

The Impact of Intellectual Capital Efficiency on Service Institution Performance - The Aurassi Chain as a Model-

أثر كفاءة رأس المال الفكري على أداء المؤسسة الخدمية - سلسلة الأوراسي كنموذج -

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Abstract:

This study aims to examine the impact of intellectual capital efficiency (human capital efficiency, structural capital efficiency) on the performance of the economic institution represented by return on equity, asset turnover ratio, and return on sales for the study sample during 2008 - 2022. Linear correlation and multiple regression coefficients were used in the statistical analysis using (SPSS) software, and it was found that the Eurasian series has efficiency in intellectual capital. It was also proved that there is a strong positive significant relationship between the variables of this study, which means that, the higher the efficiency of intellectual capital enhances, the more performance increases. However, the impact relationship was relative, as it was shown that intellectual capital efficiency affected both returns on equity and asset turnover ratio, but not return on sales.

Keywords: Intellectual capital efficiency; Performance; Return on equity; Asset turnover; return on sales.

JEL Classification Codes: O34, P47

ملخص:

تهدف هذه الدراسة إلى فحص أثر كفاءة رأس المال الفكري (كفاءة رأس المال البشري، كفاءة رأس المال الهيكلي) على أداء المؤسسة الاقتصادية ممثلاً في العائد على حقوق الملكية، معدل دوران الأصول و العائد على المبيعات، لعينة الدراسة خلال الفترة الممتدة من 2008 إلى 2022. حيث تم استخدام معامل الارتباط الخطي والانحدار المتعدد في التحليل الإحصائي باستخدام برنامج (SPSS) وتم التوصل إلى أن سلسلة الأوراسي تتمتع بكفاءة في رأس المال الفكري، كما تم إثبات أن هناك علاقة ارتباط قوية إيجابية ذات معنوية بين متغيرات الدراسة، أي أنه كلما زادت كفاءة رأس المال الفكري كلما ارتفع الأداء. إلا أن علاقة الأثر كانت نسبية، إذ تم إثبات أن كفاءة رأس المال الفكري يؤثر على كل من العائد على حقوق الملكية ومعدل دوران الأصول ولم تثبت أنه يؤثر بالعائد على المبيعات.

كلمات مفتاحية: كفاءة رأس المال الفكري، الأداء، العائد على حقوق الملكية، معدل دوران الأصول، العائد على المبيعات.

تصنيفات JEL : O34، P47

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INTRODUCTION:

Contemporary economics has witnessed a historic shift in which the value of an economic entity no longer lies only in its control over production, but rather in its intellectual resources. This is known as intellectual capital and includes resources owned by employees and controlled by the firm in the form of knowledge, culture, brands, design, creativity, innovation, or even relationships. These resources are among the most valuable assets held by economic entities, and they create value.

However, intangible assets that have not been purchased do not reflect their value in financial statements (IC value = 0), making the value of intellectual assets invisible to decision-makers. This makes it difficult to allocate financial resources to intangible assets. Many researchers and thinkers have therefore tried to measure intellectual capital and its components (human, structural, relational), developing various models and indicators such as the Value-Added Intellectual Coefficient (VAIC) to measure the efficiency of intellectual capital.

Similarly, any economic entity seeks to achieve optimal performance by efficiently and effectively using its resources and capabilities. Therefore, intellectual capital is theoretically considered a powerful tool to strengthen or at least maintain the performance of institutions in general. Thus, empirical research is needed to measure intellectual capital, expressed by the intellectual capital efficiency coefficient, and its impact on performance.

Research problem:

Despite the diversity of methods and the difficulties of measuring intellectual capital, the issue has shifted from merely researching measurement methods to interpreting the economic performance of the institution based on the efficiency of its resources. Therefore, the study problem will be :

What is the extent of the impact of intellectual capital efficiency on the performance of the Aurassi chain?

The following questions arise from this problem:

Can intellectual capital efficiency be measured using the value-added index?

Is there a correlation between the study variables?

Importance of the Study: The research derives importance from:

- Intellectual capital and its significance in measuring efficiency as one of the most vital resources of the organization;
- Using the most important indicator to measure the efficiency of intellectual capital, which is the Value Added model in a local environment.;
- Testing the correlation and the impact relationship between the study variables in a local environment.

Objectives of the study: The study aims to achieve the following objectives:

- The theoretical underpinning of the basics of intellectual capital;
- Measuring intellectual capital using the value-added model;
- To examine the empirical results to determine the extent to which the efficiency of intellectual capital helps to influence the performance of the Aurassi chain.

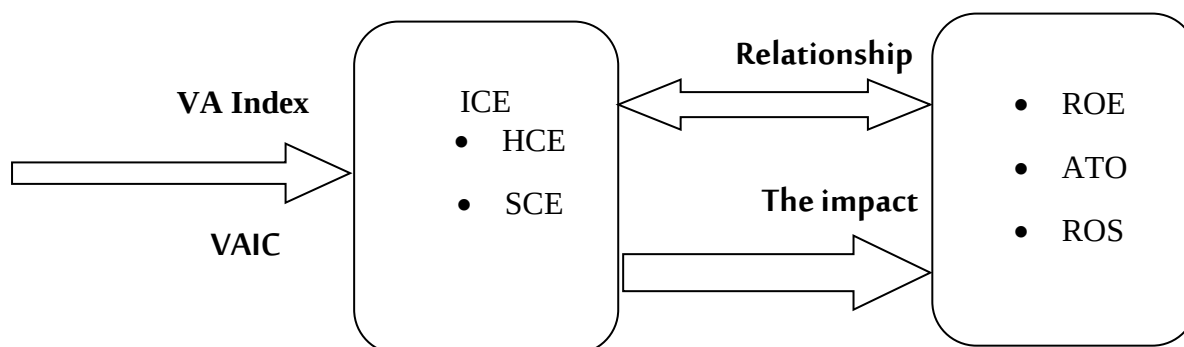
The Study Hypotheses:

- The efficiency of intellectual capital can be measured by the value-added index;
- There is a correlation between intellectual capital efficiency and financial performance, economic performance, and operational efficiency;
- There is statistically significant relationship between intellectual capital efficiency and the performance of the Aurassi chain.

the methodology used in the study:

In order to achieve the research objectives, a descriptive approach was used to study the topic from a theoretical perspective, alongside an experimental method based on the use of actual data extracted from financial statements to measure the efficiency of intellectual capital. An inductive approach was also used to investigate the relationship and impact between the study variables.

Study model:



Where:

- VAIC: Value-added of intellectual coefficient.
- ICE: Intellectual Capital Efficiency.
- HCE: Human Capital Efficiency.
- SCE: Structural Capital Efficiency.
- ROE: Return on Equity.
- ATO: Asset Turnover.
- ROS: Return On Sales.

1- Main Concepts used:

It is necessary to define the main basic concepts related to the problem before starting to study it.

1-1- Intellectual capital:

There is no comprehensive definition of intellectual capital, as definitions vary from one author or researcher to another. Some view it from a legal perspective, while others from an economic perspective... Stewart defined it as "the intellectual material that consists of knowledge, information, intellectual property, and expertise that can be used in wealth creation"(Bachir el maghribi, 2020,p 60); and also described as "knowledge that can be transformed into value and is divided into human capital which pertains to the employees with their ideas, skills... and structural capital which is the documented knowledge held by the company and independent of the employees". (Redha tawil,yakoub, Wd , P 16)

Or IC is The mental capacity of a specific group of human resources with competencies and the ability to generate ideas related to creative development within the organization's strategies and goals, enabling it to maintain a competitive advantage. (Hejese and others, 2016, P 575)

The different perspectives of researchers and writers on the concept of intellectual capital can lead to differences in the division of its elements and basic components. Some agree that there are common components, which outline the three main elements: Human Capital, Customer Capital, and Structural Capital.

Human capital consists of employees and their expertise, knowledge, skills, and competencies of value. (Bontus, wei choo, 2002, p624)

Structural capital is the other side of organizational capital and refers to all organizational and administrative dimensions, such as creativity and innovation, which result in patents and production licenses. (Elamiri, Elghanimi, 2020, p 20)

Customer capital refers to an organization's relationship with its customers, ensuring their satisfaction and loyalty to the organization. (Wall, 2003, p16)

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1-2- Performance :

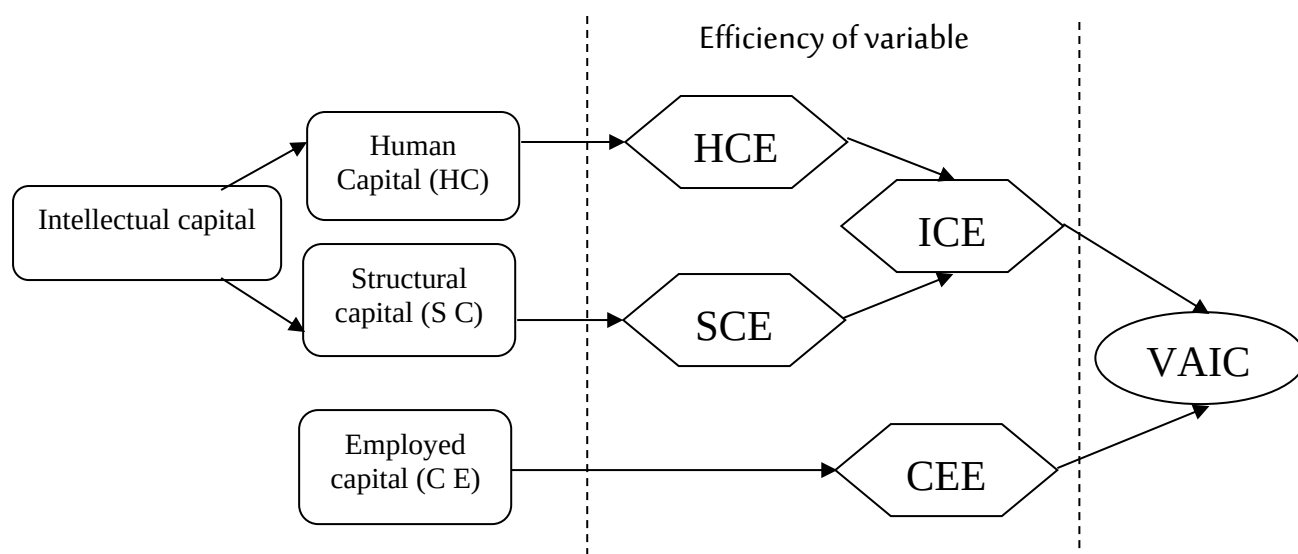
Performance is considered to be one of the key components for organizations as it provides an integrated system of accurate and reliable information for decision-making. It reflects the results of the organization's policies, processes, and the extent to which its financial resources are used, and indicates how effectively the organization is operating.

Therefore, performance can be described as an expression of the efficiency of the organization's operations. Performance is defined as "the organization's ability to create value and achieve results efficiently and effectively,(Aboudi and others,2019,p139) expressing its ability to make the best use of its resources in the short or long term to create wealth". (Hammad,Neamah,2023,p99)

2- The theoretical basis for measuring intellectual capital efficiency using the value-added approach.

There are many indicators and models for measuring intellectual capital, including the Value-Added Intellectual Coefficient (VAIC), developed by Pulic in 1998, which is the most widely used method for measuring intellectual capital efficiency. It uses audited financial data directly from financial statements, making it objective, verifiable, and comparable. This indicator was formulated to enable stakeholders to assess and monitor intellectual capital efficiency, reflecting the organization's ability to create value using tangible and intangible assets. According to Pulic, VAIC is the sum of intellectual capital efficiency and capital employed efficiency, while intellectual capital efficiency is calculated as human capital efficiency plus structural capital efficiency. According to the following plan. (Asutay , Ubaidillah, 2023,)

Fig (1): The formulation of VAIC



Source: Prepared by researchers. based on previous studies.

Where:

Table (1): Measurement of Intellectual C and its aspects

code	Indicator	Measurement	implication
VA	Value-Added	VA the total revenues - the total expenses excluding employee costs.	
HCE	Human capital efficiency	$HCE = VA / HC$	The increase in the percentage of value-added tax resulting from

		Where HC is the total employee expenditures.	investing in cash unit in human resources.
SCE	Structural capital efficiency	$SCE = SC/VA$ $SC = VA - HC$	There is an inverse relationship between structural capital and human capital, indicating how much structural capital contributes to value creation.
ICE	Intellectual capital efficiency	$ICE = HCE + SCE$	The efficiency of intellectual capital, with its human and structural components, in the creation of added value.
CEE	Capital employed efficiency	$CEE = VA/CE$ Where CE= total assets – Intangible assets.	Increasing this percentage indicates that the company is better utilizing capital employed to create value.
VAIC	Value-added intellectual coefficient	$VAIC = ICE + CEE$	It is a general indicator of the company's efficiency in creating value through tangible and intangible assets.

Source: Prepared by researchers based on (Djoual, 2020,pp348-349); (Asutay , Ubaidillah, 2023,p10)

3- The theoretical foundations for performance measurement:

Performance is one of the factors that demonstrate the efficiency and effectiveness of the economic institution in achieving its objectives, so it is concerned with measuring it for improvement. One of the most important indicators that institutions rely on to indicate their performance is considered traditional but important metrics, where a set of indicators are chosen, for example, but not limited to, as shown in the following table:

Table (2): Measurement of performance variables.

code	The Indicator	performance	measurement	Implication
ROE	Return on Equity	Financial Performance	$\frac{Net\ Income}{Shareholder's\ Equity}$ (Ali and others,2022,p6)	It reflects the efficiency of management in utilizing shareholders' funds.
ATO	Asset Turnover	Operational efficiency	$\frac{Turnover}{Total\ Assets}$	The efficiency of an organization is expressed in terms of achieving the highest return from the use of its assets.
ROS	Return On Sales	Economic performance	$\frac{net\ profit}{turnover}$	Measures the efficiency of business operations.

Source: Prepared by researchers. based on previous studies.

4- The Practical Side.

4-1- Study community and sample:

The Aurassi Hotels chain was selected among the listed economic institutions for the period 2008-2022. This selection was based on specific criteria to ensure the measurement of the study variables, such as uninterrupted operation during the research period and the availability of the necessary data for measurement. Annual financial reports were used to calculate the study variables.

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4-2- Testing the study hypothesis:

Our test hypotheses are as follows.

4-2-1- The efficiency of intellectual capital can be measured by the value-added index.

Table (3): Measurement of VAIC and its aspects of Aurassi chain 2008-2022

	VA	HC	SC	HCE	SCE	ICE	CE	CEE	VAIC
2008	1523991098,00	589663743,42	934327354,58	2,58	0,61	3,20	6599423594	0,23	3,43
2009	1393452438,84	600949705,79	792502733,05	2,32	0,57	2,89	7108181990	0,20	3,08
2010	868153163,48	437539760,39	430613403,09	1,98	0,50	2,48	8599354673	0,10	2,58
2011	-8091361,35	406704905,86	-414796267,21	-0,02	51,26	51,24	10855173478	0,00	51,24
2012	1110571561,44	387688099,50	722883461,94	2,86	0,65	3,52	11374423088	0,10	3,61
2013	1643880920,48	460717136,41	1183163784,07	3,57	0,72	4,29	11925033915	0,14	4,43
2014	2464105189,07	644203111,89	1819902077,18	3,83	0,74	4,56	12023797676	0,20	4,77
2015	2278814259,65	613720629,34	1665093630,31	3,71	0,73	4,44	12019758058	0,19	4,63
2016	2066969823,60	621345503,42	1445624320,18	3,33	0,70	4,03	11716108991	0,18	4,20
2017	2212763177,73	643042803,13	1569720374,60	3,44	0,71	4,15	11567302269	0,19	4,34
2018	2090836147,05	634300590,67	1456535556,38	3,30	0,70	3,99	11352175413	0,18	4,18
2019	1479647324,11	620422433,90	859224890,21	2,38	0,58	2,97	11124287037	0,13	3,10
2020	514474921,07	561973228,77	-47498307,70	0,92	-0,09	0,82	10415617681	0,05	0,87
2021	679982348,84	555704935,38	124277413,46	1,22	0,18	1,41	9483348507	0,07	1,48
2022	1443523646,11	664329201,10	779194445,01	2,17	0,54	2,71	9591771446	0,15	2,86

Source: Prepared by researchers. based on. Annual financial reports

From the table above, it can be seen that the lowest value of the value-added intellectual coefficient (VAIC) for the Aurassi series in the period from 2008 to 2022 was in the year 2020, reaching 0.87 with its components, where the efficiency of intellectual capital was 0.82 (human capital efficiency 0.92, which means that for every DZD invested in human capital, there was an increase of 0.92 in value added. As for structural capital efficiency, it was negative at -0.09, indicating that the Group's structural capital was not efficient). The second component, representing the efficiency of employed capital, reached 0.05, indicating that each dinar invested in employed capital increased value added by 0.05. This can be attributed to various factors, one of the most important being that the year 2020 was associated with the COVID-19 pandemic and lockdown. However, from 2021 onwards, the group began to resume its activities, which is reflected in the increase in intellectual value added.

In 2014, intellectual value added (VAIC) was the highest at 4.77, meaning that every Algerian dinar invested in capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE) increased value added by 0.2, 3.83 and 0.74 respectively. However, in 2011, when VAIC was the highest at 51.24, the negative value added in that year was due to human capital exceeding it. A closer look reveals that the Aurassi Group didn't generate any intellectual value added.

When comparing the efficiency of intellectual capital and the efficiency of capital used in all years of study, we find that intellectual capital is more efficient in all years, including the year 2020.

Based on the above, it can be said that the efficiency of intellectual capital can be measured using the value-added index. However, the results obtained in 2011 were not accurate because the Group's value-added was negative. Nevertheless, the intellectual value added was very high, which is illogical. Therefore, if the value added is negative, the efficiency of intellectual capital is zero and the first hypothesis is correct.

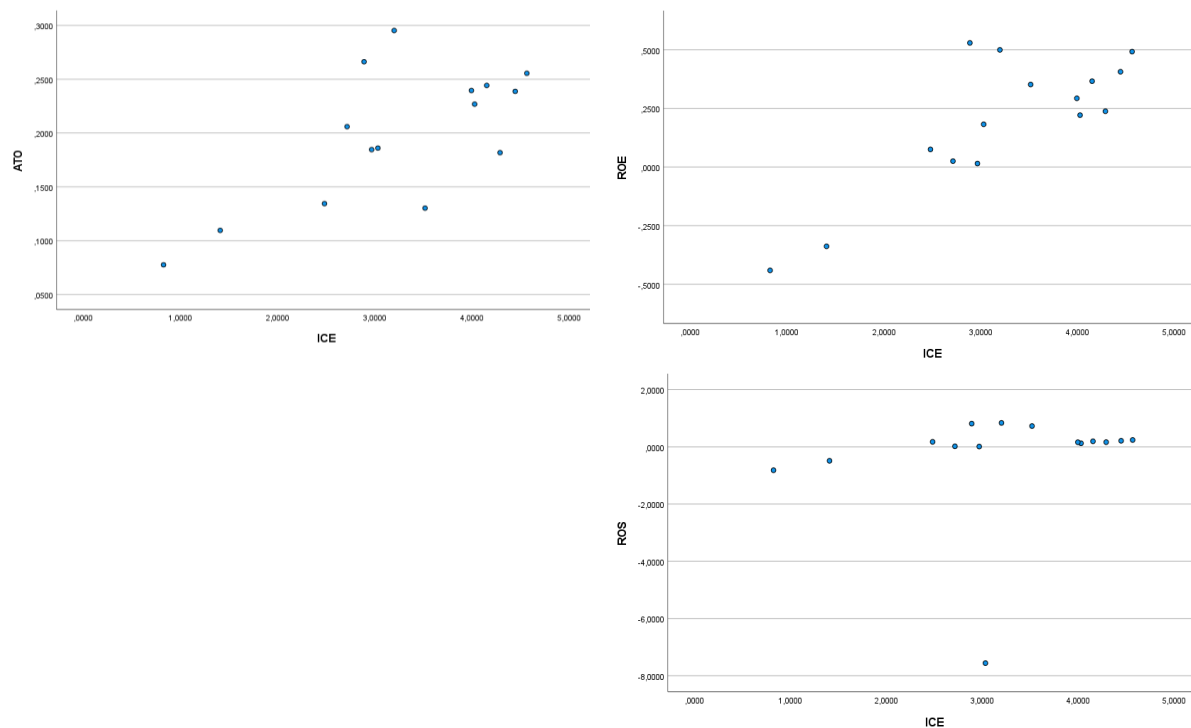
4-2-2- There is a statistically significant relationship between intellectual capital efficiency and the performance of the Aurassi chain.

To test the second main hypothesis, the program (SPSS) was used to study the relationship between the study variables according to the Pearson correlation coefficient, based on three sub-hypotheses as follows:

- There is a statistically significant relationship between return on equity and intellectual capital efficiency.
- There is a statistically significant relationship between asset turnover and intellectual capital efficiency.
- There is a statistically significant relationship between return on sales and intellectual capital efficiency.

The following steps were taken to conduct the test:

- **Linear relationship testing:**
Fig(2): Linear relationship



Source: data (spss v27)

From the cloud of points, we infer that there is a linear relationship between the study variables (ROS, ICE), (ROE, ICE), (ATO, ICE).

- **Data Normality Test:**

The [Shapiro-Wilk](#) test can determine whether the data follows a normal distribution.

The table below illustrates this.

Table (4): Tests of Normality

	Shapiro-Wilk Statistic	df	Sig.
ICE	,919	15	,189
ROS	,917	15	,173
ROE	,899	15	,092

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ATO	,956	15	,629
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Source: Prepared by researchers. based on.data (spss v27)

“Table 4” shows that the calculated sig for Intellectual Capital Efficiency (ICE), Return on Equity (ROE), Asset Turnover (ATO), and Return on Sales (ROS) are 0.189, 0.092, 0.629, and 0.173 respectively, which are all greater than the tabular sig of 0.05, thus meeting the requirement for data normality.

- Hypotheses testing:

ROE and ICE are not significantly correlated $H_{10}: r=0$

There is a statistically significant relationship between ROE and ICE $H_{11}: r \neq 0$

ATO and ICE are not significantly correlated $H_{20}: r=0$

There is a statistically significant relationship between ATO and ICE $H_{21}: r \neq 0$

ROS and ICE are not significantly correlated $H_{30}: r=0$

There is a statistically significant relationship between ROS and ICE $H_{31}: r \neq 0$

The table below shows the correlation matrix between the study variables using the Pearson correlation coefficient.

Table (5): Correlations

		ICE	ROE	ATO	ROS
ICE	Pearson Correlation	1	,816**	,687**	,553*
	Sig. (2-tailed)		,000	,005	,033
	N	15	15	15	15

**Correlation is significant at the 0.05 level (2-tailed).

Source: Prepared by researchers. based on.data (spss v27)

The correlation matrix shows that the positive relationship between asset turnover and intellectual capital efficiency is statistically proven with a correlation coefficient of 0.687 and sig=0.005, which is less than 5%. Furthermore, there is a strong positive inverse relationship between intellectual capital efficiency and return on equity with a correlation coefficient of 81.6% and sig=0. In addition, the correlation between intellectual capital efficiency and return on sales was moderate with a coefficient of 55.3% and sig=0.033. This result indicates that increasing the efficiency of intellectual capital leads to an improvement in the performance of the studied sample series. (based on ROS.ROE.ATO).

Based on the above, the sub-hypotheses have been accepted. Therefore the second main hypothesis has been accepted: there is a statistically significant positive relationship between intellectual capital efficiency and the performance of the study institution.

4-2-3- The performance of the Aurassi chain is affected by the efficiency of the intellectual capital components.

The multiple regression model was applied to test this hypothesis, which was divided into three sub-hypotheses:

- **H1₀** The intellectual capital efficiency components have no statistically significant impact on ROE.
- **H1₁** There is a statistically significant impact of intellectual capital efficiency components on ROE.

Table (6): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,861 ^a	,741	,698	,1587802

a. Predictors: (Constant), sce, hce

Source: Prepared by researchers. based on.data (spss v27)

From the results in Table 06, we can see that the coefficient of determination $R^2 = 0.698$, which means that 69.8% of the variation in the return on equity is due to changes in human and structural capital efficiency, while 30.2% of the variation is due to other independent variables not included in the model.

Table (7): ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,864	2	,432	17,141	,001 ^b
	Residual	,303	12	,025		
	Total	1,167	14			

a. Dependent Variable: ROE

b. Predictors: (Constant), sce, hce

Source: Prepared by researchers. based on.data (spss v27)

From the analysis of the ANOVA table, we can see that the significance level $\text{sig} = 0.001$ is less than 5%, indicating the existence of at least one independent variable (human capital efficiency, structural capital efficiency) that significantly affects the return on equity.

Table (8): Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,408	,114		-3,577	,004
	hce	-,007	,053	-,027	-,129	,900
	sce	1,111	,269	,880	4,131	,001

a. Dependent Variable: ROE

Source: Prepared by researchers. based on.data (spss v27)

From the table of coefficients, we can see that the significance level for the constant $B_0 = 0.004$ is less than 0.05, indicating statistical significance and therefore can be included in the model. The significance level for human capital efficiency is 0.9, which is greater than 0.05, indicating that there is no statistically significant relationship between human capital efficiency and the return on property rights. However, the statistically significant relationship of structural capital on property rights has been demonstrated, which leads us to accept the alternative hypothesis H_{11} : there is a statistically significant impact of intellectual capital efficiency on property rights return at the 5% significance level. The model equation can be written as follows:

$$\text{ROE} = -0.408 - 0.007\text{HCE} + 1.111\text{SCE} + \epsilon$$

- H_{20} The intellectual capital efficiency components have no statistically significant impact on ATO.
- H_{21} There is a statistically significant impact of intellectual capital efficiency components on ATO.

Table (9): Model Summary

Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	,729 ^a	,532	,454	,0464674

a. Predictors: (Constant), SCE, HCE

Source: Prepared by researchers. based on.data (spss v27)

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We note that the coefficient of determination $R^2 = 0.454$, which means that 45.4% of the variation in the asset turnover rate was due to changes in the efficiency of human and structural capital. 54.6% of the variation was due to other independent variables not included in the model.

Table (10): ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,029	2	,015	6,825	,010 ^b
	Residual	,026	12	,002		
	Total	,055	14			

a. Dependent Variable: ATO

b. Predictors: (Constant), sce, hce

Source: Prepared by researchers. based on.data (spss v27)

The analysis of variance shows that the significance level $\text{sig} = 0.01$ is less than 5%, indicating that at least one independent variable (human capital efficiency, structural capital efficiency) significantly affects the asset turnover rate.

Table (11): Coefficients^a

Unstandardized Coefficients			Standardized Coefficients			
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	,086	,033		2,582	,024
	hce	,001	,016	,026	,089	,930
	sce	,195	,079	,711	2,483	,029

a. Dependent Variable: ATO

Source: Prepared by researchers. based on.data (spss v27)

From the table of coefficients, we note that the significance level for the constant $B_0 = 0.024$ is less than 5%, indicating that the constant is statistically significant and can be included in the model. The significance level for human capital = 0.93 is greater than 0.05, indicating that there is no statistically significant relationship between human capital efficiency and asset turnover, rejecting the null hypothesis. However, the statistically significant relationship between structural capital and asset turnover has been demonstrated, rejecting the null hypothesis and accepting the alternative hypothesis H_{21} : There is a statistically significant effect of intellectual capital efficiency on asset turnover at the 5% significance level. The model equation can be written as follows:
 $ATO = 0.086 + 0.001HCE + 0.195SCE + \epsilon$

- **H_{30}** The intellectual capital efficiency components have no statistically significant impact on ROS.
- **H_{31}** There is a statistically significant impact of intellectual capital efficiency components on ROS.

Table (12): Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,705 ^a	,496	,412	,3475114

a. Predictors: (Constant), sce, hce

Source: Prepared by researchers. based on.data (spss v27)

From the results of “Table 12”: we find that the determination coefficient $R^2 = 0.412$, meaning that 41.2% of the variations in sales return were due to changes in human capital efficiency and structural capital efficiency, while 58.8% of the variations were due to other unlisted factors in the model.

Table (13): ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,428	2	,714	5,913	,016 ^b
	Residual	1,449	12	,121		
	Total	2,877	14			

a. Dependent Variable: ROS

b. Predictors: (Constant), sce, hce

Source: Prepared by researchers. based on.data (spss v27)

From the analysis of the variance table, we can see that the significance level $\text{sig} = 0.016$ is less than 5%, which means that at least one independent variable has a statistically significant effect on return on sales.

Table (14): Coefficients^a

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	-,659	,249		-2,644	,021
	hce	,047	,117	,119	,402	,695
	sce	1,216	,589	,613	2,065	,061

a. Dependent Variable: ROS

Source: Prepared by researchers. based on.data (spss v27)

The table of coefficients shows that the significance level for the constant $B_0 = 0.021$ is less than 0.05, which means that it is statistically significant and can be included in the model. The significance levels for the efficiency of human capital and structural capital are 0.695 and 0.061 respectively, greater than 0.05, indicating no statistically significant relationship between the efficiency of human capital and structural capital on return on sales. Therefore, the null hypothesis is accepted.

The previous sub-hypotheses indicate that intellectual capital efficiency has an impact on both the return on intellectual property rights and the asset turnover ratio, but not on ROS.

5- Conclusion:

Based on both theoretical and applied aspects, the study has led to several conclusions and recommendations.

5-1- Results :

The most important results are the following:

- The results of the study for the period “ 2008-2022” have shown that the Aurassi chain has recorded different levels of intellectual capital efficiency in its two components (human capital and structural capital).
- The high efficiency of intellectual capital within the Aurassi chain indicates that the return on investment in intellectual capital has been in favor of the institution. This means that the skills,

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experience, and knowledge of the employees, as well as the ways and methods of delivering their services, have been directed in such a way as to achieve the group's objectives.

- The negative correlation between intellectual capital efficiency and performance in the Aurassi series (based on return on equity, asset turnover, and return on sales) is confirmed.
- The results of testing the third hypothesis showed a significant effect of intellectual capital efficiency on financial and operational performance, which was due to the effect of structural capital efficiency, while no effect was found on economic performance.

5-2- Recommendations:

- Explore the relationship between correlation and impact on performance, focusing on intellectual capital and its components.
- It is necessary to adjust the Intellectual Capital Efficiency Index by its three components, where it can be measured if the value added is negative.
- Attention to intellectual capital has a strong reciprocal relationship with financial performance and operational efficiency.
- To measure and study the efficiency of intellectual capital with high precision, it is necessary to disclose all information related to it.

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