Investigation of Key Performance Indicators using Balanced Scorecard Approach to Evaluate Academicians' Tacit Knowledge

Zainab Amin, Awanis Romli

Abstract: ***In the academic sector, academicians are viewed as the main knowledge resource. Such resources should be managed effectively to improve the competitive advantages of university services such as teaching, researching, and supervision. For effective management of knowledge resources in universities, the tacit knowledge of academicians needs to be evaluated in order to understand how to elicit and capture the knowledge resources to address the university missions. The evaluation of tacit knowledge is difficult due to its intangibility nature. This may result problems in identifying and determining the knowledge levels of the individual. The main objective of this study is to investigate the importance of key performance indicator (KPI) based on balance scorecard (BSc) approach to evaluate the performance and value of academicians' tacit knowledge in universities. KPI-BSc is based on two types of indicators: (1) non-financial measurement and (2) financial measurement. The non-financial indicators evaluate the performance level of tacit knowledge according to knowledge quality and quantity, while the financial indicators evaluate the knowledge based on the financial returns that gained from knowledge activities and production. To address the objective of this study, a questionnaire survey was conducted among 179 academicians from three Iraqi universities. The results of this study significantly show that it is important to apply non-financial and financial indicators to provide a reliable evaluation of academicians' tacit knowledge levels. This approach is novel as individuals tacit knowledge is evaluated based on the combined use of financial and non-financial measurement indicators.***

Keywords: ***Academicians, University, Tacit knowledge, Knowledge evaluation, KPI, BSc***

I. INTRODUCTION

Knowledge is commonly defined as the combination of experiences, values, and expert insights that assist in the evaluation and incorporation of new experiences and information [1]. There are two types of knowledge: (1) explicit knowledge which is stored and codified in different formats like an electronic database or documented in a printed manual, or books and articles that are tangible and easily transferred) [2], and (2) tacit knowledge which refers to the knowledge that is stored in employees' minds as working experiences and skills [3].

The performance of working activities depends on the ways that the employees do their tasks using their tacit knowledge [3, 4, 5].The organizations that focus on the developing useful tacit knowledge will help their companies to implement business strategies successfully. Furthermore, accurate tacit knowledge allows the employees to innovate new ways to maximize their working performances which in turn, maximize the profits of organizations by reducing the current service and product costs.

Nowadays, universities are considered as the main source of human capital that is needed to support the marketplace of various sectors. Thus, the universities are concerned about developing the skills and knowledge of undergraduate and postgraduate students in order to support the various industries' need of human resources [6]. Universities can benefit from knowledge implementations in four areas: academic research, curriculum development, university strategies i.e. administration activities, and teaching activities [5, 7]. However, the main source of knowledge comes from the academicians, and this knowledge is tacit in nature. Therefore, an effective knowledge management (KM) requires effective management of tacit knowledge of academicians, who have various experiences in different areas.

Due to the importance of tacit knowledge, universities need to evaluate the academic staff as a means to determine their performance level accordingly to the tacit knowledge. However, measuring tacit knowledge is a challenge for universities due to its intangible nature, and it is hard to access [8]. Therefore, universities are facing the difficulty in evaluating tacit knowledge performance levels of the academicians [4]. To address the difficulty of tacit knowledge evaluation, two main evaluation kinds could be obtained: (1) financial knowledge evaluation, whereby the value of knowledge resources inside an organization could be evaluated based on the financial returns using the knowledge capital [8], and (2) performance knowledge measurement, whereby the performance of knowledge levels could be evaluated depend on the quality and quantity of knowledge[4].

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However, the financial knowledge evaluation usually applies indicators to evaluate the knowledge capital for the overall organization level rather than at an individual level, while, the performance indicators are obtained to evaluate the academicians' knowledge at an individual level.

Although the financial indicators are useful to evaluate the value level of the tacit knowledge for the overall organization level, in the literature there is hardly any study that shows the use of financial indicators to evaluate the academicians' tacit knowledge at individual level [4, 5, 8]. Thus, to fill this gap, this research focuses on the viability of adopting the financial indicators to evaluate the value level of the tacit knowledge in addition to the performance level evaluation using the non-financial indicators.

The combination of the financial and performance evaluation indicators is called the Balanced Scorecard (BSc) approach [8]. By combining the financial and the performance evaluation indicators (i.e., the non-financial indicators), a more reliable evaluation of tacit knowledge could be obtained. However, the literature shows that the majority of researches on the BSc are focused also on the knowledge evaluation resources at organization level [4, 5, 8]. This represents the main challenge in this study, which focuses on using the BSc to evaluate tacit knowledge at the individual level.

Many organizations adopt the KPI system to evaluate the levels of knowledge resources through various kinds of knowledge measurement [9, 10].However; most KPI systems that have been conducted only focus on the financial measurement approaches to evaluate the knowledge capital at organization level [8]. On the other hand, the KPI systems are conducted based on non-financial measurement approaches to evaluate the individuals' knowledge [4]. This study aims to investigate the importance of evaluating the academicians' knowledge at individual level based on the integration of non-financial and financial indicators (i.e. KPI-BSc) in university.

II. RELATED WORKS

The measurement of knowledge resources is one of the most important success factors of KM implementations in universities. Knowledge measurement helps universities to develop their knowledge assets based on the structured of KM processes [5]. Several studies focused on the importance of KPI systems to measure knowledge levels of the workers based on various indicators (financial and non-financial) such as the technology performance, customers satisfaction, learning and growth, and total profits [11,12,13].

Masron conducted a survey on 500 academic staff from University Sains Malaysia (USM) to analyse the importance of measuring academic staff knowledge using effective indicators. They found that the KPI in the university are only generally related to the academicians' activities such as research, teaching, and supervision rather than being specific in nature. They also found that only a few KPI were used to measure tacit knowledge. They recommended that universities should put more focus to convert these intangible assets to the tangible [11].

The KPI system based on financial indicators such as the financial returns of conducted teaching and researching services and the feasibility of technology is found to have an effective role in evaluating the overall performance of universities [12]. In addition, the KPI of various organizations including universities were reviewed in order to identify the most effective measurement methods for KPI development [13]. As a result, the researcher found that the BSc approach is the most efficient measurement of KPI. Furthermore, BSc must be conducted using several perspectives of measurement indicators such as finance, customer, learning and growth, and internal processes [13].

Due to the research lack of the conducted works on the BSc KPI to evaluate the academicians' knowledge levels in the universities, we review the several variables that adopted to evaluate the tacit knowledge levels of workers in various domains. Based on related works, employees' knowledge level can be evaluated using seven indicators which are: (1) The number of knowledge-gaining activities accomplished such as the number of attended workshops and training courses; (2) qualification level, the workers who have high qualifications would have high knowledge level due to the required knowledge gaining for qualification upgrading; (3) number of published research, the number of published knowledge could indicate the knowledge level of the academicians; (4) quality of published research, employees who publish their knowledge in trusted or high impact knowledge sources could possess knowledge level higher than employees who publish their knowledge on other sources such as social network or blogs; (5) years of experiences, working for a long time allows employees to gain greater knowledge due to daily working activities that require continuous development of knowledge; (6) assessment by supervisors, the employees' supervisors can determine the increasee in employees' tasks outcomes through real observation and assessment of employees' skills; (7) assessment tests, the level of the employee's tacit knowledge can be evaluated using formal assessment such as assignments, quizzes, or exams.

Table 1 summarizes the tacit measurement variables of previous studies. Based on the past studies, the tacit knowledge resources were evaluated using financial and non-financial variables. Significantly, the quantity and quality measurement indicators (such as years of experience, qualification levels, and assessments using tests) were applied to evaluate the performance level of tacit knowledge.

On the other hand, the financial indicators were applied to evaluate the value level of tacit knowledge resources. Only a few works were focused on measuring the value of tacit knowledge resources using financial indicators.

However, the studies that applied the financial measurement methods are evaluating the value of tacit knowledge resources based on the financial returns of the organization based on overall knowledge resources.

Thus, the financial methods aim to evaluate the overall value of knowledge resources in organizations rather that evaluate the knowledge value of individuals (workers). Most of conducted studies in this domain are based on non-financial variables. Thus, it is important to fill this gap by investigate the importance of utilising financial and non-financial measurement indicators to evaluate the tacit knowledge at workers' level. The integration between financial and non-financial measurement indicators is named the BSc method.

Table. 1 Tacit Measurement Variables of Previous Studies

SOURCE	PERFORMANCE VARIABLES (NON-FINANCIAL)							FINANCIAL VARIABLES
	ASSESSMENT BY SUPERVISOR	TESTS ASSESSMENTS	EXPERIENCE YEARS AND QUALIFICATION LEVEL	NUMBER OF PUBLISHED KNOWLEDGE	QUALITY OF PUBLISHED KNOWLEDGE	GAINING KNOWLEDGE BASED ON ACTIVITIES	QUALITY OF TEACHING SERVICES	
[5]	✓	✓	✓	X	✓	X	X	X
[4]	✓	✓	✓	X	✓	X	✓	X
[14]	X	X	X	X	✓	X	✓	X
[12]	X	X	X	X	X	X	X	✓
[15]	✓	✓	X	X	X	X	X	X
[16]	X	X	X	X	X	X	X	✓
[17]	X	✓	X	X	X	X	X	X
[18]	X	X	✓	✓	✓	X	X	X
[19]	X	X	X	X	X	✓	X	X
[20]	X	X	✓	✓	✓	X	X	X
[21]	X	X	X	✓	✓	X	X	X
[22]	✓	X	X	X	X	X	X	X
[23]	X	X	X	X	X	X	X	X
[24]	X	✓	X	X	X	X	X	X

III. RESEARCH METHOD

The main objective of this case study is to investigate the importance of academicians'tacit knowledge measurement in three Iraqi universities based on financial and non-financial measurement indicators using BSc method. Based on the literature as discussed in Section 2 and the summary of the previous works as shown in Table 1, there are three main research hypotheses need to be tested, which are the following:

H1: There is a positive relationship between the non-financial indicators and the evaluation of knowledge performance of academicians in universities.

H2: There is a positive relationship between the financial indicators and the evaluation of knowledge value of academicians in universities.

H3: There is a positive relationship between the BSc approach and the evaluation of knowledge level of academicians in universities.

In order to achieve the objective as well as the research hypotheses, a questionnaire survey was conducted among academicians from three Iraqi universities; Albasrah University, Alknouz Private University, and Iraq Private University. The questionnaire was distributed to 200 respondents with PhD qualification (i.e. professors and assistant professors).

Out of 200 distributed questionnaires, 12 responses were not returned, and 9 responses were excluded due to incomplete answers. Thus, the final and valid number of collected responses is 179. The response rate of the questionnaire is about 90%, which is a very good rate.

The data collection is based on the quantitative survey using 5 Likert scale items: 1 for Strongly Disagree (SD), 2 for Disagree (D), 3 for Neutral (N), 4 for Agree (A), and 5 for Strongly Agree (SA). There are 41 items that respondents were required to answer and these items were distributed into five main questionnaire parts which are: (1) tacit knowledge management, which consists of 10 scaled items, (2) tacit knowledge evaluation, which consists of 10 scaled items, (3) non-financial measurement indicators, which consists of 10 scaled items, (4) financial measurement indicators, which consists of 5 scaled items, and (5) importance of tacit knowledge KPI based on BSc, which consists of 6 scaled items. Analyses were done using SPSS V.22 and are presented in the next section.

IV. DATA ANALYSIS

Based on the data collected, four main analyses were conducted: (1) reliability analysis to assure the effectiveness of the collected responses, (2) frequency analysis to assure the validity of respondents' characteristics, (3) descriptive analysis to explore the importance of KPI using BSc measurement approach to evaluate the performance and value level of academicians' tacit knowledge, and (4) correlation analysis to study the relationship between tacit knowledge evaluation and the KPI using BSc approach in the context of the daily working activities of academicians.

Questionnaire reliability

Table 2 presents the reliability analysis of the questionnaire. The questionnaire reliability indicates the extent to which the respondents understand the questionnaire items while recording their responses. The Cronbach's Alpha test is one of the most known reliability tests. The accepted coefficient Alpha should be more than 0.7. Table 2 below shows that the coefficient Alpha of the questionnaire is 0.813, which reflects the high level of questionnaire reliability

Table. 2 Questionnaire Reliability

Cronbach's Alpha	Number of Respondents	Number of Items
0.813	179	41

Demographic Frequencies

The respondents' characteristics are useful to enrich the collected questionnaire data. The data were collected from both male and female academicians. The respondents have high qualification levels, the years of experience of the respondents are more than 4 years, and the job roles of respondents are teaching, researching, and supervision activities. Table 3 summarizes the frequency analysis of demographic data.

Table. 3 Frequencies of Demographic Data

Variable	Scale	Frequency	Percentage
Gender	Male	122	68.2%
	Female	57	31.8%
Age	20-30 years	1	0.6%
	31-40 years	49	27.4%
	41-50 years	82	45.8%
	More than 50 years	47	26.3%
Job Title	PhD-Assistant professors	96	53.6%
	PhD-Associate Professors	15	8.4%
	PhD-Professors	68	38.8%
Years of Experience	<2 years	0	0%
	2-4 years	1	0.6%
	5-7 years	42	23.5%
	More than 7 years	136	76%
Job role	Teaching	24	13.4%
	Researching	2	1.1%
	Supervisions	1	0.6%
	Advising	1	0.6%
	Management	20	11.2%
	Teaching, researching, and supervision	131	73.2%
	All Above	0%	0%

Descriptive Analysis

To explore the situation of knowledge measurement challenges and importance in the case study, the descriptive analysis covers five areas: tacit knowledge management, tacit knowledge evaluation, non-financial measurement indicators, financial measurement indicators, and importance of KPI based on BSc method. (Refer to Appendix A.).

Tacit knowledge management

Findings show that the respondents are not sure that their universities have effective implementations of knowledge management as there are no clear implementations of recording the tacit knowledge of academicians in a structured way (item #1). On the other hand, the respondents were not sure that the experts' tacit knowledge is converted to standard format and stored in knowledge base for easy retrieval by other academicians to develop their knowledge (items # 2 and 3). Also, there no clear processes to integrate/organize knowledge from different resources to support the academicians' tacit knowledge (items # 4 and 5). Moreover, items # 6 and 7 show that the respondents are not sure that their universities have processes for replacing outdated knowledge by new knowledge according to changes in working environment, or filtering and extracting out only the most useful knowledge from various knowledge sources to support the development of academicians' tacit knowledge.

Furthermore, findings reveal that the universities made little effort to organize trainings, workshops and conferences to enhance the academicians' skills of teaching, researching and supervision activities (Items # 8, 9, and 10). Table 4 shows the descriptive analysis of this part. The respondents' are neutral with all items in this part.

Table. 4 Descriptive Analysis of Tacit Knowledge Management

No of item	SD	D	N	A	SA	Mean	Agreement Level
1	30	69	46	30	4	2.49	Medium
2	15	79	62	17	6	2.55	Medium
3	13	84	42	36	4	2.63	Medium
4	7	76	54	35	4	2.77	Medium
5	10	68	53	44	4	2.79	Medium
6	11	62	52	43	11	2.89	Medium
7	8	77	42	48	4	2.79	Medium
8	3	38	47	64	27	3.41	Medium
9	15	33	42	67	22	3.26	Medium
10	12	63	56	34	14	2.86	Medium

Based on the responses of all items in this category, it is clear that there are weaknesses in the management of academicians' tacit knowledge in these universities. There are limitations in the innovated ways of tacit knowledge transferring, evaluation, and development. This indicates the several challenges that face the universities in the context of tacit knowledge management. For deep exploration of the challenges of tacit knowledge evaluation, the descriptive analysis of next part was conducted (tacit knowledge evaluation).

Tacit knowledge evaluation

Findings reveal that the respondents were not sure that there are participative goal setting, measurement and feedback for tacit knowledge (item #11), and they were not sure that the university evaluated and generated new tacit knowledge according to working context (item #13). Items #15 and19 indicate that there is no clear vision in the university about the continuous evaluation of academicians' tacit knowledge. Thus, the academicians' roles and responsibilities may not be structured based on the effective evaluation of their tacit knowledge (item #17). However, item #12 shows that the academicians are highly committed to continuous improvement of the tacit knowledge in the university. Furthermore, findings show that academicians are committed to develop their knowledge through ongoing training and development (item #14). The tacit knowledge improvement could be supported through effective and specific evaluation variables such as number and quality of published papers (item #16, and 18). The evaluation variable motivates the academicians to enhance their knowledge in order to assure high records based on the various evaluation indicators. Hence, the academicians are committed to continuous improvement of their tacit knowledge through various activities such as attending conferences and reading more articles (item #20). Table 5 shows the descriptive analysis of this part

Table. 5 Descriptive Analysis of Tacit Knowledge Evaluation

No of item	SD	D	N	A	SA	Mean	Agreement Level
11	12	74	52	41	0	2.68	Medium
12	8	23	49	67	23	3.46	High
13	10	42	61	62	4	3.04	Medium
14	5	30	47	67	30	3.48	High
15	32	49	49	43	6	2.67	Medium
16	6	19	31	108	15	3.59	High
17	17	53	53	52	4	2.84	Medium
18	2	5	10	72	90	4.35	High
19	24	59	52	43	1	2.65	Medium
20	9	17	29	96	1	3.65	High

According to the responses on all items in this part, it can be concluded that there are no clear processes to evaluate the academicians' tacit knowledge in the university. This could discourage the expended efforts to enhance/develop the academicians' tacit knowledge according to working context of the university. The evaluation processes using effective evaluation variables should be designed by the university in order to motivate academicians to improve their tacit knowledge levels. The academicians' will expend more efforts and time to enhance their tacit knowledge to achieve high evaluation records. Significantly, the academicians' are committed to conduct the necessary procedures of knowledge evaluation in the university.

Non-financial measurement indicators

The results show that respondents totally agreed that the performance level of tacit knowledge could be evaluated using various quantity and quality indicators: years of experience, qualification level, the quality and quantity of publications, work achievements and innovative ideas e.g. innovated ideas and conducted projects, number of training courses or conferences attended, number of classes that they teach, feedback from the students, and number of postgraduate students that they have supervised.

On the other hand, the respondents were neutral with two evaluation indicators (items #23 and 24). In total, the respondents see that it is important to evaluate their tacit knowledge performance using various non-financial (quantity and quality) indicators for better management and developing of tacit knowledge in the universities. Table 6 shows the descriptive analysis of this part.

Table. 6 Descriptive Analysis of Non-Financial Measurement Indicators

No of Item	SD	D	N	A	SA	Mean	Agreement Level
21	4	18	20	119	18	3.72	High
22	0	0	10	122	47	4.20	High
23	0	30	64	68	17	3.40	Medium
24	2	45	39	73	20	3.35	Medium
25	2	8	25	103	41	3.96	High
26	0	0	2	109	68	4.36	High
27	0	2	30	113	34	4.00	High
28	0	12	36	113	18	3.76	High
29	0	10	40	100	29	3.82	High
30	2	4	35	114	24	3.86	High

Financial measurement indicators

Data show the respondents agreed that the value level of academicians' tacit knowledge could be evaluated using various financial indicators; (1) the financial returns from research activities e.g. collected research/projects funds of consultancy from external organization, (2) the financial returns from the teaching activities i.e. number of students that attend my classes, (3) the financial returns from the supervision activities i.e. number of complete postgraduate students, (4) the financial returns profits from the new ideas that provided in working environment, and (5) the funds that obtained from the external organizations such as external clients and industries). Hence, the respondents were agreed that it is important to evaluate the value level of their tacit knowledge using financial indicators. Table 7 shows the descriptive analysis of this part.

Table. 7 Descriptive Analysis of Financial Measurement Indicators

No of Item	SD	D	N	A	SA	Mean	Agreement Level
31	0	2	30	123	24	3.94	High
32	0	10	26	127	16	3.83	High
33	0	10	51	110	8	3.64	High
34	0	2	18	117	42	4.11	High
35	0	10	23	96	50	4.03	High

Importance of KPI based on Balanced Scorecard

Data show that KPI based on BSc approach is important to be implemented in the university in order to evaluate the performance and value level of academicians' tacit knowledge. The responses indicate that it is necessary to evaluate academicians' tacit knowledge in the university based on standard processes (item #36). According to the items #37, 38, and 39, the tacit knowledge level could be evaluated effectively using financial (value level) and non-financial indicators (performance level). The effective evaluation of tacit knowledge based on BSc approach is important to provide fair rewards and promotions by the university according to academicians' knowledge levels (items #40). Thus, the academicians will be motivated to develop/ enhance their tacit knowledge in the context of working environment (item #41). Therefore, the respondents confirmed the importance of proposed idea of this research which is to formulate a KPI model based on BSc to evaluate the performance and value level of academicians' tacit knowledge. Table 8 shows the descriptive analysis of this part.

Table. 8 Descriptive Analysis of the Importance of KPI based on BSc

No of Item	SD	D	N	A	SA	Mean	Agreement Level
36	0	0	16	98	65	4.27	
37	0	4	29	109	37	4.00	High
38	0	4	40	101	34	3.92	High
39	0	2	24	9	54	4.13	High
40	0	2	16	92	69	4.27	High
41	0	2	4	81	92	4.46	Very high

Correlation Test

The correlation analysis is effective to study the relationships between two or more variables. The Pearson correlation test is conducted to study the relationship between tacit knowledge management and the KPI using BSc approach in the context of the daily working activities of academicians. The correlation test is conducted to find the relationship between the various questionnaire parts: Tacit Knowledge Management (TKM), Tacit Knowledge Evaluation (TKE), Non-Financial Measurement Indicators (NFMI), Financial Measurement Indicators (FMI), and KPI-BSc variables. Table 9 shows the correlation between these parts.

Table. 9 Correlations Analysis

		TKM	TKE	NFMI	FMI	KPI-BSc
TKM	Pearson Correlation	1	.522**	.191*	-.095	-.385**
	Sig. (2-tailed)		.000	.010	.205	.000
	N	179	179	179	179	179
TKE	Pearson Correlation	.522**	1	-.015	.026	-.080
	Sig. (2-tailed)	.000		.845	.726	.285
	N	179	179	179	179	179
NFMI	Pearson Correlation	-.191*	-.015	1	.261**	.293**
	Sig. (2-tailed)	.010	.845		.000	.000
	N	179	179	179	179	179
FMI	Pearson Correlation	-.095	.026	.261**	1	.434**
	Sig. (2-tailed)	.205	.726	.000		.000
	N	179	179	179	179	179
KPI-BSc	Pearson Correlation	-.385**	-.080	.293**	.434**	1
	Sig. (2-tailed)	.000	.285	.000	.000	
	N	179	179	179	179	179

**. Correlation is significant at the 0.01 level (2-tailed).

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

Based on the result in Table 4, there is a very strong and positive relationship between TKM and TKE parts (significant at the 0.01 level, B = 0.522). This relationship indicates the importance of tacit knowledge evaluation in enhancing the knowledge management implementations. The evaluation of tacit knowledge allows the university to understand the knowledge levels of the academicians. Thus, the top managementwill have aclear vision about the necessary implementations to enhance/develop the tacit knowledge levels of the academicians. On the other hand, there is a very strong and positive relationship between the NFMI and FMI parts (significant at the 0.01 level, B = 0.261). This relationship indicates the effectiveness of applying the financial and non-financial evaluation indicators together in order to evaluate the performance and value level of academicians' tacit knowledge. Hence, KPI-BSc is considered as effective approach to evaluate the academicians' tacit knowledge. Moreover, there is a very strong and positive relationship between KPI-BSc and NFMI (significant at the 0.01 level, B = 0.293). Also, there is a very strong and positive relationship between KPI-BSc and FMI (significant at the 0.01 level, B = 0.434).

In other words, the implementation of KPI-BSc should involve the financial and non-financial evaluation indicators to evaluate the performance and value levels of academicians' tacit knowledge because both indicators enhance the development and management of the knowledge resources in the university.

V. HYPOTHESES AND RESULTS DISCUSSION

The results of the questionnaire show that the evaluation of academicians' tacit knowledge in universities is important to assess the knowledge resources strength and understand how to develop these resources. In addition, the evaluation of academicians' tacit knowledge can support the ideal distribution of benefits such as rewards and promotions based on the knowledge performance of the academicians. These results match several studies such as [25, 26]. Supervisor, tests, number of published research, quality of published research, number of allocated classes, years of experience, and qualifications levels, and (2) evaluate the value level of knowledge through financial indicators such as the financial returns from teaching, researching, and supervision activities. This result matches with many studies that discuss the BSc importance such as [4, 5, 13, 25].

The application of KPI-BSc to evaluate the performance and value level of individuals' tacit knowledge is assumed to be novel due to the research gap in this domain. The financial indicators are usually applied to evaluate the overall knowledge resources in the organization rather than evaluate the individuals' knowledge.

Hence, this research gives a clear vision of the importance of integrating the financial and non-financial indicators for a reliable evaluation of the academicians' tacit knowledge. This move is supported by three hypotheses which are as the following:

H1: There is a positive relationship between the non-financial indicators and the evaluation of knowledge performance of academicians in universities.

H2: There is a positive relationship between the financial indicators and the evaluation of knowledge value of academicians in universities.

H3: There is a positive relationship between the BSc approach and the evaluation of knowledge level of academicians in universities.

Table 10 summarizes the test results of research hypotheses based on the descriptive and correlation tests that were conducted on the findings of the questionnaire.

Table. 10 Hypotheses Test

Hypothesis	Test	Findings	Test Result
H1	Descriptive Analysis	Totally agreed	Supported
	Correlation Test	Correlation is significant at the 0.05 level	
H2	Descriptive Analysis	Totally agreed	Supported
	Correlation Test	Correlation is significant at the 0.05 level	
H3	Descriptive Analysis	Totally agreed	Supported
	Correlation Test	Correlation is significant at the 0.05 level	

VI. CONCLUSION AND FUTURE WORKS

The tacit knowledge of workers represents the main success of any business. The evaluation of tacit knowledge resources is very important to understand, manage, and make decisions that are related to knowledge resources. However, tacit knowledge evaluation is difficult due to the intangible nature of these resources. The previous studies have focused on evaluating the tacit knowledge of academicians in the universities based on non-financial indicators. This study focuses on evaluating the tacit knowledge of academicians based on BSc method which integrates financial and non-financial indicators. The results of this study are significant as they show that it is important to apply both non-financial and financial indicators to provide a more reliable evaluation of academicians' tacit knowledge levels. In the future, it is recommended that the views of university top management should be taken into consideration in light of evaluating tacit knowledge by the means of BSc approach.

Appendix A.Questionnaire items used in this study

Tacit Knowledge Management

1. In our organization, the knowledge of academic staff is recorded in a structured way so that others in the organization may benefit from it.
2. In our organization, the tacit knowledge is converted from expert's knowledge to standard format e.g. structured knowledge base.
3. In our organization, knowledge is indexed for easy retrieval to support the academic staff tacit knowledge.
4. Our organization has processes to integrate knowledge from different resources to support the academic staff tacit knowledge.
5. In our organization, knowledge is organized in a useful way to support the academic staff tacit knowledge.
6. Our organization has processes for replacing outdated knowledge by new knowledge according to changes in working environment.
7. Our organization develops and enhances my tacit knowledge through my supervision activities using various methods such as sessions to develop supervision skills and discussion with expert supervisors
8. Our organization has processes for filtering and extracting out only the most useful knowledge
9. Our organization develops and enhances my tacit knowledge through teaching knowledge using various methods such as training courses and conferences.
10. Our organization develops and enhances my tacit knowledge through my research knowledge using various methods such as workshops and conferences to enhance my skills to do research.

Tacit Knowledge Evaluation

11. There are participative goal setting, measurement and feedback for tacit knowledge
12. The academic staffs in our organization are committed to continuous improvement of the tacit knowledge.
13. There is a constant flow / generation of new tacit knowledge within the organizational context
14. The academic staffs are committed to develop his/her knowledge through ongoing training and development.
15. The academic staff's tacit knowledge is evaluated continuously.
16. There are specific variables to measure the tacit knowledge in our organization e.g. number and quality of published papers.
17. The current tacit knowledge measurements help to determine the lecturers' roles and responsibilities in the university
18. Knowledge evaluation methods of academic staff are necessary to be designed and developed.
19. Tacit Knowledge is evaluated in our organization
20. Academic staffs are committed to continuous improvement of tacit knowledge e.g. attending conferences and reading more articles

Non-Financial Measurement Indicators

21. It is useful to evaluate my tacit knowledge level based on my years of experience.
22. It is useful to evaluate my tacit knowledge level based on my qualifications.
23. It is useful to evaluate my tacit knowledge level based on assessment by my immediate supervisor e.g. head of department
24. It is useful to evaluate my tacit knowledge level based on tests such as exams or quizzes.
25. It is useful to evaluate my tacit knowledge level based on the quality and quantity of publications.
26. It is useful to evaluate my tacit knowledge level based on my work achievements and innovative ideas e.g. patents,

ideas that were suggested by me and were adopted at the workplace, as well as the number of projects that I have completed.

27. It is useful to evaluate my tacit knowledge level based on the number of training courses or conferences I have attended.
28. It is useful to evaluate my tacit knowledge level based on the number of classes that I teach/have taught.
29. It is useful to evaluate my tacit knowledge level based on the feedback obtained from my students.
30. It is useful to evaluate my tacit knowledge level based on the number of postgraduate students that I have supervised.

Financial Measurement Indicators

31. It is useful to evaluate my tacit knowledge based on the financial returns from my research e.g. teaching and researching return comparing with my salary and projects funds that I collect from consultancy from external organization.
32. It is useful to evaluate my tacit knowledge based on the financial returns from my teaching activities i.e. number of students that attend my classes.
33. It is useful to evaluate my tacit knowledge based on the financial returns from my supervision activities i.e. number of completed postgraduate students under my supervision
34. It is useful to evaluate my tacit knowledge based on the financial returns from the new ideas that I provide in my working environment
35. It is useful to evaluate my tacit knowledge based on the funds I obtained from external organizations such as external clients and industries.

The Importance of KPI based on BSc

36. It is necessary to evaluate employees' tacit knowledge in my working environment based on standard processes.
37. The evaluation of my tacit knowledge level using only indicators such as qualification level, years of experience, and number of papers may not be able to reflect the actual tangible output of my tacit knowledge.
38. My tacit knowledge can be evaluated accurately through effective connection between my tacit knowledge level and its tangible output.
39. I prefer to evaluate the level of my tacit knowledge and my tangible output because I want to understand my knowledge value in comparison to my colleagues
40. An accurate evaluation of my tacit knowledge level and tangible output is helpful to provide fair rewards and promotions.
41. An accurate evaluation of my tacit knowledge level and tangible output is a motivation for me to continuously develop my tacit knowledge.

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