, activities related to examining, evaluating and selecting strategies, adopting any measures inside and outside the organization for implementing these strategies and finally controlling the activities carried out are called strategic leadership (Kebede et al., 2024). Strategic leadership is a process that knowledge It relates the organization to the following: the type of organizational structure design for the expansion and advancement of knowledge, organizational strategy, growth and development of individuals' knowledge specializations, and re-engineering of organizational structures.

One of the most important concepts in the information age is intellectual capital, which is defined as the collective brainpower or shared knowledge of the workforce. In this age, knowledge is an irreplaceable resource and the goal should always be to create and grow intellectual capital (Rajbhandari, 2017). Intellectual capital management focuses on creating and nurturing intellectual capital from strategic and practical perspectives. Nowadays, intellectual capital management has become one of the most important concerns in organizations and can develop organizations and improve organizational benefits (Aishah & Nor, 2022).

Intellectual capital management deals with the interaction of resources (tangible and intangible) to create maximum value, and leadership plays an important role in transforming the knowledge available in an

organization into intellectual capital (Tjahjadi et al., 2024). Therefore, it seems that the intersection point of knowledge leadership and intellectual capital management is the production and application of new knowledge and ideas in the organization, creativity and innovation, improving organizational learning, and organizational effectiveness. Today, paying attention to knowledge leadership and intellectual capital management in universities and higher education centers is doubly necessary and important; because the main role-playing element in the academic community is human resources, which, the more capable and knowledgeable they are, the better universities can achieve their vision and mission, which is the production of Science and technology in society (Tjahjadi et al., 2024). In order to achieve this goal and transform and promote employees into scholars, more attention should be paid to the accumulation of intellectual capital and use it for strategic planning and management. One of the most important effective factors in this field is strategic leadership; because strategic leadership, in addition to inspiring, empowering, and motivating employees, can integrate human resources and intellectual capital in universities by taking measures and achieving predetermined goals.

There is a great positive role for strategic leadership in building intellectual capital, and this result is natural because building intellectual capital can only take place with the presence of a strategic leadership that is interested in its human resource and works for its development. Previous studies have proven that there is a role for strategic leadership over intellectual capital (Slack & Munz, 2016).

AI in Educational Leadership

Artificial Intelligence (AI) has emerged as a transformative force in various sectors, revolutionizing the way tasks are performed and decisions are made. In the field of education, AI holds great promise for changing educational leadership practices and increasing organizational effectiveness.

In the field of education, AI is revolutionizing administrative tasks, instructional practices, and student support services. Educational leaders are increasingly turning to AI-based tools and platforms to streamline administrative workflows, optimize resource allocation, and increase organizational efficiency. From intelligent instructional systems that adapt to student learning needs to data analytics platforms that predict student outcomes, AI is changing the landscape of educational leadership. The proliferation of AI technologies presents educational leaders with unprecedented opportunities to improve student outcomes, foster innovation, and drive organizational change.

The importance of AI in educational management lies in its potential to address long-term challenges and accelerate transformative change. Traditional leadership practices in education often struggle with inefficiencies, limited resources, and complex decision-making processes. AI offers a paradigm shift by automating routine tasks, enhancing human decision-making capabilities, and opening up new possibilities for innovation. One of the key challenges is the lack of awareness and understanding among educational leaders about the capabilities and limitations of AI technologies. Many educational leaders may perceive AI as a complex and intimidating concept, leading to reluctance or resistance to its implementation.

Aims

The aim is to investigate the impact of strategic leadership on intellectual capital of administrative leaders in King Saud University.

Methodology

Research Design

The study is a cross-sectional descriptive research. It utilizes a quantitative approach. It will prove the cause and effect relationship between strategic leadership and intellectual capital.

Sample

The statistical population of this research was faculty members of King Saud University (n=220 people) in the academic year 2024-2025. The data collection tool was a researcher-made strategic management questionnaire with sixty seven questions and a researcher-made intellectual capital questionnaire with thirty five questions. Both questionnaires were prepared and used based on the study of theoretical foundations

and on the Likert scale. Considering that the aforementioned questionnaires were researcher-made, the opinions of experts in the fields of management, educational management, higher education management, and educational sciences were used to determine their face validity and content, and the Cronbach's alpha coefficient formula was used to determine their reliability, which resulted in 0.89 for the strategic management process and 0.93 for intellectual capital. Data analysis was performed using SPSS and Amos graphics statistical software, and regression analysis, MANWA analysis, and structural equation modeling were used.

To enhance the estimation of the minimum sample size, G*Power was utilized. With an effect size of 0.15, a significance level of 5%, and a statistical power of 80% (Mohammad et al., 2024), the analysis indicated that at least 92 participants were necessary. Consequently, the chosen sample size of 220 cases was deemed adequate.

Ethics approval

All procedures in studies involving human participants were performed in accordance with the ethical standards of the institution's Human Research Ethics Committee of King Saud university. Informed consent was obtained. Data privacy was ensured.

Pilot Testing

Using the self-report, structured questionnaire, pilot testing has been conducted to ensure that respondents understand all items.

Results

The findings related to the regression coefficient of the effect of strategic leadership process stages on intellectual capital components are presented in Tables 1 - 3.

Table 1.
Results of the regression coefficient of the effect of strategy development on intellectual capital components

	Standard Error	Regression Coefficient	t-Value	Coefficient of Determination	*P*
Human capital	0.18	0.32	4.55	0.72	0.000
Structural capital	0.15	0.54	7	0.72	0.000
Customer capital	0.25	0.05	0.77	0.72	0.45

Source: By the author

Table 1 shows that strategy development has an effect on human capital and structural capital with (<0.001), while it does not have an effect on the customer capital component with (P = 0.45). According to the results, implementing the strategy development step can increase human capital and structural capital in the university. The coefficient of determination shows that 0.72 of the changes in the scores of the two components of human capital and structural capital are affected by strategy formation.

Table 2.
Results of the regression coefficient of the effect of strategy implementation on intellectual capital components

	Standard Error	Regression Coefficient	t-Value	Coefficient of Determination	*P*
Human capital	0.19	0.31	3.50	0.57	0.000
Structural capital	0.15	0.43	4.44	0.57	0.000
Customer capital	0.27	0.08	1.40	0.11	0.18

Source: By the author

The results of Table 2 show that strategy implementation has an effect on human capital and structural capital, which are components of intellectual capital, with a P = 0.001, while it does not affect the customer capital component (P = 0.18). According to the results, implementing the strategy implementation step can increase human capital and structural capital in the university. The coefficient of determination shows that 0.57of the changes in the scores of the two components of human capital and structural capital are affected by strategy formation.

Table 3.
Results of the regression coefficient of the effect of strategy evaluation on intellectual capital components

	Standard Error	Regression Coefficient	t-Value	Coefficient of Determination	*P*
Human capital	0.12	0.19	2.18	0.57	0.03
Structural capital	0.09	0.60	6.57	0.57	0.001
Customer capital	0.18	0.09	0.40	0.10	0.73

Source: By the author

The results of Table 3 show that strategy evaluation has an effect on human capital (P = 0.03) and structural capital (P = 0.001) on the components of intellectual capital, while it does not affect the customer capital component. Therefore, the results of implementing the strategy evaluation step can lead to an increase in human capital and structural capital in the university. The coefficient of determination shows that 0.57 of the changes in the scores of the two components of human capital and structural capital are affected by strategy formation.

Table 4.
Results of the Relationship between Each of the Strategic Management Components and All of the Intellectual Capital Components

Strategic Leadership Process	Lambda Wilkes	F-coefficient	DF	P	coefficient of correlation	statistical power
Strategy development	0.80	20.12	3	0.001	0.24	0.99
Strategy Application	0.99	1.27	3	0.30	0.10	0.75
Strategy evaluation	0.95	5.20	3	0.002	0.19	0.94

Source: By the author

The f coefficients in Table 4 show that there is a positive and significant relationship between strategy development and all components of intellectual capital (P = 0.001) and the coefficient of correlation is 0.24.

There is also a positive and significant relationship between strategy evaluation and all components of intellectual capital (P = 0.002) and the coefficient of correlation is 0.19. However, there is no significant relationship between strategy application and all components of intellectual capital (P = 0.30) and the coefficient of correlation is 0.10.

Table 5.
Results of the relationship between each of the components of intellectual capital and all strategic leadership components

Components of intellectual capital	Sum of Squares	Degree of freedom	Mean of squares	F	P	coefficient of correlation	statistical power
Human capital	4684,211	3	1561,40	112,32	0.001	0.64	0.98
Structural capital	8839,32	3	2946,44	160,35	0.001	0.72	0.99
Customer capital	728,241	3	242,74	43,34	0.001	0.40	0.97

By the author

The findings in Table 5 show that there is a positive and significant relationship between all three components of intellectual capital with all stages of the strategic management process, and the statistical power (0.98, 0.99, and 0.97) indicated the adequacy of the sample size to test these hypotheses.

Table 6.
Estimating the significant difference of parameters with a value of zero

Parameter type	Estimate		Critical ratio CR	Significance level P-value
	Standard	Non-standard		
Gamma	0,92	0.39	17.827	0.000
Lambda x	0,96 0,87 0,89	1 0,77 0,54	 20.180 19.400	0.000
Lambda y	0,89 0,96 0,78	1 1.40 0.42	 20.700 12.800	0.000

By the author

As can be seen in Table 6, the value of the standardized gamma coefficient between strategic leadership and intellectual capital, and was 0.92 = Gamma 2, i.e. knowledge conversion process, which indicates a positive effect of 0.91 percent of the strategic leadership process on the intellectual capital components.

The calculated factor loadings (lambda parameters x and y) are also all different from zero, and a value higher than 0.7 for all of them indicates high accuracy in measuring the latent variables defined in the model. Overall, the results show that the strategy development indicator for strategic leadership with lambda x is 0.91 and the structural capital determinant for intellectual capital with lambda y 0.96 has a higher weight.

Discussion

The knowledge-based era, in which strategic insight and knowledge are considered the most important capital of organizations, requires a different management approach to organizational and employee issues. Universities have been the vanguard of development in every society that needs to have a transformational perspective and in order to reach a high level of development and bring society to the path of excellence, because according to theories, no fundamental change takes place in any society unless that change begins with its educational system.

Integrating AI into educational leadership offers numerous opportunities and benefits. AI-based analytics enable evidence-based decision-making, with real-time information and insights. By automating routine administrative tasks, AI frees up time and resources for educational leaders to focus on strategic initiatives and innovation (Picciano, 2017). AI-based personalized learning platforms respond to individual student needs, preferences, and learning styles, and enhance engagement and academic success (VanLehn, 2011). Furthermore, AI technologies facilitate collaboration, communication, and knowledge sharing among educational stakeholders, fostering a culture of continuous improvement and organizational learning (Picciano, 2017).

The findings in Table 1 show that strategy development has an impact on human capital and structural capital (components of intellectual capital), while it does not affect the customer capital component. According to the results, implementing the strategy development step can increase human capital and structural capital in the university. The results of the present study are somewhat consistent with the results of the studies of Rideg et al. (2023), and Belmonte da Silva et al. (2021).

Findings of Table 2 show that strategy implementation affects the human capital and structural capital components of intellectual capital, while it does not affect the customer capital component. According to the results of the implementation of the strategy, the implementation of the strategy can increase human capital and structural capital in the university. The results of the present study are somewhat consistent with the results of the studies of Saad (2020), Lee & Choi (2003). They do but sometimes The reasons for the failure of appropriate strategies in the implementation phase lie in the instability of environmental conditions, low expertise and commitment of implementers, considerate supervision, informal communication within and outside the university, lack of proper formal and human communication.

Table 3 shows that strategy evaluation affects human capital and structural capital; While it does not affect the customer's capital component. According to the results of the implementation of the strategy evaluation step, it can increase human capital and structural capital in the university. In addition to measuring the success of these strategies, the evaluation of the strategies developed and implemented also clarifies the role of human resources and the structure of universities, which can contribute to both better implementation of strategies and the promotion of intellectual capital. In order to fully evaluate the process of university activities, it is better for the university to adopt a procedure that involves the customers and stakeholders of the organization in this evaluation.

The findings in Table 4 show that there is a positive and significant relationship between strategy development and evaluation and all components of intellectual capital. The findings are consistent with Jaunanda et al. (2024). The findings showed that the strategy evaluation step had a positive effect on increasing intellectual capital; however, in the strategy implementation stage, where it is necessary to adopt the necessary policies, determine the necessary financial resources, provide the necessary support and motivation, and be prepared to accept and participate in the change process, there are weaknesses that, in

addition to disrupting the strategic leadership implementation process, did not have an effect on intellectual capital and did not show a significant relationship.

According to the findings in Table 5, it should be said that there is a positive and meaningful relationship between all three components of intellectual capital and all stages of the strategic management process. To move towards strategic leadership, the knowledge and skills, experiences and information, creativity and innovation of faculty members should be used, but to benefit from these abilities, it is necessary to change the university structure, hardware and software systems, laws and regulations, and management styles according to the needs.

According to the results of the structural equation model presented in Tables 6 the generality of the study was confirmed and the impact of the stages of the strategic management process on the components of intellectual capital was high. Intellectual capital (human, structural and customer) is a category whose emergence, improvement and preservation in organizations requires time and precise long-term planning. From a strategic perspective, it can be said that for the improvement and preservation of each component of intellectual capital, a strategic plan is needed that includes the stages of developing, applying and evaluating the strategy in order to achieve the goals. In the study of lambda coefficients x, the strongest indicator for strategic leadership is the strategy development stage. It is necessary to take a firm first step and design a successful process by considering (strengths, weaknesses, opportunities and threats) for all stages and components.

Conclusion

Furthermore, the integration of AI opens up new opportunities for collaboration, innovation, and knowledge sharing in the educational ecosystem (Picciano, 2017). Educational leaders can use AI-based platforms and networks to connect with peers, share best practices, and collaborate on joint projects and initiatives (Murchan & Siddiq, 2019). Furthermore, partnerships with AI companies, research institutions, and technology startups can stimulate innovation, drive technological advancements, and accelerate progress toward educational goals (Murchan & Siddiq, 2019). By embracing these opportunities and harnessing the potential of AI, educational leaders can lead their institutions toward greater excellence, effectiveness, and equity in educational management.

Practical implication and future research

If we take an expert look at the university structures and human resources available in them, it is natural that despite the presence of specialized forces armed with up-to-date strategic knowledge and the readiness of the university's professional structures, the ground for promoting intellectual capital in the strategy development stage is high, and the activity process of universities also shows this; however, the fact that customers, as the most important element of university life, remain oppressed and do not receive much attention requires special attention from those responsible. According to the theories of Although it is necessary for university stakeholders to actively participate in all stages of the strategic management process, a survey revealed a lack of awareness of this issue, and part of the reason for this can be attributed to the centralization of decision-making and power structures in universities.

The existence of a relationship between the stages of the strategic management process and the dimensions of human capital and the structure of intellectual capital is a confirmation of the universities' familiarity with strategic management and their strategy-oriented nature; however, it is necessary to provide the necessary training to improve this knowledge, to review university structures, and to pay close attention to customer capital.

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