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Transformation of knowledge and skills by entry-level graduates: Perception of logistics and supply chain managers in Oman

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Abstract: This study aimed to examine and assess the impact of the logistics industry's environment, entry-level graduates' characteristics and the logistics and supply chain management (LSCM) program design on the transformation of knowledge and skills at Sohar port in the Sultanate of Oman. The study employed a pragmatic research philosophy involving a structured questionnaire. The sample size included 49 mid-managers from the logistics industry who were working at Sohar Port. The study found that entry-level graduates' characteristics and LSCM program design positively and significantly influenced the transformation of knowledge and skills. However, the organisational environment had a negative and insignificant impact on the transformation. This study revealed several dimensions that may require further research. It is pertinent to broaden the research scope to other towns, ports, and other countries in the Gulf Council Countries (GCC) to broaden the scope and generalisability of the results. According to the study findings, several recommendations are proposed for the logistics and supply chain sector in Oman to enhance the transformation of knowledge and skills by entry-level graduates, as well as for higher education institutions (HEIs). To meet the sector requirements, HEIs may improve the current university-industry collaborations by increasing the inputs of the industry in designing and developing the LSCM program. The organisational environment must reconsider the knowledge and skills transformation by entry-level graduates in their strategic plan of resources management, which must be emphasised by the remuneration system and career paths incentive. While other studies have explored knowledge and skill transformation in the context of employee training, this study aims to fill a specific research gap by focusing on the transformation of knowledge and skills by entry-level graduates, an area which has not been extensively studied before. Furthermore, this study is unique as it examines the impact of the industry's environment, entry-level graduates' characteristics and the LSCM program on the transformation of knowledge and skills within the unique context of Oman. This novel approach provides an opportunity to understand the specific challenges and opportunities faced by entry-level graduates in Oman and suggests strategies for addressing them.

Keywords: transformation of knowledge and skills; logistics; supply chain; graduates entry-level; Oman

1. Introduction

Knowledge and skills management play a key role in contemporary logistics and supply chain management (LSCM). "Knowledge" refers to the ability to understand facts, principles, theories and practices (Ullah, 2020), while "skills" include the capacity to apply the knowledge in real-life situations, and perform certain tasks successfully (Marle et al., 2022). The concept of knowledge transformation denotes

bridging the gap between the updated academic knowledge and skills possessed by entry-level graduates to match the changing job requirements (Su and Wang, 2022). The forefront of this transformation is the entry-level graduates, who are students who recently completed their academic education and joined the workforce (Singh and Jaykumar, 2019). Logistics and Supply Chain Management are concepts that sometimes used interchangeably, despite their difference. Supply chain management emphasize the need for cooperation and collaboration between multiple organizations that are involved in meeting customer requirements (Ali et al., 2022), while logistics is a component of supply chain that focuses on the planning, implementing and controlling the physical flow of products, services and related information from point of origin till point of consumption (Vacar, 2019).

The TIM Press Office (2020) argued that companies should focus on knowledge and skills management through the acquisition of new ideas and continuous evaluation of their current knowledge. The assessment of skills and capabilities by other supply chain members, comprehension of existing capabilities across the supply chain, and the ability to combine the two helps in reducing competitive pressure. Globalisation, product diversity, and technological breakthroughs require logistics and supply chains to share knowledge and skills. This collective and synchronised process is a vital component of enhancing competitiveness (Zailani et al., 2018). An empirical study by Jena and Ghadge (2021) indicated that knowledge and skills are enhanced through collaboration among supply chain partners rather than intra-organisational practices. This implies that companies survive and thrive through knowledge and skills sharing with the help of cooperation, rather than pure competition. Furthermore, being ahead of the competition can result in higher profits, and the rate of knowledge transfer is linked to social capital. A higher social capital leads to an increase in the speed of the knowledge transfer process. According to Lahiff et al. (2019), the skills required in the workplace can be classified into two types: Technical skills and non-technical skills. Technical skills are the basic skills required for a job, and workers usually acquire such skills through higher education. However, possessing only technical skills is not sufficient to enhance workers' productivity. Non-technical skills, such as communication skills, decision-making and problem-solving, are of equal importance to organisations.

Today, graduates are joining organisations with a wealth of accumulated knowledge and skills gained from Higher Education Institutions (HEIs). Khan (2019) argues that for organisations to effectively utilise educated and skilled workers, they must possess certain organisational capabilities that facilitate competitive production, ultimately leading to profitability. These capabilities may include strategic planning, efficient resource allocation, effective communication and strong leadership. Without these capabilities, organisations may struggle to fully leverage the potential of their workforce and remain competitive in their respective markets. Therefore, developing and maintaining these organisational capabilities is critical for organisations to achieve long-term success. Additionally, codified knowledge and professional skills in the workplace are critical elements in structural transformation. The transformation of knowledge and skills requires appropriate capabilities, environment and culture (Khan, 2019).

While the transformation of knowledge and skills has been studied by several

researchers, only a few studies have explored it in the Omani context. The Sultanate of Oman is one of the most developed countries and relies heavily on oil and gas revenue. It works to enhance economic diversification by focusing on improving the logistics sector. Diachenko et al. (2021) argued that the transformation of knowledge and skills from retiring employees in the Omani public sector is crucial. They found that these employees are motivated to transfer their knowledge; however, their organisations were required to develop an implementation strategy for transferring their skills.

Other studies on knowledge and skill transformation have suggested that the transfer depends on several dimensions, including the organisational environment, employee characteristics and program or training content. The industry's environment encompasses various factors such as organisational support, supervisor support, peer or colleague support and technical support. Employee characteristics include cognitive ability, personality traits, self-efficacy, motivation, commitment, valence (the value attached to outcomes), anxiety and competence (Al-Swidi and Al Yahya, 2017; Chauhan et al., 2017; Du and Wang, 2019; Ghosh et al., 2015; Iqbal and Dastgeer, 2017; Nafukho et al., 2017; Na-nan et al., 2017).

However, these studies have focused on training transfer, other industries and/or a few factors involved in the transformation of knowledge and skills. The lack of studies focused on entry-level graduates drives this study to fill the knowledge gap of transformation of knowledge and skills by entry-level graduates in the logistics industry in Oman. The study focuses on the perception of supply chain and logistics managers, where "perception" is referred as the process by which people use their senses to become aware of things, people, and other elements of our surroundings (Whitney and Leib, 2018). This study considered three dimensions of the transformation of knowledge and skills: LSCM program design, organisational environment and graduates' entry-level characteristics. This study aims to examine and assess the impact of these three dimensions on the transformation of knowledge and skills at Sohar port, Oman. The paper focuses on the transformation of knowledge and skills by entry-level graduates, representing a pioneering research endeavour in a field that has been extensively explored in employee training transformation. To augment its originality, this research introduces a framework delineating how the industry's environment, entry-level graduates' characteristics and the LSCM program impact the transformation of knowledge and skills by evaluating both direct and indirect pathways. Additionally, the study offers policy recommendations and advances a model for the transformation of knowledge and skills within the logistics industry, aimed at bolstering overall effectiveness in alignment with Oman Vision 2040. The study is structured as follows: literature review which includes three subheadings. The next section is methods, detailing the research approach and techniques employed. This is followed by the 'Findings' section, where the results of the study are presented. The 'Discussion' section then interprets these findings within the context of the existing literature. The paper concludes with the 'Conclusion' section, summarizing the key insights and implications of the research.

2. Literature review

2.1. Transformation of knowledge and skills: The context of organisational environment

Organisational support plays a significant role in facilitating knowledge and skill sharing in organisations (Chung et al., 2016; Nafukho et al., 2017). According to Mazzei et al. (2023), newcomers' perception of an organisation's support is related to the transfer of training and the development of affective and normative commitment to their workplace. Wuryaningrat et al. (2022) tested the role of trust in streamlining the transfer of knowledge and promoting innovation. Although the study had certain shortcomings since it focused merely on a specific industry in Indonesia, besides using a quantitative approach which may not be appropriate for capturing the complex dynamics of trust in knowledge transfer, it asserted its pivotal role in facilitating knowledge sharing, allowing for cooperation among employees, fostering relationship building, enabling innovation and eventually facilitating knowledge transfer.

Liu et al. (2018) concluded that a positive relationship exists between perceived organisational support and job satisfaction. An employee can become more satisfied when they perceive that their organisation cares about their well-being and appreciates their efforts. Furthermore, job satisfaction has a positive relationship with the effectiveness of the workplace's transfer of training. When employees are more satisfied with their job, they tend to transfer more skills in training and vice versa. This research depicted that well-designed training with proper budgets is not necessarily guaranteed to be successful as other factors impact the quality of the training, especially the environment and employees' characteristics. The same was established by Prince et al. (2015), who noticed that culture and the reward system facilitate the learning process in the workplace.

The speed of knowledge transfer within the workplace in Multinational Enterprises (MNEs) and the role of social capital have been investigated by numerous researchers (Krajnović, 2020; Sapuarachchi, 2021; Sluyterman, 2017; Svetozarovová et al., 2021). According to Sluyterman (2017) and Svetozarovová et al. (2021), there is a positive relationship between knowledge transfer in MNEs and their performance, as well as their ability to create and sustain competitive advantages. However, the pace of knowledge transfer is influenced by differences between organisational environments in home and host nations, in terms of regulatory, political, legal and cultural aspects (Krajnović, 2020; Sapuarachchi, 2021). Additionally, the availability of information networks is integral for facilitating knowledge transfer in MNEs (Sluyterman, 2017).

The success of training transfer programs heavily relies on supervisors' support. Organisations must arrange supervisory roles in a manner that ensures maximum training transfer and successful training program management (Al-Swidi and Al Yahya, 2017; Chauhan et al., 2017; Ghosh et al., 2015; Na-Nan et al., 2017; Park et al., 2018; Prince et al., 2015; Salamon et al., 2021). A study suggested that supervisor support exhibits a variety of effects on transfer; some researchers have found a direct-indirect relationship between both elements, while others have found a positive-negative correlation and others have found mixed results (Ghosh et al., 2015). Each

time trainee traits are utilised as mediators; the relationship tends to be indirect. Ghosh et al. (2015) further concluded that supervisors could improve trainee motivation for learning and transfer by boosting their enthusiasm and triggering their desire to develop and transfer. This implies that supervisors can introduce trainees to the curriculum and discuss how newly acquired abilities can be implemented in the workplace, as well as how to set goals and provide timely feedback. It also demonstrates that supervisors should be taught how to help learners during the pre-training phase, the while phase and the post-phase of training.

Moreover, Nguyen and Malik (2020) promoted the significance of intrinsic rewards in encouraging trainees to acquire more skills and transfer those talents to the workplace. Prince et al. (2015) emphasised the role of supervisors in boosting the viability of work training by providing proper reward systems and job enrichment activities.

Research indicates that the role of supervisors is pivotal in training transfer (Botke et al., 2018; Lancaster et al., 2013; Nguyen and Malik, 2020; Sahoo and Mishra, 2022). Lancaster et al. (2013) attempted to explain supervisory behaviours that personnel perceived as both beneficial and ineffective in promoting training transfer and provided extensive qualitative data from the perspective of the personnel. They observed that the way employees performed before in the pre- and post-class attendance stages was crucial to training transfer. Hence, assistance from supervisors can include motivation, support and the establishment of clear expectations. Moreover, the best way to facilitate knowledge transfer is to hold meetings following the training. It has been found that when participants encounter a positive role model and supervisors show interest in their training experience, support and sponsor new efforts, and include the participants in decision-making, the transfer is maximised. On the contrary, culture, policies and a lack of encouragement are cited as the key barriers to skill transfer.

Chauhan et al. (2017) asserted that designing the training transfer process may result in boosting the adoption of skills. The training supervisor should use examples during the training process to link the learned knowledge and proposed application in the organisation, which is essential for the success of the training program. A supportive training supervisor can make the training transfer process successful even with a poor training design. On the other hand, good training design with an unsupportive supervisor is more likely to fail. Salamon et al. (2022) shed light on the training transfer process, which is influenced by several environmental, situational and human aspects. It enhances the training transfer process and, consequently, the performance of the organisation.

Peer support can boost a trainee's motivation to impart newly acquired abilities (Hughes et al., 2019). Research shows that the suggested paradigm has a strong mediating impact, which enhances the effectiveness of information transfer (Yaghi and Bates, 2020). Only partner characteristics and relationship factors demonstrate a significant influence on knowledge transfer efficacy. This appears reasonable, since mere complementarities and coordination between partners may not lead to learning or information transfer, which necessitates a particular level of partner involvement with respect to partner characteristics, coordination and relationship quality. Yaghi and Bates (2020) emphasised the significance of intrinsic rewards and discovered that

intrinsic rewards encourage trainees to acquire more skills and transfer those talents to the workplace. A key potential implication of this study is that human resource management experts can use the findings to create successful strategies for maximising training transfer and efficiently managing training programs.

2.2. Transformation of knowledge and skills: The context of employee characteristics

The Middle East region sees significant investment in knowledge transfer; however, research shows that graduates are falling short of global standards (Quesada-Pallarès et al., 2022). To address this issue and ensure graduates meet the expectations of the contemporary industry, HEIs must evaluate the success of their training programs (Al-Swidi and Al Yahya, 2017; Quesada-Pallarès et al., 2022). This evaluation will help establish a thorough understanding of the transfer of essential information and skills that satisfy current industrial needs.

Al-Swidi and Al Yahya (2017) conducted a study on training transfer intention and training effectiveness of Saudi university staff and found that learning preferences significantly predicted training transfer intention. Hence, training programs should consider employees' preferred learning methods to maximise the returns on their training investment. Furthermore, Nafukho et al. (2017) demonstrated that training efficiency and relevance are critical components in HEIs' curriculum and knowledge transfer, implying that these components collectively make it easier to gain useful guidance at the workplace, which has a significant and advantageous impact on learning transfer. The study also discovered that the work environment, as determined by the variety, difficulty and trainee engagement incentive of the activity, had a positive impact on learning transfer. Similarly, according to Cooley et al. (2015) and Turke et al. (2017), outdoor group work skills programs are successful in fostering the development of interpersonal skills, viewpoints and information that might be used in degree programs and employment.

Cheng et al. (2015) developed an intention-based exercise transfer model grounded in the theory of planned behaviour, revealing that attitude, personal preference and perceived behavioural control positively influence transfer intention, serving as a mediator of knowledge and skill transfer. The role of apprentices in transportation has been overlooked in previous studies, and the trainees' intentions to transfer their knowledge to the workplace are central to achieving the objectives of the training. Additionally, it has been observed that people earning higher wages tend to be happier than those earning lower wages (Yang et al., 2022). Iqbal and Dastgeer (2017) believe that the higher the self-efficacy of employees, the greater their ability to transfer knowledge in training. Overall, these studies highlight the importance of evaluating and improving training programs to ensure that graduates meet industry standards and succeed in their careers.

2.3. Transformation of knowledge and skills: The context of the LSCM program design

The logistics and supply chain industry have experienced increasing competitiveness, placing pressure on human resources departments to recruit

employees with the appropriate competencies to gain a competitive edge. As highlighted by Jena and Ghadge (2021), changes in education requirements have prompted institutions to recognise the significance of understanding logistics programs to remain viable. Consequently, institutions must conduct a training-needs analysis, as recommended by Sadik (2015), to ensure their programs impart marketable competencies. Reflecting the diverse nature of the contemporary logistics sector, higher education institutions are transitioning from traditional curriculum designs to interdisciplinary ones, as indicated by Jena and Ghadge (2021). This perspective aligns with the findings of Audunsson et al. (2018), who observed that the environment is ‘VUCA’ (volatile, uncertain, complex and ambiguous), necessitating the development of programs that incorporate a greater number of non-logistics courses. Jena and Ghadge (2021) argue that industry experts should collaborate with the academic sector to impart recent knowledge trends and skills. A partnership model between industry and higher education institutions could be employed to create a more competitive logistics curriculum.

3. Methods

3.1. Research design and participants

Figure 1 summarize the mechanism and processes of the study methodology.

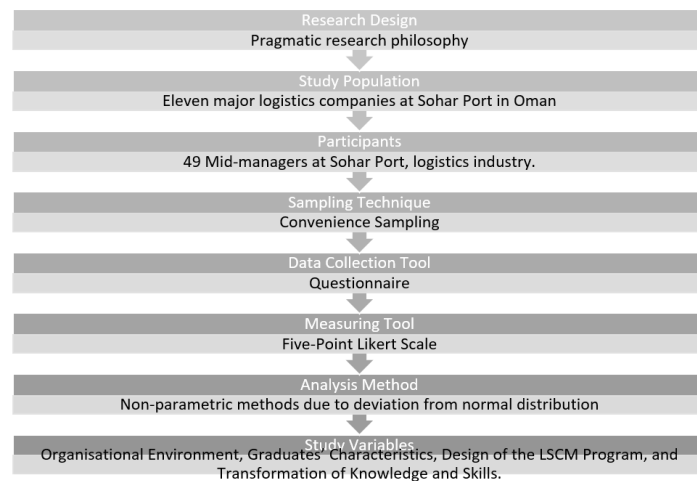


Figure 1. Mechanism and processes of the study methodology.

The study employed a pragmatic research philosophy, utilising a structured questionnaire as a data collection tool. To investigate the transformation of knowledge and skills among entry-level graduates, the study targeted mid-managers tasked with supervising the performance of entry-level employees. Convenience sampling was utilised as the sampling technique, enabling the rapid and efficient collection of data to address practical concerns promptly. The study’s sample consisted of 49 mid-managers in the logistics industry employed at Sohar Port. The questionnaire was designed as a self-administered survey. Target respondents were identified by visiting the management of targeted companies, ensuring that the survey reached appropriate participants. After identification, the questionnaire was distributed electronically via an online platform (google form). The limited scope of the research question was a

significant factor leading to the utilisation of a small sample size in this study. The research is specifically focused on the logistics industry within the Sohar Port region, which inherently limits the pool of available participants. Within this context, mid-managers emerge as a particularly crucial group due to their pivotal role in facilitating the transfer of knowledge and skills to entry-level graduates. This specific population can offer invaluable insights into the dynamics of knowledge and skills transformation among entry-level graduates within the logistics industry. The study was conducted at the eleven largest logistics companies operating in Sohar Port, including Hutchison Ports Sohar, C. Steinweg Oman, Oiltanking, Vale Oman, OQ, Liwa Plastics Industries, Sohar Steel, Sohar Aluminium, Jiangsu Chanbao Steel Tubes, Oman Copper Tubes Mill and Oman Aluminium Rolling Company SPC.

Figure 2 illustrates the characteristics of the sample. Approximately 50% of the respondents were professionals engaged in logistic operations, while the remaining participants were distributed across various areas including LSCM, marketing, human resource management, research and development, accounting and information technology. The sample comprised 69.4% males and 30.6% females. The majority of participants fell within the age range of 30–49 years (46.9%), followed by those aged 20–29 years (26.5%), 40–49 years (22.4%) and 50–59 years (4.1%). Slightly over 50% of the respondents supervised 1–9 subordinates specialised in LSCM, with 22.4% overseeing 10–19 employees, 6.1% managing 20–29 employees and 20.4% supervising more than 30 employees. Further details regarding relevant years of experience are elaborated on in **Figure 2**.

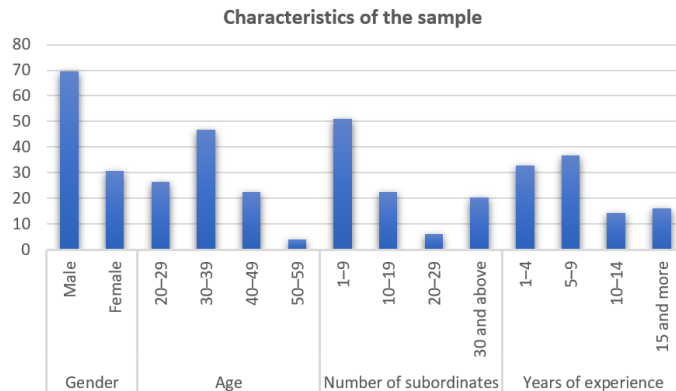


Figure 2. Characteristics of the sample.

3.2. Research conceptual framework and instrument

The conceptual framework of the study was constructed by incorporating two primary theories: the knowledge-based view and the social learning theory. To offer a more comprehensive understanding of the phenomenon under investigation, the study examined three main variables: organisational environment, graduates’ characteristics and the design of the LSCM program.

The organisational environment comprises variables pertaining to the degree to which an organisation values the knowledge and skills brought in by entry-level graduates. These variables also encompass whether the organisation trusts the knowledge and skills of entry-level graduates and provides existing career paths that incentivise them to apply this knowledge and skill to their work. Additionally, as

demonstrated by Huda et al. (2022), if the remuneration system of the organisation motivates entry-level graduates to apply their acquired knowledge and skills from HEIs to their tasks, this may also impact their willingness to transfer their skills.

The characteristics of entry-level graduates encompass variables related to cognitive ability, self-efficacy, motivation to learn and intention to transfer knowledge and skills. The cognitive ability and self-efficacy of graduates may influence their capacity to acquire and transfer knowledge and skills. Similarly, if they are motivated to learn and possess a strong intention to transfer their knowledge and skills, they are more likely to do so effectively. The literature review illustrates that these variables serve as crucial predictors of the successful transmission of knowledge and skills among employees. Employers can utilise these variables to identify employees who are more likely to effectively apply new knowledge and skills to their job and tailor training and development programs accordingly, thus increasing the likelihood of successful knowledge and skill transfer. For instance, a study by Ree and Earles (1991) found that cognitive ability was positively related to the acquisition of job-related knowledge and skills. Bandura (1997) and Procházka et al. (2017) found that self-efficacy was a key factor in transforming knowledge and skills into job performance, while Noe et al. (2014) and Chauhan et al. (2016) observed that employees' motivation to learn was positively related to their ability to transfer newly acquired knowledge and skills to the job. A study by Pletsch and Zonatto (2018) posited that employees with a stronger intention to transfer their newly acquired knowledge and skills to their job were more likely to be successful.

The design of the LSCM program includes a variable that pertains to how the program is structured, which in turn can affect the degree to which entry-level graduates are able to transfer their knowledge and skills. This includes factors such as professional competence, encompassing the ability to apply knowledge, leadership and teamwork skills, as well as communication skills. Furthermore, proficiency in using information and communication technology to access, analyse and report relevant information to diverse audiences, along with the practice of professional work ethics, and the evaluation and application of socio-cultural-legal dimensions, may also influence their ability to transfer knowledge and skills.

The transformation of knowledge and skills variable relates to the extent to which entry-level graduates are committed to the organisation and willing to participate in its development. If they are committed and willing to participate, they may be more willing to transfer their knowledge and skills to improve the organisation. However, if they are worried about proposing change initiatives, this may impact their willingness to transfer their knowledge and skills. The questionnaire **Table 1** shows the questionnaire items in all five sections.

A five-point Likert scale was utilised to gauge the perspective of mid-managers regarding their perception of the knowledge and skills transfer of entry-level graduates. The Likert scale encompassed the following response options: 'strongly agree', 'agree', 'neutral', 'disagree' and 'strongly disagree'. Each response option was assigned a numerical value, with 'strongly agree' being allocated the highest value and 'strongly disagree' the lowest. By employing a Likert scale, the study was able to quantify the attitudes and perceptions of mid-managers in a structured manner, facilitating easy comparison and analysis of the data. This tool is commonly utilised

in social science research to measure subjective opinions or attitudes on a standardised scale.

Table 1. Questionnaire items.

Variables	Included items
Organisational environment	1. Collaborative Knowledge Trust
	1. Career Incentives for Knowledge Sharing 2. Knowledge-Driven Remuneration
Entry-level graduates' characteristics	1. Cognitive Application Aptitude
	2. Continuous Learning Motivation
	3. Transfer Intentions from HEIs
	4. Self-Efficacy
LSCM program design	1. Applied Professional Competence
	2. Collaborative Leadership and Teamwork Skills
	3. Effective Communication Proficiency
	4. Ethical and Socio-cultural Work Practices
	5. ICT Proficiency for Information Management
Transformation of knowledge and skills	1. Commitment to Organisational Development
	2. Concerns and Initiatives for Change

3.3. Reliability and validity

The reliability of the used instruments was measured by Cronbach's Alpha, which indicated an acceptable level of reliability ($Alpha = 0.756$). Cronbach's alpha is a widely used statistic in research to assess the internal consistency reliability of tests and scales. It is a measure that indicates how well the items in a scale are correlated with each other. When calculating Cronbach's alpha, a value closer to 1 indicates higher internal consistency, suggesting that the items in the scale are measuring the same underlying construct (McNeish, 2018). To ensure content validity, The instrument was reviewed by five experts from both higher education institutions and the logistics and supply chain sectors based on their extensive theoretical and practical expertise in designed construct. Minor modifications received on some of the item's clarity, in specifically, 3 items in section B and 3 items in section C and 1 items in section D. Following implementation of expert feedback, the experts confirmed that the statements are clear and relevant to the measured construct.

3.4. Data analysis

Data distribution was evaluated using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The the Kolmogorov-Smirnov and Shapiro-Wilk test is particularly effective in detecting deviations from normality, especially in cases of asymmetric distributions (Shapiro and Wilk, 1965). If the p-value from the Shapiro-Wilk test exceeds the chosen significance level (typically 0.05), it indicates that the data can be considered normally distributed. Conversely, if the p-value is less than 0.05, it indicates non normal distributed data. The results for this study indicated significant deviation from normal distribution for all study constructs ($p < 0.001$). A

transformation attempt was applied by conducting Square Root Transformation. the square root transformation is a versatile tool used across various disciplines to address issues related to data distribution (Behning et al., 2021); however, the Kolmogorov-Smirnov and Shapiro-Wilk tests remained significant ($p < 0.001$). Thus, the study considered non-parametric methods in data analysis. The details of employed analysis test are discussed in next section which is “Findings and discussion”.

4. Findings and discussion

4.1. Descriptive analysis

Table 2 depicts the means, standard deviations and variances of the study variables. The organisational environment is perceived with a moderate mean score of 3.244 ($SD = 0.775$, $Var = 0.601$), showcasing relatively low variability in participants’ perceptions. Entry-level graduates’ characteristics exhibit a notably high mean of 4.538 ($SD = 0.332$, $Var = 0.110$), signifying consistent and positive perceptions with minimal variability. Similarly, the LSCM Program Design is characterised by a moderate mean score of 3.994 ($SD = 0.596$, $Var = 0.355$), reflecting moderate variability in participant responses. The Transformation of Knowledge and Skills reveals a high mean of 4.153 ($SD = 0.560$, $Var = 0.315$), indicating positive perceptions with moderate variability.

Table 2. Descriptive statistics of the study variables.

S.L	Variables	Mean	Std. Deviation	Variance
	Organisational environment	3.244	0.775	0.601
1	Collaborative Knowledge Trust	2.142	1.060	1.125
2	Career Incentives for Knowledge Sharing	3.959	.911	0.832
3	Knowledge-Driven Remuneration	3.632	1.236	1.529
	Entry-level graduates’ characteristics	4.538	0.332	0.110
1	Cognitive Application Aptitude	3.857	0.816	0.667
2	Continuous Learning Motivation	4.061	0.801	0.642
3	Transfer Intentions from HEIs	4.000	0.816	0.667
4	self-efficacy	4.061	0.801	0.642
	LSCM program design	3.994	0.596	0.355
1	Applied Professional Competence	3.857	0.912	0.833
2	Collaborative Leadership and Teamwork Skills	4.755	0.480	0.230
3	Effective Communication Proficiency	4.775	0.421	0.178
4	Ethical and Socio-cultural Work Practices	4.816	0.391	0.153
5	ICT Proficiency for Information Management	4.489	0.581	0.338
	Transformation of knowledge and skills	4.153	0.560	0.315
1	Commitment to Organisational Development	4.449	0.614	0.378
2	Concerns and Initiatives for Change	3.857	0.935	0.875

The organisational environment encompasses sub-constructs such as Collaborative Knowledge Trust ($Mean = 2.142$, $SD = 1.060$, $Var = 1.125$), The low

mean score indicates a generally poor perception of trust within the organization concerning knowledge collaboration. It suggests that employees might feel insecure or hesitant to share or collaborate using their knowledge, which could impact organizational learning and innovation. The high standard deviation and variance reflect significant discrepancies in how individuals perceive collaborative knowledge trust. This wide range suggests that while some employees may experience a supportive environment, others feel quite the opposite, indicating a potential area for organizational development. Career Incentives for Knowledge Sharing (*Mean* = 3.959, *SD* = 0.911, *Var* = 0.832) This high mean score suggests that the organization is perceived as effectively recognizing and rewarding knowledge sharing, which can motivate employees to contribute their expertise. The moderate variability indicates that while there is generally positive feedback, some discrepancies exist in how incentives are perceived across different departments or levels within the organization. Knowledge-Driven Remuneration (*Mean* = 3.632, *SD* = 1.236, *Var* = 1.529) A relatively high mean score indicates that remuneration linked to knowledge-driven activities is perceived positively, suggesting that employees see a clear link between their knowledge contributions and their compensation. The highest variability among the sub-constructs suggests diverse opinions about the effectiveness and fairness of the remuneration system. This could point to inconsistencies in how remuneration policies are implemented or understood across the organization. Despite the variability, these sub-constructs collectively depict the organisational environment as moderately perceived by participants.

Entry-level graduates' characteristics include sub-constructs such as Cognitive Application Aptitude (*Mean* = 3.857, *SD* = 0.816, *Var* = 0.667) Indicates a high level of aptitude among graduates in applying cognitive skills in practical settings, essential for effective problem-solving and decision-making in professional environments. Moderate variability suggests a generally consistent perception, though some graduates may differ in their ability levels. Continuous Learning Motivation (*Mean* = 4.061, *SD* = 0.801, *Var* = 0.642) reflects a strong intrinsic motivation among graduates to pursue ongoing professional development and learning, which is crucial for adapting to evolving industry demands. Standard Deviation and Variance both indicate consistency in high motivation across the sample, supporting the view that these graduates are well-prepared to engage in lifelong learning., Transfer Intentions from HEIs (*Mean* = 4.000, *SD* = 0.816, *Var* = 0.667) This means score reflects a strong intention and ability among graduates to transfer the knowledge and skills acquired in higher education institutions to the workplace. Self-Efficacy (*Mean* = 4.061, *SD* = 0.801, *Var* = 0.642) the mean indicates high average self-efficacy suggests that graduates feel confident in their abilities to meet job demands and overcome challenges, an important predictor of workplace success. Collectively, these attributes contribute to a positive perception, emphasising the robust characteristics of entry-level graduates.

The LSCM Program Design includes Applied Professional Competence (*Mean* = 3.857, *SD* = 0.912, *Var* = 0.833) the mean score indicates that the LSCM program effectively equips students with applicable professional skills, though there is room for improvement to reach excellence. Moderate variability suggests differences in how students perceive the applicability of the skills they are learning. Collaborative

Leadership and Teamwork Skills ($Mean = 4.755, SD = 0.480, Var = 0.230$) extremely high mean score reflects that the program excels in preparing students with necessary leadership and teamwork skills, crucial for today’s collaborative work environments. The low values of variability indicate a uniform perception among participants, highlighting a strong area of the program. Effective Communication Proficiency ($Mean = 4.775, SD = 0.421, Var = 0.178$), Ethical and Socio-cultural Work Practices ($Mean = 4.816, SD = 0.391, Var = 0.153$) and ICT Proficiency for Information Management ($Mean = 4.489, SD = 0.581, Var = 0.338$) show that the program is particularly strong in developing communication, ethical standards, and ICT skills, all essential for the modern workforce.. Collectively, these components contribute to this perception, highlighting the positive impact of the LSCM program.

The Transformation of Knowledge and Skills encompasses sub-constructs such as Commitment to Organisational Development ($Mean = 4.449, SD = 0.614, Var = 0.378$) where the mean score Indicates a strong commitment among entry graduates to apply their skills and knowledge towards organizational development, demonstrating the effectiveness of the learning environment in instilling a sense of responsibility. Moderate variability reflects some differences in personal commitment levels, which could be influenced by individual experiences and perspectives. Concerns and Initiatives for Change ($Mean = 3.857, SD = 0.935, Var = 0.875$), indicating that entry graduates are proactive in identifying and addressing organizational issues, suggesting a dynamic and responsive learning environment. Higher variability in this sub-construct could indicate that while some participants are very active in initiating change, others may be less involved, pointing to areas where further encouragement or support might be needed.

4.2. Correlation analysis

Table 3 presents the results of Spearman’s rho correlation coefficients analysis of the study variables. The dependent variable is Transformation of Knowledge and Skills (KT), while the independent variables are Organisational Environment (Env), Entry-level Graduates’ Characteristics (GC) and LSCM Program Design (LSCM).

Table 3. Spearman’s rho correlation coefficients analysis of the study variables.

	ENV	GC	LSCM	KT
ENV	1	-	-	-
GC	0.400**	1	-	-
LSCM	0.041	0.288*	1	-
KT	0.198	0.501**	0.476**	1

** : Correlation is significant at the 0.01 level (2-tailed). * : Correlation is significant at the 0.05 level (2-tailed).

As illustrated in **Table 3**, entry-level graduates’ characteristics positively and significantly influenced the transformation of knowledge and skills (GC; $\beta = 0.501, p < 0.001$), followed by LSCM program design (LSCM; $\beta = 0.476, p < 0.001$). The positive correlation suggests that graduates with favourable characteristics, such as motivation, cognitive aptitude and intention to transfer knowledge, are associated with a more substantial transformation of knowledge and skills within the organisational

context. Furthermore, a well-designed LSCM program, including learning attributes such as professional competence, leadership skills, communication proficiency and ethical practices, is correlated with an increase in the level of knowledge and skills transformation among entry-level graduates. This is consistent with several studies that have reported the importance of employee characteristics in the transformation of knowledge and skills (Cheng et al., 2015; Iqbal and Dastgeer, 2017; Kenyon, 2016; Nafukho et al., 2017). Moreover, the positive impact of program design on the transformation of knowledge and skills is further supported by the findings of Al-Swidi and Al Yahya (2017), who highlighted the positive impact of training program design on the transformation of knowledge and skills along with the importance of learning style as a predictor of training transfer intention.

However, the relationship between the organisational environment (ENV) and the transformation of knowledge and skills was positive but insignificant ($\beta = 0.198$, $p = 0.553$). This finding contradicts the results of several researchers who have reported the importance of the organisational environment in the transformation of knowledge and skills. Previous literature has found that organisational support plays a key role in facilitating knowledge and skills sharing (Nafukho et al., 2017; Zumrah and Boyle, 2015). Moreover, many authors have also highlighted that the success of training transfer is heavily dependent on supervisors' support, and organisations must arrange supervisory roles in a manner that ensures maximum training transfer (Al-Swidi and Al Yahya, 2017; Chauhan et al., 2017; Ghosh et al., 2015; Prince et al., 2015). Furthermore, Hughes et al. (2019) reported that peer support can boost trainees' motivation to impart newly acquired abilities. An interpretation of this study finding is that the organisational environment (i.e., Sohar port, Oman) does not facilitate the transformation of knowledge and skills for entry-level graduates. Hence, strategic changes are required to enable and motivate the transfer.

In terms of the correlation coefficient among the independent variables, the result shows a positive but significant relationship between entry-level graduates' characteristics and LSCM program design ($\beta = 0.288$, $p = 0.045$), as well as between the organisational environment and entry-level graduates' characteristics ($\beta = 0.400$, $p = 0.004$). However, there is a positive and insignificant relationship between LSCM program design and the organisational environment ($\beta = 0.041$, $p = 0.778$). This finding may be explained by the idea that there is a lack of interaction between industry and HEIs, as several researchers have indicated the importance of university-industry collaboration (Awasthy et al., 2020; Castro et al., 2018; Chais et al., 2018).

4.3. Ordinary least squares regression (OLS) analysis

Ordinal Logistic Regression (OLS) analysis was conducted to examine the impact of independent variables, including Organisational Environment (ENV), Entry-level Graduates' Characteristics (GC) and LSCM Program Design (LSCM), on the dependent variable Transformation of Knowledge and Skills (KT). **Table 4** provides an overview of the regression model's performance. The *R*-square value is 0.413, indicating that approximately 41.3% of the variance in the dependent variable is explained by the independent variables.

Table 4. Model summary.

Model	R	R Square	Adjusted R Square	Std. error of the estimate
1	0.643 ^a	0.413	0.374	0.44375

Predictors: (Constant), LMSC, Env, GC.

Table 5 presents the Analysis of Variance (ANOVA), which assesses the overall significance of the regression model. The *p*-value is 0.001, associated with the *F*-statistic ($F = 10.565$), indicating that at least one of the independent variables significantly contributes to the prediction of the dependent variable (KT). Thus, the model is statistically significant. Additionally, multicollinearity among the model variables was assessed. The tolerance values of all independent variables were found to be greater than 0.2 (Organisational environment = 0.909; Entry-level graduates’ characteristics = 0.917; and LSCM program design = 0.959). Additionally, the Variance Inflation Factor of all independent variables was 1.1, 1.09 and 1.04, respectively. Hence, the Variance Inflation Factor value of all variables confirms no multicollinearity, as the values are less than 5 (Kim, 2019). In line with the structural regression analysis interpretation, these results are of great interest in understanding the knowledge and skills requirements in the Sultanate of Oman. The results show moderate predictive power with a moderate correlation between the independent and dependent variables. The results imply that organisational environment, entry-level graduates’ characteristics, and LSM program design are important variables to be considered by logistics companies in enhancing the knowledge and skills of entry-level graduates. Interpreting the results using the R^2 and R^2 the results are surprisingly lower than expected, hence suggesting the model may not fit the data. Citing Hair et al. (2017) consider the results given the complexity of the model and the pragmatic nature of the study. Pertinent to note in the study is the need to carry out further studies especially involving more robust data collection and analysis procedures to understand the effect. Relatedly the study results point to the fact that the Organisational environment, Entry-level graduates’ characteristics, and LSCM program design are important factors to be considered by different stakeholders in Oman to Transforming of Knowledge and Skills.

Table 5. Analysis of variance.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	6.241	3	2.080	10.565	<0.001
1 Residual	8.861	45	0.197	-	-
Total	15.102	48	-	-	-

Table 6 presents the coefficients of Ordinary Least Squares Regression Results. The coefficient for Entry-level Graduates’ Characteristics (GC) is positive and significant ($\beta = 0.299$, $p = 0.019$), indicating that, holding other variables constant, a one-unit increase in Entry-level Graduates’ Characteristics is associated with a 29.9% increase in the Transformation of Knowledge and Skills (KT). These results provide an interesting and relevant understanding of the study in that it brings the importance of entry-level graduates to the transformation of knowledge and skills. This implies

graduates bring in valuable skills and knowledge hence it becomes of paramount importance to retain such employees with certain skill sets for organisation performance. Additionally, the coefficient for LSCM Program Design (LSCM) is strongly positive and significant ($\beta = 0.852, p = 0.001$), implying that, holding other variables constant, a one-unit increase in LSCM is associated with a substantial 85.2% increase in the Transformation of Knowledge and Skills (KT). Continuous professional development remains a critical component of organisational success. This assertion is confirmed by the study results in that they are an indication that investment in LSCM program design has a contribution to improving employees' knowledge and skills. Pertinent to these results is that the organisation needs to continuously investigate its training competence and aim to enhance the employee skills and knowledge to remain competitive. However, the coefficient for Organisational Environment (ENV) is negative and insignificant ($\beta = -0.058, p = 0.529$), suggesting that, holding other variables constant, a one-unit increase in Organisational Environment is associated with a decrease of 0.058 units in the Transformation of Knowledge and Skills (KT). The results are critical in understanding the study since it indicates the fact that the organisational environment though relevant may not have a significant contribution to transforming knowledge and skills. Therefore, it is detrimental for the LSCM industry to comprehend the different relationships that are critical in influencing the knowledge and skills development that enhances organizational competitive advantage in Oman.

Table 6. Ordinary least squares regression results.

Model	Unstandardised Coefficients		Standardised Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	-0.717	0.926	-		-0.774	0.443	-	-
1 Env	-0.058	0.092	-0.080		-0.634	0.529	0.815	1.227
GC	0.299	0.122	0.317		2.442	0.019	0.772	1.295
LSCM	0.852	0.199	0.504		4.276	<0.001	0.937	1.067

Dependent variable: KT.

Figure 3 depicts the results of the structural equation model generated through the Analysis of Moment Structures (AMOS) software. According to Hooper et al. (2008), a model fit is considered good if CMIN/DF is less than 5, the Conformity Fit Index (CFI) and Tucker and Lewis (1973) Index (TLI) are greater than 0.9, and the Root Mean Square Error Approximation (RMSEA) is between 0.05 and 0.08. The model fit indices for our study fall within the acceptable range (degrees of freedom = 72, $p = 0.044$, $CMIN/DF = 1.3$, $CFI = 0.928$, $TLI = 0.909$, $RMSEA = 0.079$). The squared multiple correlation was 0.74 for the transformation of knowledge and skills, indicating that 74% of the variance in the transformation of knowledge and skills was accounted for by entry-level graduates' characteristics, the industry environment and the LSCM program design.

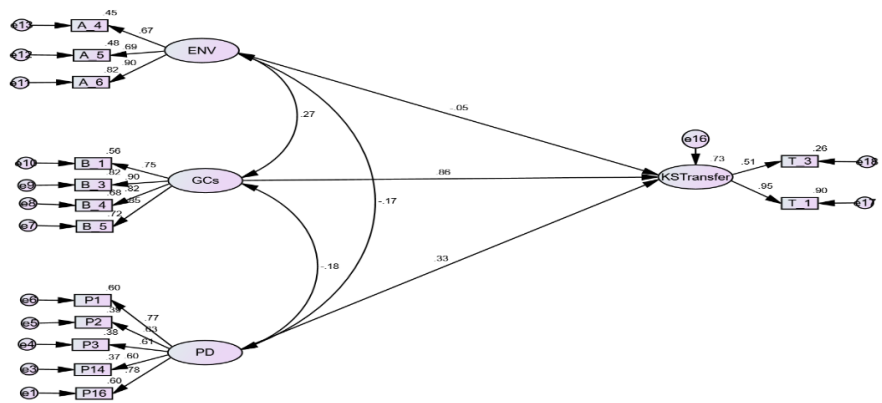


Figure 3. The structural equation model of Transformation of knowledge and skills (KSTransfer) influenced by the organisational environment (ENV), entry-level graduates’ characteristics (GC) and LSCM program design (LSCM).

As illustrated in **Figure 3**, among the entry-level graduates’ characteristics (GC), self-efficacy (B3) exhibited the highest impact with a loading factor of 0.82, followed by the intention to transfer (0.72), motivation to learn (0.68) and cognitive ability (0.56). These characteristics of graduates demonstrate a significant and positive influence on the transformation of knowledge and skills. This finding aligns with previous studies by Kenyon (2016) and Iqbal and Dastgeer (2017), who reported a positive correlation between self-efficacy, motivation and the intention to transfer trained skills. Furthermore, individuals with high self-efficacy may attain superior results in training while also striving for knowledge transfer. Regarding the LSCM program design (PD), the components ‘professional competence and ability to apply knowledge’ and ‘practice professional work ethics and evaluate and apply socio-cultural-legal dimensions’ exhibited the highest impact with a loading factor of 0.60, followed by leadership and teamwork skills (0.39), communication skills (0.39) and utilising information and communication technology (ICT) in accessing, analysing and reporting to diverse audiences on relevant information (0.37). The LSCM program design significantly and positively influenced the transformation of knowledge and skills. However, within the organisational environment factors, the remuneration system exhibited the highest impact with a loading factor of 0.82, followed by career paths incentive (0.48) and organisation trust in shared knowledge and skills by entry-level graduates (0.45). Despite these strong loading factors, these organisational environment factors show an insignificant and negative influence on the transformation of knowledge and skills. This observation aligns with the findings of Zumrah and Boyle (2015) and Prince et al. (2015), who reported that the reward system and career paths incentive emphasise job satisfaction and demonstrate a positive relationship with the effectiveness of the workplace’s transfer of training.

5. Conclusion

This study aimed to examine and assess the impact of the logistics industry’s environment, entry-level graduates’ characteristics, and the LSCM program on the transformation of knowledge and skills at Sohar Port in Oman. The study collected data through a self-administered questionnaire, with a sample size of 49 logistics

industry mid-managers working at Sohar Port. The findings indicate that entry-level graduates' characteristics positively and significantly influenced the transformation of knowledge and skills, followed by the LSCM program design. However, the impact of the organisational environment on the transformation of knowledge and skills was found to be negative and insignificant. An interpretation of this finding suggests that the organisational environment in Sohar Port may not be conducive to supporting the transformation of knowledge and skills for entry-level graduates. In terms of the correlation coefficient among the independent variables, the results revealed a negative and insignificant relationship between entry-level graduates' characteristics and the LSCM program design, as well as between the LSCM program design and the organisational environment. However, a positive and insignificant relationship between the organisational environment and entry-level graduates' characteristics was observed. This finding may be explained by the idea that there is a lack of interaction between the industry and higher education institutions. Among the entry-level graduates' characteristics, self-efficacy showed the highest impact, followed by intention to transfer, motivation to learn and cognitive ability. These graduates' characteristics collectively depict a significant and positive influence on the transformation of knowledge and skills. Additionally, within the LSCM program design (PD), 'professional competence and ability to apply knowledge' and 'practice professional work ethics and evaluate and apply socio-cultural-legal dimensions' exhibited the highest impact, followed by leadership and teamwork skills, communication skills and using information and communication technology in accessing, analysing and reporting to diverse audiences on relevant information. This LSCM program design significantly and positively influences the transformation of knowledge and skills. However, among the organisational environment factors, the remuneration system displayed the highest influence, followed by career paths incentive and organisation trust of shared knowledge and skills of entry-level graduates. These organisational environment factors were found to insignificantly and negatively influence the transformation of knowledge and skills.

Implications for practice

According to the study findings, we suggest several recommendations for the logistics and supply chain sector in Oman to enhance the transformation of knowledge and skills by entry-level graduates:

- 1) **HEIs:** To meet sector requirements, HEIs may enhance current academia-industry collaborations by increasing industry input in designing and developing the LSCM program. Meanwhile, more efforts are needed to focus on improving and enhancing graduates' characteristics, particularly self-efficacy, intention to transfer knowledge and skills, motivation to learn and cognitive ability.
- 2) **Organisational environment:** The current situation in the sector does not support the transformation of knowledge and skills for entry-level graduates. Organisations should recognise the crucial role they play in this transformation. They must understand the positive relationship between an organisation's support and the transformation of knowledge and skills. Furthermore, organisations need to reconsider the transformation of knowledge and skills by entry-level graduates

in their strategic resource management plan. This emphasis should be reflected in the remuneration system and career path incentives.

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