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The impact of applied tacit knowledge on the performance level of faculty members: Saudi evidence and analysis

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Abstract:

The present study investigates the impact of tacit knowledge on faculty performance. It does so by examining Saudi higher education faculty performance in connection with the following tacit knowledge attributes: cognitive self-motivation, cognitive self-organization, individual skills, institutional skills, task-oriented social interaction, and general social interaction. Following the traditional scientific paradigm, the study centers on a quantitative analysis specifying faculty performance as a linear function of the six attributes. The study tests hypotheses and answers research questions based on the responses to the Academic Tacit Knowledge Scale given by 1014 Saudi faculty members. The study contributes to the literature by documenting the role of faculty tacit knowledge in Saudi higher education, a topic particularly relevant given the importance that Saudi 2030 vision places on higher education, human capital, and performance management and appraisal. Based on such analysis, the study produces well-defined and significant parameter estimates attesting to performance level differences between faculty member types separated by the six attributes of tacit knowledge.

Keywords: faculty performance, tacit knowledge, performance management, self-motivation, self-organization, skills, social interaction.

المنيع، الجوهرة، السلمي، سامي. (٢٠٢٣). أثر المعرفة الضمنية التطبيقية على مستوى أداء أعضاء هيئة التدريس "الدليل السعودي والتحليل". *مجلة العلوم التربوية ، ٩* (٤) ، ٦١٩ - ٦٣٨

أثر المعرفة الضمنية التطبيقية على مستوى أداء أعضاء هيئة التدريس: الدليل السعودي والتحليل

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المستخلص:

تبحث هذه الدراسة في تأثير المعرفة الضمنية على أداء أعضاء هيئة التدريس. وهي تقوم بذلك من خلال فحص أداء أعضاء هيئة التدريس في التعليم العالي السعودي فيما يتعلق بسمات المعرفة الضمنية التالية: التحفيز الذاتي المعرفي ، والتنظيم الذاتي المعرفي ، والمهارات الفردية ، والمهارات المؤسسية ، والتفاعل الاجتماعي الموجه نحو المهام ، والتفاعل الاجتماعي العام. وحيث تتبني الدراسة النموذج العلمي التقليدي من خلال تركيزها على التحليل الكمي الذي يحدد أداء أعضاء هيئة التدريس كدالة خطية للسمات الست. تقيس الدراسة الفروض وتجيب على أسئلة البحث بناء على استجابة عدد ١٠١٤ من أعضاء هيئة التدريس السعوديين على مقياس المعرفة الأكاديمية .تساهم الدراسة في الأدبيات من خلال توثيق دور المعرفة الضمنية لأعضاء هيئة التدريس في التعليم العالي السعودي ، وهو موضوع مهم بشكل خاص نظرا للأهمية التي توليها رؤية السعودية ٢٠٣٠ للتعليم العالي ورأس المال البشري وإدارة الأداء وتقييمه. واستنادا إلى هذا التحليل ، تقوم الدراسة على تقديرات معيارية محددة جيدا تكون ذات دلالة على اختلافات مستوى الأداء بين أنواع أعضاء هيئة التدريس مرتبطة بالسمات الست للمعرفة الضمنية.

الكلمات المفتاحية: أداء أعضاء هيئة التدريس ، المعرفة الضمنية ، إدارة الأداء ، التحفيز الذاتي ، التنظيم الذاتي ، المهارات ، التفاعل الاجتماعي.

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Introduction and Research Questions:

This study investigates empirically the extent to which applied tacit knowledge contributes to understanding higher education faculty performance levels. Tacit knowledge, though field-specific and experience-oriented, can hardly be objectively measured or transmitted (Asher and Popper, 2019). Even so, the term "tacit knowledge," relates to best practices and the optimal choices to achieving predefined goals (Bolade and Sindakis, 2020). In keeping with this relation, the present study maintains the hypothesis that higher education faculty performance level variability can be explained in terms of underlying levels of tacit knowledge application.

Though the empirical literature regarding the relationship between tacit knowledge and organization performance is rich, it devotes little attention to measuring tacit knowledge in terms of individual performance (Insch et al., 2008). Classically understood as conceived and non-expressive across individuals' choices and actions (Farnese et al., 2020), tacit knowledge combines hands-on experience, continuous learning, and practical observations (Kucharska & Bedford, 2020). Indeed, the term "tacit knowledge" implies practical know-how and performance attributes, and it is often used interchangeably with the terms "practical experience" and "practical intelligence" (see, e.g., Mueller, 2014). Tacit knowledge thus remains unintelligible, personal, abstract, equivocal, action-oriented, and extremely difficult to quantify absent a clear and comprehensive conceptual framework (see, e.g., Bosancic, 2016).

Such a conceptual model can be found in Insch et al. (2008), whose theoretically influential model of tacit knowledge examined the construct validity of six propositions based on the theory of information processing and the notion of cognitive representations of knowledge structures that instruct context-oriented behavioral manifestations. Reconciling classical literature on the subject of tacit knowledge, Insch et al.'s (2008) model delineated the concept in terms of six attributes: cognitive (self-motivation, self-organization), technical skills (individual, institutional), social interaction (task-oriented, general).

The present study advances an empirical model of faculty performance in terms of the six tacit knowledge attributes articulated by Insch et al. (2008), where parameter estimates are tested along with the model's explanatory power. The study utilizes random sampling techniques to produce a large and representative sample of Saudi faculty members pulled from a population comprising three major universities covering the main regions of Saudi Arabia: Imam Mohammad Ibn Saud Islamic University, Imam Abdulrahman Bin Faisal University, and the Islamic university of Medina. The study contributes to the literature by documenting the role of faculty tacit knowledge in Saudi higher education. Such documentation is particularly relevant given the importance that Saudi 2030 vision places on higher education, human capital, and performance management and appraisal. Toward this end, estimating the empirical model of this study may pave the way for an educational research tradition in Saudi Arabia that is intrinsically intertwined with the socio-cultural future aspirations of the country.

In view of the preceding, this study advances the following research questions:

1. RQ1: How does the tacit knowledge attribute of self-motivation impact Saudi faculty performance?
2. RQ2: How does the tacit knowledge attribute of self-organization impact Saudi faculty performance?
3. RQ3: How does the tacit knowledge attribute of individual technical skills impact Saudi faculty performance?
4. RQ4: How does the tacit knowledge attribute of institutional technical skills impact Saudi faculty performance?
5. RQ5: How does the tacit knowledge attribute of task-oriented social interaction impact Saudi faculty performance?
6. RQ6: How does the tacit knowledge attribute of mainstream social interaction impact Saudi faculty performance?

Literature Review and Hypothesis Development

This study situates tacit knowledge in the context of performance management. Though a broad term with various interpretations and implications, performance management takes as its central focus improving performance through the typical management cycle of planning and control (Koriat and Gilbard, 2014). Recognizing tacit knowledge constitutes a critical part of performance measurement, planning, control, and appraisal (Farnese et al., 2019). Informed measurement of employee tacit knowledge can empower management to engage effectively in the cycle of establishing objectives and setting expectations (i.e., performance planning); measuring performance and reviewing results (i.e., performance measurement and analysis); and formulating performance improvement plans and interventions (i.e., performance improvement) (Gharakhani and Mousakhani, 2012). In fact, assessing tacit knowledge within the context of performance management highlights a subset of the strategic human resource management literature emphasizing the context of the set of management activities and practices that lead to improved performance. Such context is non-trivial for this study given the importance that Saudi 2030 vision places on higher education, human capital, and performance management and appraisal.

Tacit knowledge is often contrasted with explicit knowledge (Gubbins, 2012). Though tacit knowledge may eventually become sequenced and structured explicit knowledge through socialization and externalization, explicit knowledge may contribute to unstructured and nonsequential tacit knowledge by combination and internalization (Hsueh et al., 2016). Tacit knowledge thus comprises much of the basis of the individual's total knowledge owing to its informality, novelty, personality, reproducibility, and effortless storability (Nakano et al., 2013). As a result of such centrality, the processes through which tacit knowledge is measured, recognized, captured, and shared still pose a set of difficult challenges to the fields of performance management and knowledge management (Muthuveloo and Teoh, 2013).

Focusing on how to differentiate tacit knowledge from other forms of knowing, Stanley and Krakauer (2013) distinguish tacit knowledge from propositional, semantic, and theoretical knowledge. Whereas tacit knowledge is manifested in what is actually being done absent the necessity to explain, theoretically knowledge represents the type of knowledge that can be explained absent the necessity for practical exploitability.

Tacit knowledge transmission has received much focus in the literature. Boshoff (2014) asserts that tacit knowledge is intrinsically inexplicable and follows no rules or principles. Cirino et al. (2016), by contrast, maintain that tacit knowledge may be externalized, but only as metaphors and told stories. Asher and Popper (2019) address this subject by distinguishing tacit knowledge types according to communicability, identifying types ranging from explainable to virtually impossible to explain. Taking a different approach to tacit knowledge measurement and transmission, Kucharska (2021) contends that such communication depends on awareness of tacit knowledge. Kucharska and Bedford (2020) show that reasonable explanations of tacit knowledge must allow for error acceptance and underlying learning cultures.

Other scholars focus on tacit knowledge construction. Farnese et al. (2020) argue that tacit knowledge is mainly shaped by cultural and social considerations. Love and Smith (2016) document the relationship between tacit knowledge construction and continuous learning. Bosancic (2016) adopts a psycho-cognitive perspective of tacit knowledge accentuating the roles of specific contexts and environments. In a similar vein, Allen and Reber (1980) emphasize the subconscious nature of the process underlying generating tacit knowledge. Bolade and Sindakis (2019) highlight the conscious and subconscious attributes that lead stimuli of tacit knowledge to manifest in terms of unique characteristics, traits, and behaviors. Fridland (2014) relates tacit knowledge to focal awareness.

Unlike the studies highlighted above, and in contrast to much of the literature related to tacit knowledge, Insch et al. (2008) advance a model by means of which tacit knowledge can be measured and related to individual performance. This model constitutes the present study's conceptual framework; based on it, the study tested the following null hypotheses against Saudi higher education data. Testable statements are expressed in the alternative form.

1. The tacit knowledge attributes of cognitive (self-motivation, self-organization) play no role in faculty performance, against the alternate hypothesis that the tacit knowledge attributes of cognitive (self-motivation, self-organization) impacts faculty performance positively.

   Ha1: Self-motivation has a positive impact on faculty performance.

   Ha2: Self-organization has a positive impact on faculty performance.

2. The tacit knowledge attributes of technical skills (individual and institutional) play no role in faculty performance, against the alternate hypothesis that the tacit knowledge attributes of technical skills (individual and institutional) impact faculty performance positively.

   Ha3: Individual technical skills have a positive impact on faculty performance.

   Ha4: Institutional technical skills have a positive impact on faculty performance.

3. The tacit knowledge attributes of social skills (task-oriented and general) play no role in faculty performance, against the alternate hypothesis that the tacit knowledge attributes of social skills (task-oriented and general) impact faculty performance positively.

   Ha5: Task-oriented social skills have a positive impact on faculty performance.

   Ha6: General social skills have a positive impact on faculty performance.

Empirical Study

Following the traditional scientific paradigm, the present study centers on a quantitative analysis whose objective is explanation of the endogenous variable of faculty performance in terms of six exogenous variables correlated with the tacit knowledge attributes advanced by Insch et al. (2008). These six exogenous variables consist of the following faculty member characteristics:

- propensity to complete required tasks on time (cognitive self-motivation)
- propensity to participate in work groups (cognitive self-organization)
- propensity to set regular research hours (individual technical skills)
- propensity to be available for discretionary office hours (institutional technical skills)
- propensity to shape future performance on student evaluations (task-oriented social interaction)
- propensity to participate in community development (mainstream social interaction)

The empirical analysis evaluates the model parsimoniously and reports respective parameter estimates, particularly the respective parameter estimates corresponding to the impact of the six tacit knowledge attributes on faculty performance levels.

Data Collection and Participants

The dataset for this study consists of the faculty members at three major universities covering the three main regions of Saudi Arabia: Imam Mohammad Ibn Saud Islamic University, Imam Abdulrahman Bin Faisal University, and the Islamic University of Medina. Researchers collected exogenous variable data from participants' responses to the validated

questionnaire developed by Insch et al. (2008) (Figure 1). The validated questionnaire is themed on the following characterizations of the six tacit knowledge attributes:

1. Cognitive self-motivation: the faculty member's propensity to complete required tasks on time.
2. Cognitive self-organization: the faculty member's propensity to participate in work groups.
3. Individual technical skills: the faculty member's propensity to set regular hours for research.
4. Institutional technical skills: the faculty member's propensity to be available for discretionary office hours.
5. Social interaction (task): the faculty member's propensity to impound student evaluations into future performance.
6. Social interaction (general): the faculty member's propensity to participate in community development.

In addition, researchers collected endogenous variable data by determining the number of peer-reviewed research papers published by each participant in the year 2019. Faculty members who published no papers or more than eight papers were eliminated from the study sample. Researchers set the lower limit of one paper and the upper limit of eight papers to mitigate the presence of outliers and to produce robust estimates of the extent to which faculty-applied tacit knowledge affects performance. This double filtration method excluded more than three-quarters of the faculty population, yielding a study sample comprising 1014 participants: 315 from the first region university, 229 from the second region university, and 470 from the third region university.

Item	Very Low	Low	Average	High	Very High
How do you rate the level of your completion of required tasks on time?					
How do you rate the level of your inclination to participate in work groups?					
How do you rate the level of your availability for regular research hours?					
How do you rate the level of your availability for discretionary office hours?					
What is the extent to which your student evaluations are reflected into your future performance?					
How do you rate the level of your inclination to participate in community development projects?					

Figure(**1**): Insch et al.'s (2008) Likert-Typed Scale Questionnaire

Variable Measurement and Coding

The study measured the endogenous variable of faculty performance continuously, with a number between one and eight. It measured the exogenous variables associated with tacit knowledge attributes on a binary "yes" or "no" basis according to participant responses to the validated Likert-typed questionnaire developed by Insch et al. (2008). The six measures of the exogenous variables were coded "1" for "yes" and "0" for "no," where "yes" defines an above-average response and "no" defines a below-average response.

Statistical Analysis

This study explains faculty performance in terms of the six attributes of tacit knowledge. Specifically, the study estimates the level of faculty performance in terms of the following faculty-member characteristics:

- propensity to complete required tasks on time (cognitive self-motivation)
- propensity to participate in work groups (cognitive self-organization)
- propensity to set regular research hours (individual technical skills)
- propensity to be available for discretionary office hours (institutional technical skills)
- propensity to shape future performance on student evaluations (task-oriented social interaction)
- propensity to participate in community development (mainstream social interaction)

The estimation was carried out according to the following functional form:

FF: the level of faculty performance = f (self-motivation, self-organization, individual technical skills, institutional technical skills, task social interaction, general social interaction)

For ease of exposition, the collective impact of all exogenous variables other than the six attributes of tacit knowledge is assumed to cancel out and so reduce to an expected value of zero while maintaining the Gauss-Markov data generating process with well-behaved mathematical properties. The functional form thus reduces to the following linear specification form:

SF: The level of faculty performance (i) = b0 + b1★Motivation (i) +b2★Organization (i) + b3★Skills individual (i) + b4★Skills institutional (i) + b5★Task social (i) + b6★General social (i) + e (i)

where the level of faculty performance is the number of published peer-reviewed research papers in 2019; (i) is an index for faculty members included in the dataset; b1, b2, b3, b4, b5, and b6 are rates for change (the derivatives) in the endogenous variable stimulated by a corresponding change in the respective exogenous variables; b0 is an intercept term that the endogenous variable collapses to whenever any of the exogenous variables or the respective derivatives b1, b2, b3, b4, b5, and b6 take the value of zero; motivation is an exogenous variable measured on a binary basis according to whether the faculty member completes required tasks on time; organization is an exogenous variable measured on a binary basis according to whether the faculty member participates in work groups; skills individual is an exogenous variable measured on a binary basis according to whether the faculty member sets regular hours for research; skills institutional is an exogenous variable measured on a binary basis according to whether the faculty member is available for discretionary office hours; task social is an exogenous variable measured on a binary basis according to whether the faculty member shapes future performance using student evaluations; general social is an exogenous variable measured on a binary basis according to whether the faculty member participates in community development; and e is a Gauss-Markov error term with the independent and identical statistical distribution $e \sim N(0, K)$.

Moreover, employing binary measures of the six attributes of tacit knowledge leads to the following model:

1. M1: b0 + b1 + b2 + b3 + b4 + b5 + b6 if the faculty member completes required tasks on time, participates in work groups, sets regular research hours, maintains availability for discretionary office hours, shapes future performance using student evaluations, and participates in community development.

2. M2: b0 + b1 + b2 + b3 + b4 + b5 if the faculty member completes required tasks on time, participates in work groups, sets regular research hours, maintains availability for discretionary office hours, and shapes future performance using student evaluations, but does not participate in community development.

3. M3: b0 + b1 + b2 + b3 + b4 if the faculty member completes required tasks on time, participates in work groups, sets regular research hours, and maintains availability for discretionary office hours , but does not shape future performance using student evaluations, or participate in community development.

4. M4: b0 + b1 + b2 + b3 if the faculty member completes required tasks on time, participates in work groups, and sets regular research hours, but does not maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

5. M5: b0 + b1 + b2 if the faculty member completes required tasks on time, and participates in work groups, but does not set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

6. M6: b0 + b1 if the faculty member completes required tasks on time, but does not participating in work groups, set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

7. M7: b0 if the faculty member does not complete required tasks on time, participate in work groups, set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

The model's coefficients can be interpreted according to the following system:

1. S1: b0 is the average number of peer-reviewed papers published by faculty members who do not complete required tasks on time, participate in work groups, set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

2. S2: b0 + b1 is the average number of peer-reviewed papers published by faculty members who complete required tasks on time, but do not participate in work groups, set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

3. S3: b0 + b1 + b2 is the average number of peer-reviewed papers published by faculty members who complete required tasks on time and participate in work groups, but do not set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

4. S4: b0 + b1 + b2 + b3 is the average number of peer-reviewed papers published by faculty members who complete required tasks on time, participate in work groups, and set regular research hours, but do not maintain availability for discretionary office hours, shape future performance using student evaluations, or participate in community development.

5. S5: b0 + b1 + b2 + b3 + b4 is the average number of published peer-reviewed papers published by faculty members who complete required tasks on time, participate in work groups, set regular research hours, and maintain availability for discretionary office hours, but do not shape future performance using student evaluations, or participate in community development.

6. S6: b0 + b1 + b2 + b3 + b4 + b5 is the average number of published peer-reviewed papers published by faculty members who complete required tasks on time, participate in work groups, set regular research hours, maintain availability for discretionary office hours, and shape future performance using student evaluations, but do not participate in community development.

7. S7: b0 + b1 + b2 + b3 + b4 + b5 + b6 is the average number of published peer-reviewed papers published by faculty members who complete required tasks on time, participate in work groups, set regular research hours, maintain availability for discretionary office hours, shape future performance using student evaluations, and participate in community development.

8. S8: b1 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time while holding constant other variables.

9. S9: b1 + b2 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time and participation in work groups while holding constant other variables.

10. S10: b1 + b2 + b3 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time, participation in work groups, and setting regular hours for research while holding constant other variables.

11. S11: b1 + b2 + b3 + b4 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time, participation in work groups, setting regular hours for research, and maintaining availability for discretionary office hours while holding constant other variables.

12. S12: b1 + b2 + b3 + b4 + b5 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time, participation in work groups, setting regular hours for research, maintaining availability for discretionary office hours, and shaping future performance using student evaluations while holding constant participation in community development.

13. S13: b1 + b2 + b3 + b4 + b5 + b6 is the average difference in published peer-reviewed papers between the two types of faculty members separated by completion of required tasks on time, participation in work groups, setting regular hours for research, maintaining availability for discretionary office hours, shaping future performance using student evaluations, and participation in community development.

According to the regression output as per Appendix 2, the results show that whereas faculty members who do not exhibit any tacit knowledge attributes produce about two yearly papers on average, faculty members who exhibit tacit knowledge attributes tend to perform far better and produce a total of almost six papers on average (i.e., almost four more papers on average). The analysis reports an explanatory power of 64٪ that is statistically significant at all traditional levels. The regression output's six parameter estimates strongly indicate their theoretic predictions. Though all signs of the six attributes are conceptually meaningful, the magnitudes of the parameter estimates associated with the tacit knowledge attributes of cognitive self-organization, individual skills, institutional skills, and general social interaction are particularly well-pronounced and are statistically significant at all traditionally levels of type I error.

Though this study produced empirical evidence attesting to the positive impact of applied tacit knowledge attributes on the level of faculty performance, future research studies may include more exogenous, right-hand side variables with the objective of parsimoniously specifying the level of faculty performance.

Concluding Remarks and Limitations

This study explains 64٪ of the variation in the performance levels of faculty members via attributes of tacit knowledge. All parameter estimates reported in the study were both conceptually meaningful and statistically significant. It should be noted, however, that the conceptual framework of Insch et al. (2008), the variable measurement, and the convenient statistical ease of exposition regarding the assumed data generating process of the error term constitute limiting factors of the study. Though this study measures the level of faculty performance in terms of publications, there exist many ways to represent the same underlying theoretic construct of performance with different measures. The study is also limited by the ease of empirical exposition and the choice of convenience over tractability. Moreover, the performance level of faculty members is a compound variable that may be specified parsimoniously by many right-hand variables other than the attributes of tacit knowledge.

Despite these limitations, this study sheds needed light on the role of tacit knowledge in the Saudi higher education setting during a critical time of vision and change in which the Saudi 2030 vision places unprecedented emphasis on the value of education, human capital, and performance management and appraisal. In keeping with the Saudi 2030 vision, the results of this study may support policy recommendations along the lines of emphasizing

- faculty participation in work groups.
- faculty setting regular weekly hours for research.
- faculty maintaining availability for office hours on a discretionary basis.
- faculty participation in community development.

The results of this study seem support Saudi higher education policy aligned with the four attributes above as an important means of enhancing faculty performance levels and externalizing the optimal value of inherent tacit knowledge.

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