

Examining the Nexus: Soft Knowledge Management, Continuous Improvement and Green Innovation through SEM Approach

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Abstract— Due to global competition, manufacturers customize modern practices in their facilities. Comprehensive research has been conducted to nexus between Soft Knowledge Management (SKM), Continuous Improvement (CI) and Green Innovation (GI) within Palestinian industries. This paper aims to empirically investigate the relationships between these three practices in an attempt to recognize their coexistence and conceivable integration. A conceptual multi-dimensional model is established and three main direct hypotheses are postulated. Primary data are gathered from key respondents through the online structured closed questionnaire and analyzed using Structural Equation Modeling (SEM). Both Measurement model and structural model are further established. Results show that the impacts of (1) SKM on GI, (2) SKM on CI and (3) CI on GI are statistically significant and consequently supported. Accordingly, as the examined model shows that; these practices coexist together within same Palestinian industries, and their availability can enhance the sustainable performance of industries on the long run.

Keywords -NEXUS, SOFT KNOWLEDGE MANAGEMENT, CONTINUOUS IMPROVEMENT, GREEN INNOVATION, SEM, CONCEPTUAL MODEL

I. INTRODUCTION

Recently manufacturers are demanding to espouse best modern practices to be competitive, to meet customers' inclusive requirements, and to be viable. Soft knowledge management(SKM) which focuses on managing tacit knowledge, human experiences, collaborations, and social interactions is increasingly important in the applications of Industry 4.0 technologies. SKM is integrated into Industry 4.0 practices, especially in areas such as training, collaboration, system design, and decision support. At the same time, there inevitably are the enactment barriers and difficulties when GI methods are applied. Despite numerous obstacles, Palestinian industries have demonstrated resilience and adaptability, increasingly recognizing the importance of knowledge as a strategic resource. While traditional knowledge management has often emphasized explicit knowledge—codified and easily transferable—there is growing recognition of the value of soft knowledge, encompassing tacit, experiential, and culturally embedded insights that reside in individuals and social networks. Scholars [13] administrated both the soft (human) and hard (information and communication technology) of knowledge management (KM) practices. In the literature, there are different terminologies used for KM. including “knowledge creation/capture”, “knowledge storage”, “knowledge transfer/sharing”, and “knowledge application/use”. Other researchers [30] consider that SKM is a driver for continuous improvement(CI). [39] administrated that CI adapts with Lean Manufacturing, Kaizen and Total Quality Management (TQM). [29] Considers that

contemporary practices including TQM, Lean, Just in Time (JIT), Six Sigma and Lean Six Sigma are CI methods.

Scholars including [13] claim that KM environment remains vague even though there are numerous models and practices developed for KM. They argue that misunderstanding of KM practices can lead to undesirable KM strategies within enterprises. In the literature, concerns were raised questioning whether CI has a critical strategic role for enterprises [4]. They claim that there is lacking a clarification on the process of CI. The implementation of CI as reported by [36] is critical and complex especially in small and medium enterprises. This paper explores the convoluted connections between SKM, CI, and GI from the perspective its applications in Palestinian industries. Specifically, it scrutinizes how effectively managing SKM contributes to CI progressions and the fostering of GI in the environments with resource constraints and structural limitations. By centering on these interconnections, it aims to fill a perilous gap in both regional and global literature, offering insights into how Palestinian organizations can leverage intangible knowledge assets to drive sustainable development with competitive advantage. Researchers [46] claim that there is no strong confirmation of the analysis of GI practices referring to sustainability performance indicators. [47] claim that the integration of digital technology and GI from the viewpoint of KM has not been fully established in current literature. [24] prerogative that there is a lack of research on the impact of CI on innovation. In the contemporary literature, there is a need to further clarify the results and findings regarding these three latent constructs. However, this paper addresses the following three questions to be empirically examined in Palestinian industries as in the literature and the consistencies of the links among these three practices. It can be noticed that these practices are long-term aspects and their implementations are challenging considering the required resources by industries to ensure successful adoptions. This paper attempts to answer the following research questions:

- Q1: What is the relationship between SKM and GI?
- Q2: What is the relationship between SKM and CI ?
- Q3: What is the relationship between CI and GI?

This paper is organized as follows; it starts with this introduction section followed by the contemporary literature review. Methodology and proposed design are presented in the third section illustrating the main constructs, data collection and analysis. Results are shown with a brief discussion in the following section while the last section presents conclusions and implications of this research.

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II. LITERATURE REVIEW

This section reviews the contemporary literature with the three key practices namely SKM, CI and GI. Themes of these constructs, the relationships and the conceptual model is elaborated in this section.

2.1 *Soft knowledge management (SKM)*

It is reported that KM becomes a strong strategy which assist enterprises accomplish competitive advantage [12] and their availability is vital for their attainment [14]. [21] argue that among researchers and scholars, there is no agreed opinions about the definition and concept of KM, and this is justified as people come from different disciplines and societies. [4] argues that the collaboration amongst technology, techniques, and people permit enterprises to manage its knowledge successfully. SKM practices focus on human and social factors in knowledge sharing, such as trust, culture, collaboration, and leadership, rather than purely technical systems or processes. Based on [22], SKM includes the culture, the structure and the people working in enterprises. On the other hand, Hard KM practices emphasize the usage of technological tools, formal processes, systems, and arrangements for managing explicit knowledge (documents, data, manuals, etc.). These practices typically involve knowledge codification, databases, intranets, and structured workflows. Literature indicated that some scholars focus only on the soft aspects for KM (i.e., the human resource dimension), and that other practices is related to information systems oriented. Scholars [17] consider both soft and hard KM practices. They argue that KM is vital to achieve intellectual capital for sustaining industrial sustainability. Both [23] demonstrate that SKM (tacit knowledge) is complicated to achieve properly. [3] considers KM as a mediator between TQM and institutions sustainability relationship. Their results imply that KM performs as partial mediator in this association Using KM systems is also approved by [26] reflect his study in the Brazilian small and medium industries.

2.2. *Continuous improvement (CI)*

Currently, there is a concern on CI initiatives, values, behaviours and programs [23]. Different programs are allocated for CI including TQM, lean manufacturing, six sigma and others. It started in Japan and mainly reflected as a strategy for performance improvement and enhancing operations within firms. Considered a foundation for the success of Japanese enterprises [39]. According to [38], these CI programs utilize different practices that are grouped within essential ideas and concepts. [44] argue that managers have to adopt CI processes to be competitive. [18] examine CI as mediator construct between TQM and organizational performance within Nigerian construction industry. Findings show that mediation is confirmed and it is availability is necessary to ensure smooth implementation for TQM practices. According to [2], CI require managerial cultures which provide sureness to applicants in modernizing while decreasing anxiety along the way while providing themselves with most modern and effective tools. [8] proposed a

systematic CI model which supports the incremental improvements in key characteristics and priorities of the aerospace firms.

2.3. *Green Innovation (GI)*

Normally innovation practices refer to the structured and unstructured methods that enterprises practice to nurture the generation, development, and implementation of new ideas. It is considered by scholars when developing new business strategies to be competitive and sustainable [37]. [43] argued that since there is an interest on innovation performance, but still it is not easy to measure. In the literature, innovation has many types including both product and process [25]. GI attracted researchers and practitioners from different scenarios and situations; for instance, researchers [20], and [35] demonstrated enabler of innovation in industries. [46] deal with GI in Chinese manufacturing industries based on sustainability issues. They confirm that adoption of green GI practices is indispensable to certify environmental sustainability. [32] evaluate GI practices among industries. They use concepts concerned with green research and development ability, GI investment aptitude, and GI management capability. [37] use GI as a moderator in the link amongst organizational ambidexterity exploration (innovation exploration) and Sustainable performance.

2.4. *SKM and GI linkage*

It is advocated that KM can stimulate GI, manage in problem solving, and decision making processes. [1] confirmed that SKM human aspects has a clear role in sharing and creating tacit knowledge through direct experience, enunciating and rendering tacit knowledge (know-how) concluded dialogue, replication, networking and concerted doings, and personifying unequivocal knowledge through erudition by doing and action. The collaboration between these practices is further investigated in Jordanian firms by [31] who consider that KM as processes and approaches. They found a significant and positive impact of KM processes on GI in Jordanian consulting firms. [47] consider the practices related to green knowledge and digital GI with respect to industry 5. [33] investigate KM practices with GI in United Arab Emirates. In their recent research, [49] consider that tacit KM is vital for innovation and organizational effectiveness. They examine the role of product innovation as mediator construct between both SKM and organizational performance.

2.5. *SKM and CI linkage*

Models for better recognizing how CI work is reviewed by [5] in their attempts with KM approach. CI has a clear role when successfully implemented to show observed better performance for enterprises. This is filled with barriers and difficulties and number of failures are occurred due to misunderstanding of the real motives for practicing [5]. The integration of SKM practices with CI methodologies has garnered significant attention in organizational studies. SKM emphasizes the management of tacit knowledge—knowledge that is personal, context-specific, and often difficult to formalize—through interpersonal interactions, communities of practice, and organizational culture. CI, on the other hand,

focuses on incremental, ongoing improvements in processes, products, or services. This literature review explores the intersection of SKM and CI, highlighting how the management of tacit knowledge can enhance continuous improvement efforts. SKM supports the transformation towards hard KM. Ultimately this entail going to be CI. Actually, the interplay between SKM and CI is vital for organizations aiming to achieve sustained excellence. By effectively managing tacit knowledge, organizations can enhance their CI efforts, leading to improved processes, products, and services. Future research should focus on developing frameworks to assess the impact of SKM practices on CI outcomes and exploring strategies to overcome the challenges associated with tacit knowledge management. [15] noted that KM and CI is better to be implemented in large institutions rather than small firms. [37] hypothesize that quality management practices foster innovation exploration and exploitation in enterprises. [45] examine the impact of KM on sustainability issues using innovation as mediator construct in this linkage.

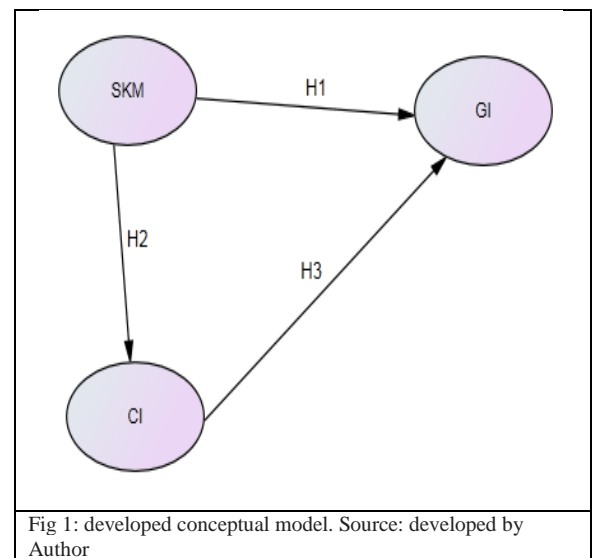
2.6. CI and GI linkage

It is observed that CI can lead and contribute to better GI paradigm for organizations [4]. In the context of Palestinian industries, the integration of CI practices with GI strategies is essential for augmenting competitiveness and fostering sustainable development. Manufacturers follow TQM, Kaizen and LM as CI strategies to enhance operational efficiency and quality of product. To bridge the existing gap between academia and industry, several initiatives followed to support GIV strategies in this competitive environment. The reviewed literature underscores the significance of integrating CI practices with GI strategies in Palestinian industries. While CI methodologies including TQM and Kaizen have been implemented to enhance efficiency and quality, their direct impact on GI outcomes varies across sectors. The synergy between CI and GI is essential for achieving sustainable competitive advantage and promoting industrial development in Palestine. In Brazilian firms, a recent study by [24], assess the impact of CI on innovation practices and conclude that more CI behavior implementation was associated with better product and process innovation performance. [9] noted that CI influence on Innovation is complex subject as there is both positive and negative relationships. [25] argue that here is limited research focusing on CI programs and Innovation performance. Other scholars are questioned about the commitment of CI to innovation [10].

2.7. Conceptual model and hypotheses

The proposed model in this paper as it portrayed in Fig. 1 is developed based on the three latent constructs namely SLM, CI and GI. These are multi-dimensional in nature and consists of numerous items upon consideration. Direct relationships are postulated amongst these constructs in an attempt to bridge the existing gap in the literature and mainly try to understand the coexistence of these practices once these found in the same industry. Obeidat et al.(2016) argued that KM is considers among the important management strategies. Herlina et al.(2019) conduced a research to develop a archetypal which links SKM and CI. This knowledge transfer

model affects CI for Small and medium Indonesian enterprises. According to Sikombe and Phiri (2019), SKM support initiatives to improve their innovation and performance. The developed model as it depicted in Figure 1 with three latent constructs to the understanding of author of this paper is not empirically examined before considering soft aspects of KM, and these links combined in the same industry.



Three hypotheses are postulated to better realize the mechanism of this model, these are:

- H1: There is a positive and significant relationship between SKM and GI in Palestinian industries.
- H2: There is a positive and significant relationship between SKM and CI in Palestinian industries.
- H3: There is a positive and significant relationship between CI and GI in Palestinian industries.

These are main direct hypotheses including both exogenous and endogenous latent constructs and will be empirically examined in Palestinian industries after gathering the primary data from key respondents in the suggested industries.

III. METHODOLOGY

This section presents the main methodology of this research.

3.1. Design, target population and sample determination

Quantitative design is considered appropriate in this paper to empirically examine the three postulated hypotheses which is adopted by several scholars including [24]. Unit of analysis selected is the Palestinian manufacturing industry. Target population is the Palestinian manufacturing industries, whether these small, medium or large firms. The aim is to have a suitable large sample so that results can be obtained correctly, where this sector affects the Palestinian developing economy and contribute significantly towards its improvement. These industries in different sectors distributed in the West Bank region are selected randomly. Though, simple random sample is selected. As per the Palestinian Central Bureau of Statistics web page

(https://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=602), there are 777 manufacturing firms in the West Bank. These distributed among different industrial categories and considered the total population here. Hair et al. (2006) suggested that minimum sample sizes between 100 and 150 are required to achieve stable MLE results. Consequently, the sample size determined for this paper is suitable and within the acceptable limit.

3.2. Constructs conceptualization and data collection instrument

Primary data gathered through the structured closed questionnaire tool, which considered useful to follow for this type of research concerned with examining the three postulated direct hypotheses. The common five point's likert scale is used for all items as per the latent constructs. There are 14 items allocated for SKM, whereas 14 items for CI and other 8 items for GI. These items as it depicted in Table 1 are modified to ensure the validity and be appropriate to Palestinian industries. Interviews with relevant 15 manufacturers', manages and respondents were done in the first stage to examine the applicability of the developed model with constructs included to the Palestinian environment. As per their responses, the model developed is acceptable and may push improvement in the Palestinian industry. The survey is designed online and the link sent to the key respondents'. This strategy is followed by Lizarelli et al.(2021) in their research in the Brazilian manufacturing industries. These items as per the likert scale follows the ordinal scale of agreement: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree.

Code	SKM items	Source	Cronpach alpha
SKM1	Our company encourages and rewards us for sharing of knowledge.	[22]	0.71
SKM2	We reward for actual performance improvement		0.73
SKM3	Our employees are valued for what they know		0.81
SKM4	Our culture encourages cooperation among the employees		0.69
SKM5	Our culture improves involvement of workers in the workplace		0.71
SKM6	In our company, we have an open and trusting culture.		0.74
SKM7	Our company recognizes knowledge as a main resource.		0.71
SKM8	We acquire plenty of knowledge regarding team building from external networks.	[6]	0.81
SKM9	We acquire sufficiently managerial experience from outward networks.		0.69
SKM10	We attain plenty of knowledge regarding vision planning from external networks		0.71
SKM11	We acquire plenty of knowledge regarding climate creation from external networks		0.74

SKM12	We are ready to cooperate with others and let others better learn from work	[16]	0.71
SKM13	We are eager to share with others rules of thumb, tricks of the trade, and other insights		0.81
SKM14	We often share and gain novel ideas during work		0.69
	CI items	[24]	0.74
CI1	our employees are often encouraged to share experiences, opinions and ideas and implement them		0.71
CI2	CI culture is widespread and stimulated throughout the organization and is part of company culture		0.86
CI3	when there are unwanted results, the natural reaction of people or all hierarchical levels is to identify the causes of the problem, not blaming individuals		0.69
CI4	Senior management is committed to employees to carry out improvement projects by the elimination of barriers (such as communication) and keeping feedback		0.81
CI5	Top management provides resources (time, financial, training) for CI		0.74
CI6	There is use of formal method of specific tools to find and solve problems		0.77
CI7	CI projects are carried out in interdisciplinary teams with people from different areas and hierarchical levels, promoting the sharing of information and experiences		0.69
CI8	– There is regular training for employees on tools and methods for analysis and problem solving		0.84
CI9	There are mechanisms for recognizing and rewarding CI efforts		0.73
CI10	People are involved in sharing project experiences, including best practices, successes and failures		0.77
CI11	All key processes are regularly evaluated for implementing changes and improvements		0.81
CI12	There is a formal process for prioritizing and choosing improvement projects aligned with the competitive strategies		0.70
CI13	CI project results are measured and evaluated according to their contribution to the company's strategic objectives		0.73
CI14	There is a concern about continuous improvement of the CI system/ program, seeking better practices, methods and tools		0.77
	GI items		

GI1	Our company manufacturing process effectively reduces the emission of hazardous substances or waste	[37]	0.84
GI2	Our company manufacturing process recycles waste and emissions that allow them to be treated and re-used		0.69
GI3	Our company manufacturing process reduces the consumption of water, electricity, coal, or oil		0.73
GI4	The manufacturing process of our company reduces the use of raw materials		0.84
GI5	Our company chooses the materials of the product that produce the least amount of pollution for conducting the product development for design		0.81
GI6	Our company chooses the materials of the product that consume the least amount of energy and resources for conducting the product development or design		0.76
GI7	Our company uses the fewest amount of materials to comprise the product for conducting the product development or design		0.70
GI8	Our company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design		0.72

Value of Cronbach alpha for the items (Table 1) in the developed questionnaire are within the acceptable limit as their value is approximately near and above 0.7. this ensures that these items have consistent reliability and accepted for further analysis. It is clear that Cronbach alpha for SKM construct within the range of 0.69 – 0.81, for the latent construct CI (0.69 – 0.86) and for GI (0.70-0.84).

3.3. Data analysis techniques

Since three hypotheses are developed as per the conceptual multi-dimensional model; consistent with the objectives assigned, and paper design, both the most used statistical techniques namely statistical package for social sciences (SPSS 24) and Structural Equation Modeling (SEM) software based on Analysis of Moment Structure (AMOS 23). AMOS 23 is utilized as the sample size is large and the nature of items are reflective. [48] recommend considering SEM for examining the interrelationships among the latent contracts, as it is an advanced multivariate technique, which allows for the simultaneous analysis of multiple, connected links and hypotheses testing for the exogenous and endogenous latent constructs. SEM consists of both measurement model characterized by the Confirmatory Factor Analysis (CFA) and then the structural model. Once CFA is achieved and fitness indices are appropriate for each latent construct, the next step is the assessment through the structural model and hypotheses testing.

IV. RESULTS

This section introduces findings of Response rate and descriptive statistics including mean and standard deviation are presented, followed by Structural equation modeling analysis.

4.1. Response rate

Since author, does not expect to receive full 100% response rate of the respondents' participating in this data collection phase. The designed instrument administrated to all industrial firms as respondents' managers. Different mechanisms used to increase the response rate and encourage respondents to send their online feedback. A reminder email sent to respondents who did not respond an approach followed by Khalili et al.(2018). However, 320 surveys returned during the seven months data collection period. These returned responses checked to filter the usable and unusable questionnaires. 20 surveys found to have missing values and outliers cases; these are un-suitable and consequently, removed. Finally, 300 structured questionnaires are considered for further analysis and entered in AMOS 23 software. Based on this, the response rate considered is 38 % considering the total questionnaire sent to key respondents.

4.2. Descriptive statistics for latent constructs

To consider the responses on the three latent constructs, the descriptive statistics is done to develop the frequency distributions, and to find out estimates of the maximum, minimum, mean, and standard deviation of all the exogenous and endogenous latent constructs as per the developed conceptual model. The common Likert scale with 5 points (scales) as indicated in the questionnaire is used. Table 2 displays results of descriptive statistics for practices considered. Findings show that the mean average of these constructs is greater than midpoint value. For instance, as per SKM , the mean equals to 3.25 whereas for CI (mean= 3.66) and for GI (mean = 3.607).

Construct	Mean	Std. deviation	Maximum	Minimum
SKM	3.2521	.41053	4.85	2.34
CI	3.6693	.42571	4.82	2.39
GI	3.6079	.51854	4.78	2.00

4.3. Measurement model analysis

Confirmatory factor analysis (CFA) is applied separately for all latent constructs in this paper. Fitness indices are used to evaluate how well the model's structure aligns with the observed data. As per the guidelines of [48], these indices are: normed chi square to be less than 5, CFI (greater than 0.9) , RMSEA (less than 0.08), df(no threshold), chi -square(no threshold), P-value(greater than 0.05). Analysis of CFA for the three practices is as follows: The loadings of items of each construct (better to be higher than 0.6) , the Cronbach's alpha (greater than 0.6) the composite reliability (CR: greater than 0.7) , and the average variance extracted (AVE: greater than

0.6) are assessed to examine the measurement model of these latent constructs.

4.4 Measurement model for SKM

The initial hypothesized Confirmatory factor analysis (CFA) for SKM practices contains 14 different items adapted from the literature of former scholars in the relevant field to be consistent with Palestinian industries. Initial CFA show that fitness indices are not achieved. Factor loadings for all 14 items are SKM1 (0.73), SKM2 (0.41), SKM3 (0.47), SKM4 (0.77), SKM5 (0.64), SKM6 (0.46), SKM7 (0.68), SKM8 (0.79), SKM9 (0.76), SKM10 (0.48), SKM11 (0.42), SKM12 (0.72), SKM13(0.78) and SKM14 (0.75). It is clear that there are five SKM items have factor loading less than 0.5 and so these have to be removed from further analysis as these are not appropriate namely SKM2, SKM3, SKM6, SKM10 and SKM11. Additionally, values of normed chi square (16.621), CFI (0.708), and RMSEA (0.225) don't achieve the threshold values, so, the Initial CFA is to be modified again. After removing 5 unnecessary items, and correlating error terms based on theoretical justification, the modified CFA for SKM practices contains 9 items retained for further analysis. The modified CFA have an acceptable fit indices as RMSEA =0.054 which is less than 0.08, CFI = 0.963(greater than 0.9), normed chisquare =1.88 (less than 3). Factor loadings for the retained 9 items are: (SKM1, 0.76), (SKM4, 0.80) , (SKM5, 0.69), (SKM7, 0.73), (SKM8 ,0.81), (SKM9, 0.78), (SKM12, 0.75), (SKM13, 0.82), (SKM14, 0.80).

4.5 Measurement model for CI

The initial hypothesized measurement model for CI contains 14 different items. These items are reflective with one factor of Continuous Improvement (CI). Findings show that initial CFA for CI construct has 5 items with low factor loading (less than 0.50) and author decided to delete these as considered unnecessary in this stage. Factor loading of all 14 items are : (CI1, 0.74), (CI2, 0.65), (CI3, 0.48) , (CI4, 0.62), (CI5 ,0.60) , (CI6,0.45) , (CI7,0.67), (CI8,0.61) , (CI9,0.44) , (CI 10 ,0.72), (CI 11, 0.49), (CI 12, 0.66) , (CI 13, 0.63), (CI 14, 0.47). Since 5 items have low factor loadings, these are discarded from further analysis namely CI3, CI6, CI9, CI11, and CI14. Besides, values of fit indices are poor and unacceptable. For instance, normed chisquare = 3.45 , CFI = 0.86, RMSEA= 0.091.This requires modifying CFA to have better situation to proceed. Consequently, the retained nine items are CI1, CI2, CI4, CI5, CI7, CI8, CI10, CI12, and CI13. After removing the unnecessary CI items, the retained items entered again to AMOS 23 and the modified CFA finally obtained as fitness indices were satisfied and achieved. Values of normedchisquare =1.96, CFI=0.957, RMSEA= 0.061, P=0.000. Item loadings for the modified CFA as follows: (CI1, 0.77) , (CI2, 0.71), (CI4 , 0.70) , (CI5,0.68) , (CI7, 0.74), (CI8,0.69), (CI10,0.76), (CI 12,0.72), (CI 13,0.73).

4.6 Measurement model for GI

The initial hypothesized CFA for GI have 8 items. These are reflective with one factor formulated. Findings from AMOS 23 show that CFA does not achieve the best model fit as

fitness indices are not satisfied and three items have low factor loadings namely GI4 (0.48), GI7 (0.44) and GI8 (0.46). These discarded from further analysis in attempt to modify the CFA for GI. Fitness indices are: normedchisquare = 3.36, CFI= 0.87, RMSEA = 0.093, which are not acceptable. Factor loadings for the remaining items are: (GI1, 0.76), (GI2, 0.72) , (GI3,0.69) , (GI5, 0.63), (GI6,0.61). Conducting the CFA again with the five retained GI items show that the modified CFA is acceptable with the values of factor loadings are: (GI1, 0.77), (GI2, 0.74) , (GI3,0.71) , (GI5, 0.68), (GI6,0.69). Model fit indices are achieved as normedchisquare =1.88 which is good value, CFI= 0.97 and RMSEA= 0.056. These results support the uni-dimensional structure of the Green Innovation (GI) construct.

4.7. Full-fledged- Structural model assessment

The next step after realizing that CFA achieved for the three latent constructs is assessment of the structural model, which is performed before SEM final analysis and testing the main hypotheses. Full-fledged structural model (Fig. 2) is established which assist in finding the nature of the relationships amongst SKM- CI and GI. Nine retained items for SKM, nine items for CI and other five items for GI were remained for further analysis and ready for full-fledged structural model assessment. The initial structural model seems not realized as some items have low loadings and model fit indices not realized. Author delete these unnecessary items namely SKM4, SKM9 , CI7, CI 13, and GI3. After deleting these five items, the modified full-fledged structural model achieved as model fit indices acceptable and items loadings are within the threshold limit. Normed chisquare = 2.69, CFI=0.91 and RMSEA=0.05 which are acceptable values.

4.8. Hypotheses testing

Three direct hypotheses are postulated as per the developed conceptual model in this paper. According to [48], hypothesis can be significant once critical ratio value(C.R) is greater than 1.96 and standardized beta is greater than 0.2. Based on the final modified structural model, it seems that these hypotheses are significant and consequently supported. Results of testing the three hypotheses are depicted in Table 3. Hypothesis 1 between both SKM and GI have C.R of 3.07 and $\beta = 0.3$. Hypothesis 2 to examine the impact of SKM on CI has C.R= 7 and $\beta = 0.4$. Hypothesis 3 between CI and GI also has C.R= 4.34 and $\beta = 0.26$.

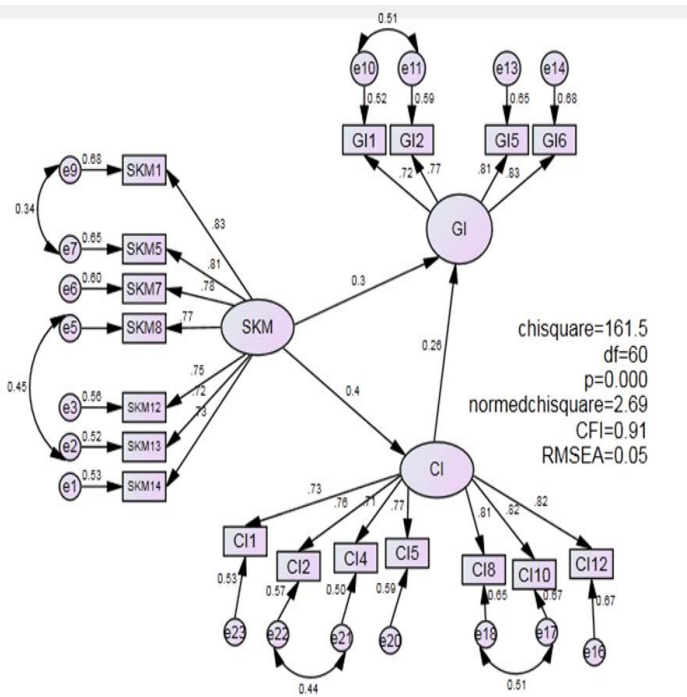


Fig.2: Full-fledged structural model. Author computations

	Exo.	End.	β	Estimate	S.E	C.R	P value	result
H1	SKM	GI	0.30	0.35	.114	3.07	***	Sig.
H2	SKM	CI	0.4	0.42	0.06	7	***	Sig.
H3	CI	GI	0.26	0.33	0.076	4.34	***	Sig.

C.R = Critical ratio, S.E= standardized error,
Exo= exogenous , End= endogenous, Sig.= significant

4.9 Result discussions

There are three main objectives and questions proposed in this paper to be examined while model development and empirical analysis for gathered data upon investigation. The first question in this paper is related to examine the impact of SKM on GI practices in Palestinian industries. In the literature, there is no agreement about unique definition for KM. this is obvious as people working in KM comes from numerous disciplines and sectors [21]. SKM considered the exogenous latent construct and GI is the endogenous construct. The direct relationship to assess the impact of SKM on GI is examined through techniques from modern applied Structural Equation Modeling (SEM). Recently, [33] found a positive and significant association between knowledge acquisition, knowledge dissemination and knowledge responsiveness with GI within UAE firms. Referring to the final refined structural model, it is observed that this relationship amongst these practices are significant and so it is supported. This entails that this link is obvious and enterprises have to consider within their operations. A strong link between KM inputs and product outputs is further required [7]. [42] study how KM affects GI using SEM methodology and proposed a detailed model based on these practices. [41] proposed a detailed framework for KM with innovation, autonomy, performance, and less absenteeism as outcomes generated.

The second question related to SKM and CI raised in the literature of [30] who questioned about the general KM practices that may lead to enhance and support CI. They focus on key KM different processes including utilization, sharing and acquisition. The hypothesis proposed here is that there a statistical and significant relationship between both SKM and CI practices. Findings elaborated from the revised structural model show that this link is statistically significant and through it is supported. Standardized beta value equals 0.4 while C.R=7 which are acceptable values implies the strong linkage between these practices. [28] examine tacit KM on organizational performance and conclude that these are positively correlated. [44] deliberate that to be competitive, enterprises have to develop a well CI culture through the successful implementation of this process. In the Brazilian industries, [25] confirmed that CI and GI are of great importance in these days as these have an influence on the competitiveness.

The third question is related to examining the impact of CI on GI practices. CI is hypothesized to be the exogenous while GI is the endogenous construct. Findings from the final fledged structural model show that this relationship is significant and consequently it is approved and supported. Thus, CI in Palestinian industries affects positively GI and both can coexist together in the same industry as their collaboration together can improve green practices and environmental concerns. This linkage is reinforced by researchers [27]. It is obvious that results differ among various firms and locations as of the variability of priorities and practices understanding and realization.

V. CONCLUSIONS

In this section, we present the main findings, conclusions, implications and future research directions of this research .The contemporary literature suggests a strong interrelationship between SKM, CI, and GI practices as these are not properly considered within Palestinian industries. These three practices received attention from scholar and academics and their synergy empirically examined in this paper to check if these can coexist within the same industry or not. It proposes that firms that effectively manage SKM and adopt CI strategies are better positioned to achieve GI outcomes, adopting sustainable growth and competitive advantage. Dynamic capabilities theory and KM are intertwined concepts, with KM often seen as a key enabler of dynamic capabilities. Findings of this study are expected to provide practical implications for industrial managers, policymakers, and development agencies seeking to enhance organizational performance and GI capabilities in Palestine. Moreover, the study contributes to the broader discourse on knowledge management literature by highlighting the often-overlooked role of soft knowledge in facilitating adaptive and GI behaviors in challenging contexts. The main contribution of this paper is that it focuses in depth with respect to three main practices their availability is challenging by industries. These require facilities and improvement from mangers to keep in track and meet customer requirements and continuously. The developed conceptual model is vital, as it introduces three different integrated practices not easy to adopt

while these are separated. Palestinian industry is still developing and requires more advanced practical strategies and technologies to improve its manufacturing products and services.

It can be a reference for policy makers, manufacturer's academics and other scholars to get aware of these practices and their alignment. Manufacturers adopting these constructs in their attempts to achieve sustainable and competitive advantages. Existing models and implications in the literature are generating from former models, terminologies and concepts and much provided for external societies. Palestinian manufacturers should continuously examine and observe their KM practices either tacit or explicit KM and realize how this impact GI. The study conducted here is cross sectional (snapshot based). A longitudinal study would better assess long-term impacts of SKM/CI on GI. Findings should be treated carefully. It is applied in the developing situation in the Palestinian industries. Generalizations have to be studied properly. Future research can examine different dimensions for innovation such that process or product types. Besides, other regions or service sector can be under investigation by scholars in the next research to show how these are affected by practices included and expand the model applicability. Future research can be designed to expand the applicability of the mentioned model including other mediation (organizational structure) and moderation (firm size) mechanisms. Besides, since many items have low factor loadings hence are deleted from further analysis, a pilot study could improve questionnaire design and item clarity. While conflicting literature is noted, deeper analysis of why results differ (e.g., cultural/industry variations) would add value. Refer to Palestinian situation, this paper is useful to manufacturers as it provides a guide to adopt and practice by industrial managers' despite of the difficult to change by the relevant employee's in the respondents industries. It is best to invest in SKM infrastructure through knowledge sharing cultures, environmental awareness training. Besides, it is to embed continuous improvement philosophies (TQM, lean) aligned with green outcomes.

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