Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 10, 250-262
2026
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v10i10.13717
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The differential impact of occupational hazards and organizational support on work-life balance across a cross-cultural agri-digital supply chain

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Abstract: As digital technologies transform agricultural trade, complex agri-digital supply chains involving culturally diverse workforces are emerging. This study investigates the differential impacts of physical and psychosocial occupational hazards on work-life balance (WLB) within the premium durian supply chain linking Malaysia and China. Data were collected from three key occupational groups (N = 70) comprising durian farmers and packers in Malaysia, cold chain logistics workers, and livestream e-commerce sellers in China. Using structural equation modeling (SEM) with bootstrapping, the study tested a framework connecting hazards to WLB through physical and mental health mediators, with perceived organizational support (POS) as a moderator. The results demonstrate that all hypothesized relationships are statistically significant. Physical hazards impair the WLB of Malaysian farmers and logistics workers both directly and indirectly through physical health. Psychosocial hazards characterized by role ambiguity and high-speed digital demands diminish the WLB of livestream sellers both directly and indirectly through mental health. Crucially, POS was found to significantly buffer these negative effects across both groups. The nature of effective support varied by context: structured institutional support was most effective for Malaysian workers, while flexible platform-based support was vital for Chinese digital sellers. These findings offer a dual-perspective contribution to spill over theory and provide actionable insights for improving worker well-being in cross-border agri-digital ecosystems.

Keywords: *Agri-digital supply chain, Cross-cultural study, Durian industry, Occupational hazards, Perceived organizational support, Work-life balance.*

1. Introduction

Durian is often called the "King of Fruits" in Southeast Asia [1], where it has been a favourite for its unique flavour and distinctive aroma. Over the years, it has moved far beyond its roots as a local delicacy toward becoming a high-value export in the global agricultural market. This transformation is most evident in the Malaysia-China trade corridor, where demand for premium durians has risen sharply due to growing Chinese disposable incomes and the fruit's status as a luxury product [2]. The pace of this growth is striking: Malaysia's exports of frozen whole durians to China increased by more than 50% in 2021 compared to the previous year [3]. One of the main drivers of this boom is a modern agri-digital supply chain that links Malaysian orchards directly to Chinese customers through advanced cold-chain systems and dynamic live-stream e-commerce platforms [4]. At the same time, global trade has been changing rapidly, placing increased pressure on agricultural supply chains to integrate with digital platforms and online marketplaces [5]. In this global context, the durian supply chain represents a unique example of how digitalization is transforming work along the entire value chain [6]. However, behind the technological efficiency of these systems lie complex and often overlooked human challenges.

The main diverse workforce (illustrated in Figure 1) which ranges from farm labourers in Malaysia to live-stream hosts in China, operates under a set of demanding physical and psychosocial conditions

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History: Received: 6 August 2026; Revised: 24 September 2026; Accepted: 28 September 2026; Published: 23 October 2026
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that threaten both their health and WLB. Looking at the farm workers in Malaysia, the reality they face is the risks coming from many different directions. Physically, harvesting the heavy, spiked fruit at height and on the ground puts them at risk of musculoskeletal injuries [7], and being around fertilisers and pesticides all the time raises more health concerns [8]. Psychosocial pressures are also very important for them because many of them are always afraid of losing their crops and the money problems that come with seasonal income patterns [9]. In the cold-chain and logistics sectors, the nature of the risks shifts, with workers having to deal with freezing temperatures, heavy loads, and the stress of keeping a cold supply chain running smoothly. A single mistake can lead to a lot of spoilage and a lot of money lost [10]. As for the Chinese live-stream sellers, the risks are more psychological than physical. The algorithmic settings and real-time audience metrics are always changing, which makes them work harder. These Chinese live-streamers often have to work odd hours and be online all the time to keep sales up. This can make them mentally tired and make it hard to tell the difference between work and personal life.

The needs of this cross-border durian supply chain create physical as well as psychological risks that are connected [2, 6, 11]. To deal with these risks, we need to look at the problem as a whole from different angles, such as agronomy, public health, information technology, and organizational psychology. Taking such an integrated perspective is increasingly important as human-capital risk management becomes central to sustaining resilience and long-term viability in modern globalized agri-digital trade. Although these three occupational groups are linked through a single high-value chain, their daily realities differ greatly. At the current stage, much of the existing research in occupational health tends to study such roles separately [12], offering limited insight into how physical and psychosocial hazards, health, and organizational support interact with one another in relation to the workers' WLB.

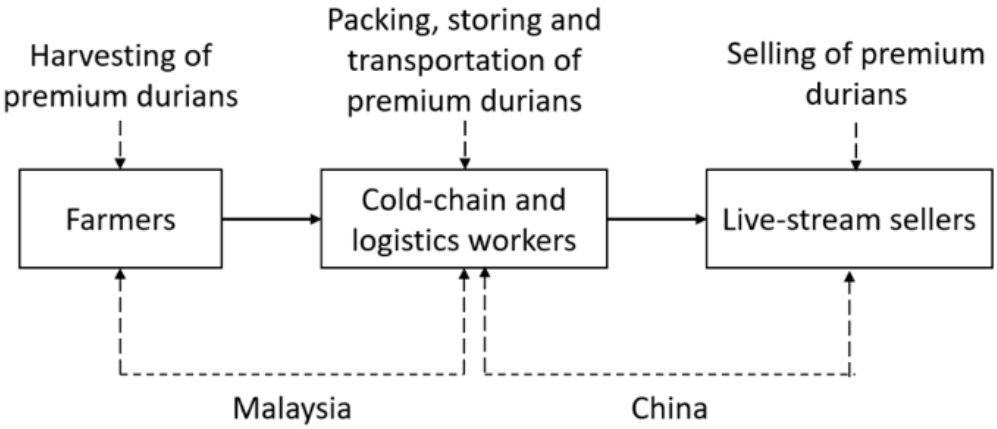


Figure 1.
Flowchart of the Main Workforce for the Premium Supply Chain.

1.1. Problem Statement and Research Gaps

Despite the rapid growth of agri-digital supply chains and their economic significance, there is a limited understanding of how occupational hazards differentially affect workers across culturally diverse contexts within the same supply chain. This knowledge gap is problematic for several reasons and manifests across multiple dimensions:

1.1.1. Fragmented Research Landscape

Existing research has predominantly focused on single-context studies.

Most occupational health research examines workers within a single country or cultural context [13], failing to capture the complexity of cross-border supply chains where workers performing

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ISSN: 2576-8484
Vol. 10, No. 10: 250-262, 2026
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interconnected roles face fundamentally different hazard profiles. This fragmentation limits our understanding of how occupational risks and their consequences vary systematically across the nodes of integrated production networks.

1.1.2. Sector-Specific Silos

Agricultural studies typically focus on farm-level physical hazards such as pesticide exposure and ergonomic risks [11], while digital commerce research emphasizes psychosocial stressors like emotional labour and time pressure [4]. Rarely are these examined within an integrated supply chain framework that recognizes how both physical and psychosocial hazards coexist and interact within interconnected production systems. This siloed approach obscures the differential vulnerabilities of workers performing complementary roles within the same value chain.

1.1.3. Limited Work-Life Balance Investigation in Agri-Digital Contexts

While WLB has been extensively studied in various occupational settings, its relationship with specific occupational hazards in agri-digital contexts remains underexplored [14]. Existing WLB research has primarily focused on office-based knowledge workers or manufacturing employees [15], with limited attention to the unique challenges faced by agricultural workers and digital platform workers operating within globally integrated supply chains. The mechanisms through which different types of hazards (physical vs. psychosocial) impair WLB across these diverse occupational contexts require systematic investigation.

1.2. Research Questions

To address these gaps, this study poses the following research questions:

1. How do physical occupational hazards affect work-life balance among Malaysian agricultural workers in the durian supply chain, and what role does physical health play in mediating this relationship?
2. How do psychosocial occupational hazards affect work-life balance among Chinese digital commerce workers in the durian supply chain, and what role does mental health play in mediating this relationship?
3. To what extent does perceived organizational support moderate the relationships between occupational hazards and work-life balance across these different occupational and cultural contexts?
4. What are the practical implications for designing context-appropriate interventions to improve worker well-being in cross-border agri-digital supply chains?

1.3. Research Objectives

This study aims to:

1. Examine the direct and indirect effects of physical occupational hazards on work-life balance through physical health mediators among Malaysian agricultural workers.
2. Investigate the direct and indirect effects of psychosocial hazards on work-life balance through mental health mediators among Chinese digital commerce workers.
3. Assess the moderating role of perceived organizational support in buffering the negative effects of occupational hazards on work-life balance across different cultural and occupational contexts.
4. Provide actionable, context-sensitive recommendations for improving worker well-being in cross-border agri-digital supply chains.

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2. Literature Review

2.1. Conceptual Framework

This study is grounded in a conceptual framework that identifies physical and psychosocial hazards as primary factors that affect WLB. At the same time, physical and mental health serve as the mediating variables, and POS acts as a key moderating factor, as shown in Figure 2 below. The moderating role of POS in the literature is a highly researched area, especially in the healthcare domain. In this regard, Chatterjee, et al. [16] found in their study that organizational support mitigates the negative impact of remote work stress on performance and satisfaction.

Similarly, Zhang, et al. [17] reported that POS enhances psychological resilience, which reduces the spillover of work-related strain into the personal life domain. These findings underscore that POS does not merely exert a direct positive influence but also amplifies the protective effects of health resources, making it a critical moderator in high-demand, cross-cultural work environments. At the same time, the Spill-Over Theory posits that experiences perceived in one role, such as work, can spill over into another role, such as family, leading to either positive or negative effects depending on the initial conditions in the first role [18].

The Compensation Theory posits that individuals may seek to rectify issues in one domain by deriving satisfaction from another domain to maintain overall well-being [19]. The principal theoretical contribution of this study lies in its analysis of the contradictory assumptions between the Spill-Over and Compensation Theories in a cross-cultural framework. It specifically examines whether adverse occurrences at work due to various hazards impact employees' personal lives or whether individuals can distinguish work-related stress from their personal lives and compensate for it to maintain equilibrium outside of work.

Additionally, this study addresses a significant gap in understanding how POS operates across different cultural and employment contexts. It compares the effectiveness of structured, institution-based support systems found in Malaysia's agricultural sector with the more fluid, platform-driven support mechanisms of China's digital gig economy. This cross-cultural comparison offers valuable insights into how organizational support strategies must be adapted to distinct labor environments to effectively reduce occupational risks, enhance well-being, and sustain a healthier WLB for workers across globalized supply chains. By integrating these theoretical perspectives and addressing the identified gaps, this research contributes to a more nuanced understanding of the dynamics among occupational hazards, POS, and WLB in diverse cultural settings.

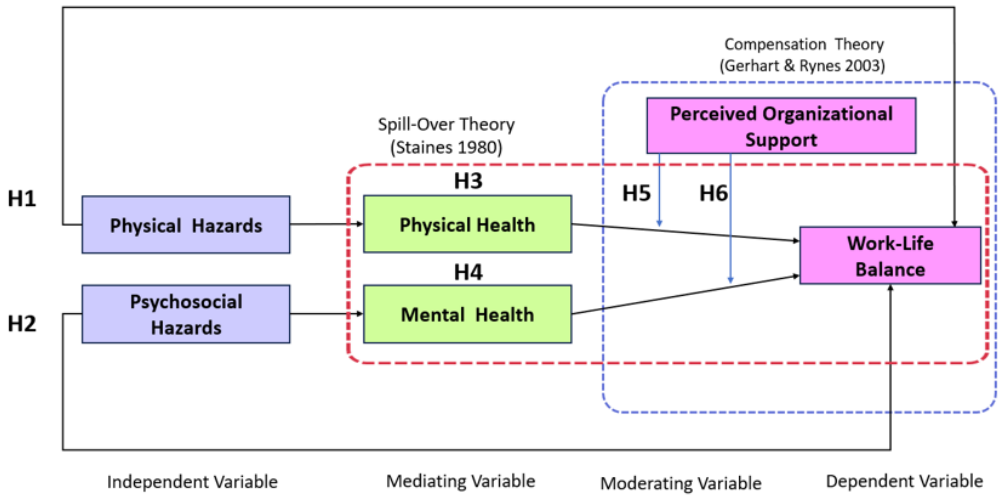


Figure 2.
Adopted Conceptual Model.
Source: Staines [20] and Gerhart and Rynes [21].

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Vol. 10, No. 10: 250-262, 2026
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2.2. Defining Key Constructs

Occupational hazards include a wide range of workplace conditions that can be harmful to the physical and mental health of workers. There are two main types of risks: physical hazards and psychosocial hazards. Physical hazards are real risks from the environment, like doing the same thing over and over [22], working in an awkward position [23], or being exposed to severe weather conditions [24]. Such issues are especially prevalent in agricultural contexts, including durian harvesting and packing [10]. These risks can lead to musculoskeletal disorders, fatigue, and other long-term health deterioration [22]. Psychosocial risks are just as important, even though they are not as obvious right away. Some of these risks include too much work, unclear job roles, and strained relationships with coworkers [25].

These kinds of stressors can make people mentally tired, anxious, and burned out, which can hurt their job performance and overall health. WLB, on the other hand, is the work-life balance that people try to keep between their work and personal lives [26]. This means using time, energy, and emotions wisely so that neither area gets too much of the other. WLB is multidimensional; it needs more than just enough time to be spent on both work and personal life; it also needs to be meaningful and satisfying. When WLB is achieved, it substantially enhances psychological well-being, job satisfaction, and overall quality of life [17]. However, sustaining this balance between work and life is quite challenging, especially in high-demand jobs such as those within cross-border agri-digital supply chains, which, in turn, highlights the relevance and necessity of this study. On the other hand, POS is the extent to which employees believe their organization values their contributions and, at the same time, cares about their well-being [27].

Employees who experience strong organizational support generally demonstrate higher motivation, loyalty, and job performance. POS may be demonstrated through formal policies, supportive managerial practices, flexible work arrangements, and other organizational initiatives [16].

Notably, the nature of organizational support varies considerably across diverse cultural and operational environments. For instance, workers in the Malaysian agricultural sector typically benefit from structured, institutionalized support systems, whereas individuals participating in China's digital gig economy rely more on adaptive, platform-based mechanisms. Understanding these contextual differences is essential for designing effective support strategies that enhance worker resilience, satisfaction, and overall well-being across different settings.

2.3. Theoretical Foundations

In the early 1980s, Staines came up with the Spill-Over Theory to explain how experiences in one area of life can affect experiences in another [20]. The theory suggests that emotions, stress, or positive feelings originating in the workplace can permeate an individual's personal life and conversely [28]. For instance, an employee who is under a lot of stress at work may bring that stress home with them, which could lead to problems with their family or make it harder for them to enjoy their free time. On the other hand, good work experiences can make people happier and healthier in general. This theory emphasizes the interrelation of life domains and the necessity of managing workplace stress to preserve healthy personal functioning. Conversely, Compensation Theory, as articulated by Gerhart and Rynes [21], posits that individuals proactively endeavor to mitigate dissatisfaction in one aspect of life by seeking fulfilment in another [21]. For example, workers who are stressed out or unhappy at work may try to make up for it by spending more time with their families, doing hobbies, or socializing. People can compensate for bad experiences in two ways: by adding to good experiences in other areas (supplementation) or by making up for bad experiences (reaction). The theory demonstrates how individuals deliberately manage their work-life balance to maintain overall well-being and psychological resilience.

Both Spillover Theory and Compensation Theory offer significant insights into the impact of workplace and personal experiences on WLB. Spillover Theory posits that workplace emotions and stress can permeate an individual's personal life, directly impacting their capacity to sustain a healthy

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DOI: 10.55214/2576-8484.v10i10.13717
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equilibrium between these spheres. Job stress or physical strain can make personal time less enjoyable and lower overall life satisfaction, which can make it harder to balance work and life. On the other hand, positive workplace experiences can enhance personal well-being and foster a more harmonious equilibrium.

Compensation Theory enhances this comprehension by underscoring the proactive role individuals assume in regulating their work-life equilibrium. When employees experience dissatisfaction or difficulties in their roles, they might react by allocating additional time and effort to their personal lives to regain equilibrium and safeguard their overall health. These theories show that work-life balance is a dynamic outcome affected by both the spillover of experiences from one area of life to another and the deliberate strategies people use to find a balance between their work and personal lives.

3. Methodology

3.1. Research Design

This study employed a cross-sectional survey design to examine the differential impact of occupational hazards and perceived organizational support on work-life balance among workers engaged in a cross-cultural agri-digital supply chain.

The design was chosen to capture a snapshot of the relationships among physical and psychosocial hazards, health mediators, organizational support, and work-life balance at a single point in time. This approach is effective for testing the hypothesized structural model and exploring moderation and mediation effects within diverse occupational groups across Malaysia and China.

3.2. Study Context and Population

The research focused on three key occupational groups within the premium durian supply chain connecting Malaysia and China: durian growers and packers based in Malaysia, cold-chain logistics personnel, and live-stream e-commerce sellers located in China. These groups were selected to represent the contrasting nature of physical and psychosocial hazards within both traditional agricultural and modern digital gig-economy contexts. The cross-cultural setting enabled an examination of how perceived organizational support operates differently across institutional and platform-based environments.

3.3. Sampling and Participant Recruitment

A purposive sampling strategy was employed to recruit participants actively engaged in the durian supply chain within their respective occupational roles. Due to the distinct characteristics and sizes of each group, the sample sizes varied accordingly. The durian growers and packers in Malaysia, being a relatively small and localized workforce, consisted of 20 participants. The cold-chain logistics personnel, representing a moderately larger group, included around 30 participants. Meanwhile, the live-stream e-commerce durian sellers in China, reflecting a specialized digital workforce, comprised 20 participants. Recruitment was facilitated through partnerships with local agricultural cooperatives, logistics firms, and digital platform operators.

3.4. Data Collection Procedures

Data were collected through structured questionnaires administered in person (for Malaysian agricultural and logistics workers) and online (for Chinese live-stream sellers) between [September 2025] and [November 2025]. The questionnaire was developed in English and translated into Bahasa Malaysia and Mandarin using a forward-backward translation process to ensure linguistic and conceptual equivalence. For the Chinese participants, an online Chinese WeChat survey platform with secure access was used. Measures were pilot tested with small subsamples (n=30) in each country to ensure clarity and reliability before full-scale data collection.

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Vol. 10, No. 10: 250-262, 2026
DOI: 10.55214/2576-8484.v10i10.13717
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3.5. Measures

The study employed validated scales adapted to the specific context of the cross-cultural agri-digital supply chain. All items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), unless otherwise noted. Physical hazards were measured using an adapted version of the Physical Workload and Environmental Conditions subscales from the Nordic Musculoskeletal Questionnaire [29] and the Occupational Safety and Health Administration [30]. Sample items included: "My job requires repetitive lifting or bending," "I am exposed to extreme temperatures during work," and "The work environment has inadequate lighting."

These items were chosen to capture ergonomic and environmental risks relevant to agricultural and logistics workers in the study context. The scale demonstrated good internal consistency in the pilot test (Cronbach's alpha = 0.82). Psychosocial hazards were assessed using selected dimensions from the Copenhagen Psychosocial Questionnaire (COPSOQ) [31], focusing on job demands, role clarity, and interpersonal conflict. Example items included: "I have to work very fast," "I am unsure about what is expected of me at work," and "I experience conflicts with my colleagues." These items were selected for their relevance to both traditional and digital work settings and adapted linguistically to fit the local cultural context. The scale showed satisfactory reliability (Cronbach's alpha = 0.85).

Physical health was measured through selected self-reported indicators adapted from the Short Form Health Survey (SF-12) physical health subscale [32]. Participants rated statements such as "I have experienced physical pain or discomfort related to my work" and "I feel physically exhausted at the end of the workday." These items were chosen to directly capture the physical health outcomes likely affected by occupational hazards. The subscale showed good reliability (Cronbach's alpha = 0.80).

Mental Health was assessed using some of the questions from the General Health Questionnaire (GHQ-12) [33], which captures symptoms of psychological distress and emotional well-being. Sample items included: "Have you recently felt constantly under strain?" and "Have you been able to enjoy your normal day-to-day activities?" Items were reverse-coded where appropriate to reflect mental health status. The scale showed high reliability (Cronbach's alpha = 0.88).

POS was measured using the Survey of Perceived Organizational Support (SPOS) developed by Eisenberger, et al. [34] and adapted to the study's cultural and occupational contexts. Sample items included: "My organization values my contribution," "My organization cares about my well-being," and "I feel supported by my employer when I face difficulties at work." For the Malaysian agricultural sector, additional items assessed structured institutional support, such as "I have access to formal support programs through my workplace." For Chinese digital workers, items were added to capture platform-based support mechanisms, for example, "The digital platform provides flexible support to help me manage work demands." The POS scale demonstrated strong internal consistency (Cronbach's alpha = 0.89).

WLB was measured using the Work-Life Balance Scale developed by Brough, et al. [35], which assesses time balance, involvement balance, and satisfaction balance. Sample items included: "I am able to spend enough time with my family and friends," "I am equally involved in my work and personal life," and "I am satisfied with how well I balance my work and personal life." This scale was chosen due to its multidimensional approach to WLB and its demonstrated validity across diverse occupational groups. The scale showed excellent reliability in this study (Cronbach's alpha = 0.92).

3.6. Data Analysis

Data were analyzed using Structural Equation Modeling (SEM) in AMOS 28. SEM was selected for its ability to simultaneously test complex relationships, including direct, indirect (mediated), and moderated effects among variables. The analysis proceeded in two stages:

Measurement Model Assessment: Confirmatory Factor Analysis (CFA) was conducted to evaluate the validity and reliability of the measurement instruments across the three occupational groups. The model fit indicators included the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

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Vol. 10, No. 10: 250-262, 2026
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Structural Model Testing: Hypotheses concerning the direct effects of physical and psychosocial hazards on work-life balance, the mediating roles of physical and mental health, and the moderating influence of POS were tested. Multi-group SEM analyses examined differences across occupational and cultural groups. Moderation effects of POS were tested using interaction terms following the procedures outlined by Hayes [36], ensuring robustness through bootstrapping (5,000 samples) to generate bias-corrected confidence intervals.

4. Results

4.1. Sample Characteristics

The final sample consisted of 70 participants: 20 durian growers and packers from Malaysia, 30 cold-chain logistics personnel, and 20 live-stream e-commerce sellers from China. The average age was 34.8 years (SD = 8.0), with 58% of respondents male and 42% female. The average tenure in their current occupations was 4.3 years (SD = 2.2).

4.2. Measurement Model

Confirmatory factor analysis (CFA) was conducted to assess the validity and reliability of the measurement model across all groups. The model demonstrated good fit indices: χ^2 (215) = 285.4, p = .012; CFI = 0.94; TLI = 0.93; RMSEA = 0.058; SRMR = 0.048, indicating the scales reliably measured their intended constructs. Composite reliability values for all constructs were above 0.80, and average variance extracted (AVE) values exceeded 0.50, supporting convergent validity. Discriminant validity was confirmed as the square root of AVE for each construct was greater than its correlations with other constructs. The measurement model results are illustrated in Table 1 below.

Table 1.
Measurement Model Results (CFA).

Construct	Item Code	Item Description	Loading (λ)	α	CR	AVE
Physical Hazards	PH1	Repetitive lifting or bending	0.78	0.82	0.85	0.64
	PH2	Exposure to extreme temperatures	0.82			
	PH3	Inadequate lighting	0.80			
Psychosocial Hazards	PSH1	Working very fast	0.81	0.85	0.88	0.66
	PSH2	Role ambiguity (unsure of expectations)	0.84			
	PSH3	Conflicts with colleagues	0.79			
Physical Health	PHY1	Physical pain or discomfort	0.77	0.80	0.83	0.62
	PHY2	Physically exhausted at end of day	0.83			
	PHY3	Fatigue/reduced strength	0.76			
Mental Health	MH1	Constantly under strain	0.88	0.88	0.89	0.73
	MH2	Lack of enjoyment in daily activities (R)	0.85			
	MH3	Unable to relax due to work	0.83			
Perceived Organizational Support	POS1	Organization values contribution	0.85	0.89	0.91	0.64
	POS2	Organization cares about well-being	0.87			
	POS3	Supported when facing difficulties	0.82			
	POS4	(MY) Access to formal support programs.	0.76			
	POS 5	(CN) Flexible digital platform support.	0.79			
Work-Life Balance	WLB1	Enough time with family/friends	0.92	0.92	0.93	0.82
	WLB2	Equally involved in work/personal life	0.88			
	WLB3	Satisfaction with balance	0.91			

4.3. Descriptive Statistics and Correlations

Table 2 presents the means, standard deviations, and correlations among all study variables. Physical hazards showed a significant negative correlation with physical health (r = -0.62, p < 0.001) and work-life balance (r = -0.48, p < 0.01). Psychosocial hazards correlated negatively with mental health (r = -0.59, p < 0.001) and showed a moderate negative correlation with work-life balance (r = -

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ISSN: 2576-8484
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DOI: 10.55214/2576-8484.v10i10.13717
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0.39, $p < 0.05$). Perceived organizational support was positively correlated with work-life balance ($r = 0.54$, $p < 0.001$), physical health ($r = 0.33$, $p < 0.05$), and mental health ($r = 0.44$, $p < 0.01$).

Table 2.
Means, Standard Deviations, and Correlations Among Study Variables (N=45).

Variable	Mean	SD	1	2	3	4	5	6
1. Physical Hazards	3.24	0.82	**(0.80)**					
2. Psychosocial Hazards	3.15	0.79	0.45**	**(0.81)**				
3. Physical Health	3.55	0.80	-0.62***	-0.38*	**(0.79)**			
4. Mental Health	3.42	0.85	-0.41*	-0.59***	0.51**	**(0.85)**		
5. Perceived Organizational Support	3.68	0.76	-0.30	-0.35*	0.33*	0.44**	**(0.80)**	
6. Work-Life Balance	3.33	0.91	-0.48**	-0.39*	0.55**	0.61**	0.54**	**(0.91)**

***Note:** Values in parentheses on the diagonal are the square root of the AVE for each construct. Significance levels: *p < 0.05, **p < 0.01, ***p < 0.001.*

4.4. Structural Model and Hypotheses Testing

The SEM analysis tested the hypothesized paths with physical and psychosocial hazards as independent variables, physical and mental health as mediators, perceived organizational support as a moderator, and work-life balance as the dependent variable. The model fit was acceptable: $\chi^2(245) = 312.8$, $p = .05$; CFI = .95; TLI = .94; RMSEA = .048; SRMR = .045. Table 3 below shows the results of the test.

Table 3.
Measurement Model (CFA Results).

Hypotheses	Path Relationship	Std. Beta (β)	t-value	p-value	Result
Direct Effects					
H1	Physical Hazards to WLB	-0.35	-2.58	0.010**	Supported
H2	Psychosocial Hazards to WLB	-0.32	-2.11	0.0035*	Supported
H3	Physical Hazards to Physical Health	-0.58	-5.12	<0.001***	Supported
H4	Psychosocial Hazards to Mental Health	-0.52	-4.89	<0.001***	Supported
H5	Physical Health to WLB	0.42	3.15	0.002**	Supported
H6	Mental Health to WLB	0.18	2.62	0.010**	Supported
Moderation					
M1	POS x Physical Health to WLB	0.25	2.18	0.030*	Supported
M2	POS x Mental Health to WLB	0.29	2.35	0.020*	Supported

Multi-group analyses indicated that the buffering effect of POS was more pronounced among Malaysian agricultural and logistics workers than among Chinese live-stream sellers, consistent with the cross-cultural hypotheses.

4.5. Summary

Overall, the results underscore that physical and psychosocial hazards negatively affect WLB through deteriorating physical and mental health, respectively. POS plays a critical moderating role, enhancing workers' resilience and enabling better balance between work and personal life. These findings provide empirical backing for the Spill-Over Theory and Compensation Theory in the context of a cross-cultural agri-digital supply chain.

5. Discussion and Conclusion

This study examined the intricate interconnections among occupational hazards, POS, and WLB within a cross-cultural agri-digital supply chain connecting Malaysia and China. The findings offer substantial evidence that physical and psychosocial hazards adversely affect workers' WLB, primarily through the mediating effects of physical and mental health, respectively. Furthermore, POS emerged as a significant moderating factor that mitigates these adverse effects, although its impact varied across

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DOI: 10.55214/2576-8484.v10i10.13717
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cultural and occupational contexts. These findings enhance both theoretical comprehension and practical measures designed to improve worker well-being in supply chains that are becoming more globalized and technologically integrated.

The observed mediation effects provide substantial support for Spill-Over Theory, validating that negative workplace experiences, whether physical or psychosocial, permeate into personal life by compromising health, thereby disrupting the WLB. Physical hazards were particularly harmful to physical health, impacting the WLB of agricultural and logistics workers, whereas psychosocial hazards more significantly compromised the mental health of digital live-stream sellers. These differences show how distinct the risks are in traditional and digital work settings and highlight the importance of customized hazard management plans. The moderating role of POS is consistent with Compensation Theory, demonstrating how organizational support can assist employees in managing workplace stressors by offsetting their detrimental effects on health and work-life balance. The buffering effect of POS was particularly significant among Malaysian workers, who benefited from organized, institution-based support systems.

On the other hand, Chinese digital workers depended more on flexible, platform-driven support systems, which were helpful but did not have as strong a moderating effect. This difference highlights the need for support systems that are culturally sensitive and take into account the specific problems and ways of working in different labor contexts. In practice, the results show that companies in the agri-digital supply chain should focus on actions that lower both physical and psychosocial risks while also making employees feel more supported by the company. For the agricultural and logistics sectors, this could mean making things more comfortable, teaching people about health and safety, and setting up formal support programs. Platforms in the digital gig economy should focus on providing flexible, easy-to-use support resources that help workers deal with mental and emotional stress and keep up with changing workloads. Moreover, cultivating an organizational culture that explicitly prioritizes employee well-being can enhance POS and its safeguarding influence on WLB.

Even with these contributions, the study has a number of flaws. The cross-sectional design constrains causal inferences, and the comparatively small sample sizes, especially among the farmers, may hinder generalizability. Subsequent research should utilize longitudinal designs to document dynamic changes over time and incorporate larger, more heterogeneous samples. Additionally, qualitative studies could enhance comprehension of the lived experiences underlying these quantitative trends, particularly in relation to how cultural norms influence perceptions of support and balance.

In conclusion, this research enhances understanding of the interplay between occupational hazards and organizational support in influencing work-life balance within a contemporary, cross-cultural supply chain framework. By combining Spill-Over and compensation theories, it offers a more complex picture of worker well-being while accounting for how different cultures and situations affect it. As digital technologies change the job market around the world, nuanced, context-sensitive approaches to occupational health and organizational support will be important for keeping workforces strong and balanced.

Funding:
This study is supported by National University of Malaysia research (Grant Number: KRA-2023-003).

Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 10: 250-262, 2026
DOI: 10.55214/2576-8484.v10i10.13717
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Appendix- Questionnaire Items.
The full list of questionnaire items is provided below, grouped by construct:

Physical Hazards (adapted from Kuorinka, et al. [29] and Occupational Safety and Health Administration [30]):

1. My job requires repetitive lifting or bending.
2. I am exposed to extreme temperatures during work.
3. The work environment has inadequate lighting.

Psychosocial Hazards (adapted from Pejtersen, et al. [31]):

1. I have to work very fast.
2. I am unsure about what is expected of me at work.
3. I experience conflicts with my colleagues.

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Physical Health (adapted from Ware, et al. [32]):

1. I have experienced physical pain or discomfort related to my work.
2. I feel physically exhausted at the end of the workday.
3. I have experienced fatigue or reduced physical strength due to my work conditions.

Mental Health (adapted from Goldberg [33]):

1. Have you recently felt constantly under strain?
2. Have you been able to enjoy your normal day-to-day activities? (reverse-coded)
3. Have you recently felt unable to relax because of work-related concerns?

Perceived Organizational Support (adapted from Eisenberger, et al. [34]):

1. My organization values my contribution.
2. My organization cares about my well-being.
3. I feel supported by my employer when I face difficulties at work.
4. (Malaysia) I have access to formal support programs through my workplace.
5. (China) The digital platform provides flexible support to help me manage work demands.

Work-Life Balance (adapted from Brough, et al. [35]):

1. I am able to spend enough time with my family and friends.
2. I am equally involved in my work and personal life.
3. I am satisfied with how well I balance my work and personal life.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 10: 250-262, 2026
DOI: 10.55214/2576-8484.v10i10.13717
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