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WORKPLACE QUALITY AND PROFESSIONAL DEVELOPMENT IN THE IT SECTOR: CONSTRUCTION AND VALIDATION OF COMPOSITE INDICES

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Abstract: The aim of this study is to examine the key organisational factors that shape the work experience of employees in the IT sector, with particular emphasis on physical working conditions and support for professional development. Based on data collected in an IT company, two composite indices were constructed – the Workplace Environment Index and the Professional Development Index – comprising a total of nine indicators assessed on a 1–7 Likert scale. The results indicate a high level of satisfaction with physical working conditions (Mean = 6.12) and an exceptionally positive perception of developmental opportunities within the organisation (Mean = 6.39). However, the analysis of internal consistency shows that both sets of indicators do not function as reflective scales (α = 0.095 and α = –0.158), which confirms their formative nature and the distinctiveness of the individual dimensions. To further refine the interpretation of these constructs, complementary analyses of item-level contributions and correlation structures were performed. The matrices revealed extremely low or negative relationships among the indicators, implying that respondents evaluate different aspects of the working environment and professional development independently of one another. These findings highlight the multidimensional character of workplace quality in the IT sector, where individual elements contribute separately to employees' overall perceptions rather than forming unified latent constructs. The study therefore emphasises the importance of applying formative conceptualisations when modelling such organisational phenomena, particularly in structural equation modelling, where reflective misspecification may lead to erroneous inference. Beyond methodological insights, the results provide a more nuanced understanding of employee experience in IT organisations. High descriptive scores indicate that the organisation provides a well-supported, adequately resourced, and development-focused work environment – factors widely recognised as enhancing employee retention, satisfaction, and long-term organisational commitment. At the same time, the independence of the measured dimensions suggests the need for targeted, domain-specific HR strategies that address each aspect separately rather than through a unified approach. Taken together, the results demonstrate that these constructs are appropriately applied as formative measures, or as sets of distinct predictors within structural equation modelling, thereby ensuring methodological rigour and theoretical coherence in analyses conducted within the IT sector.

Keywords: *workplace environment; professional development; IT sector; human resources; composite index.*
Field: Social Sciences, and Humanities.

1. INTRODUCTION

In empirical research, particularly studies that encompass complex organisational and psychosocial phenomena, individual variables often represent only partial and fragmented indicators of a broader theoretical construct. Relying solely on a single item or a small number of isolated items may lead to an incomplete understanding of a phenomenon, as different aspects of the same concept may be interrelated and contribute to the construct in complementary ways. For this reason, contemporary research approaches increasingly employ composite indices as a means of integrating multiple relevant dimensions into a single measure that more accurately reflects the true complexity of the phenomenon under observation (Spyropoulos et al., 2021; Stefana et al., 2021). In this study, two composite indices were applied: the first encompasses indicators of physical working conditions (hygiene, modern offices, kitchen facilities, equipment quality, and workspace climatization), while the second integrates key elements of employees' professional development (training, opportunities for advancement, time for acquiring knowledge, and mentoring). These domains are multidimensional by nature, and representing them through composite measures provides a more comprehensive and methodologically precise picture of the organisational context in which employees operate.

The formation of composite indices contributes to greater stability and robustness of measurement. By combining multiple indicators, the influence of random error in individual items is reduced, and the reliability of construct-level estimation is enhanced. In this way, the index becomes a conceptually rich yet analytically concise measure that enables the researcher to observe the studied phenomenon holistically (Tsounis et al., 2023; Daadmehr, 2024). This is particularly important when the constructs

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relate to working conditions, professional development, or similar organisational categories that cannot be adequately captured by a single variable. An additional advantage of composite indices lies in simplifying interpretation and improving statistical analysis. Instead of conducting multiple separate analyses for each item, aggregating variables into unified indices reduces data complexity, yields more interpretable results, and enables the more efficient application of inferential statistical methods. This includes clearer group comparisons, more precise modelling of relationships between constructs, and easier interpretation of findings in the discussion (Abramov, Vasilchenko & Seleznev, 2025; Minh et al., 2024). Although individual items may not always form a psychometrically homogeneous scale, their aggregation retains substantial descriptive and analytical value. Composite indices allow physical working conditions and employees' professional development to be examined as holistic organisational phenomena, contributing to a more complete understanding of the work context and supporting conclusions relevant to human resource management and organisational development planning.

The primary research (Kukolj, Deretić & Kamiš, 2023) was designed with the aim of examining respondents' attitudes and opinions regarding quality of work life and employee motivation within a team of an IT company. Data were collected through direct questionnaire-based surveying, with voluntary participation. The research sample was formed through purposive sampling of employees in a private IT company. The pilot study included 10 participants, while the final number of respondents was 70 (n = 70). The study was conducted in May 2023. The present paper uses data from the primary research (Kukolj, Deretić & Kamiš, 2023). This decision is methodologically justified, as processing the entire dataset with all analytical techniques planned within the broader research project exceeds the scope of a single paper. Therefore, the data from the original study were re-analysed here in accordance with the specific aims and the analytical focus of the current research.

The structure of the paper comprises five interconnected chapters that guide the reader logically from the theoretical framework to the empirical results and future research directions. The introductory chapter presents the theoretical foundations and research context, explaining why composite indices represent an appropriate method for measuring complex organisational phenomena such as the work environment and professional development in the IT sector. The second chapter provides a detailed description of the construction and analysis of the composite Work Environment Index, presenting descriptive results and indicators of internal consistency that show the dimensions of physical working conditions function as independent indicators, thereby confirming the formative nature of this construct. The third chapter focuses on the Professional Development Index, analysing descriptive statistics and psychometric characteristics that demonstrate employees' strongly positive perceptions of developmental opportunities, while also revealing that certain dimensions differ in how they are perceived, meaning they do not form a common latent structure but rather a formative whole. The discussion interprets these findings within the Structural Equation Modelling (SEM) methodological framework, emphasising the distinction between reflective and formative models and the methodological implications that the choice of construct type has for model specification and result interpretation. Finally, the conclusion synthesises the key research findings, confirms the appropriateness of the formative approach for further SEM modelling, and proposes future research directions involving model testing across different samples as well as the potential inclusion of additional predictors and moderators to enhance analytical precision and robustness.

2. COMPOSITE INDEX – WORKPLACE ENVIRONMENT

For the purposes of this research, a composite Workplace Conditions Index was constructed, calculated as the arithmetic mean of five variables measuring satisfaction with key elements of the physical working environment: hygiene, modern office space, kitchen facilities and related amenities, equipment quality, and workspace climatization. All variables were measured using a 1–7 Likert scale, which enabled their direct aggregation into a single index (Table 1). The resulting index indicates a high level of satisfaction with working conditions (M = 6.12; SD = 0.33), with a very narrow range of scores (min = 5.40; max = 6.80), suggesting a consistently and uniformly positive perception of the physical aspects of the working environment. The low variability implies that there are virtually no distinctly negative assessments among employees and that working conditions are perceived as a stable and reliable component of overall work life quality. The high index values further confirm that the physical work environment in the company is unlikely to be a source of dissatisfaction; rather, it contributes to a generally positive workplace climate and supports other dimensions of organisational satisfaction and motivation.

Table 1. Descriptive statistics of the Workplace Environment composite index

N	Mean	Std	Min	Max	Median	1st quartile	3rd quartile	IQ
70	6,12	0,33	5,4	6,8	6	5,8	6,4	0,6

Source: Authors' analysis based on the sample from Kukolj, Deretić & Kamiš (2023)

The internal consistency of the scale composed of five variables measuring hygiene, modern office facilities, kitchen areas, equipment quality, and workspace air-conditioning was assessed using Cronbach's alpha coefficient. The obtained value of α = 0.095 indicates an exceptionally low level of internal reliability. This result clearly suggests that the variables do not form a unified psychometric scale and cannot be treated as a single latent construct in the sense of measuring the same underlying phenomenon. Although they conceptually belong to the domain of physical working conditions, they do not demonstrate statistical interrelatedness nor consistent covariation. In other words, employees evaluate these dimensions independently — a high score for hygiene does not necessarily imply high ratings for equipment, air-conditioning, or kitchen facilities, which results in the low alpha value.

An additional analysis was conducted to determine whether any individual variable disproportionately influenced internal consistency. Cronbach's α was recalculated after excluding each variable from the scale. The largest increase in reliability was observed when the variable 'kitchen areas' was removed, raising Cronbach's α from 0.095 to 0.144. This indicates that satisfaction with kitchen facilities and related amenities differs from the remaining dimensions of the physical work environment, confirming its heterogeneity relative to the other items. Nevertheless, even after removing this item, the coefficient remains low, which is expected given that each variable represents a distinct dimension of working conditions rather than a psychometric scale with multiple indicators per dimension.

The correlation matrix of the five variables measuring elements of the physical work environment shows that all correlations are extremely low, ranging from –0.11 to 0.19 (Table 2). This pattern demonstrates that respondents assess each aspect of the workspace independently, without any clear tendency for high ratings on one item to be associated with high ratings on another. Accordingly, there is no observable linear relationship among the items, which is further corroborated by the low Cronbach's alpha coefficient. These findings suggest that the observed variables represent separate indicators of physical working conditions rather than a single latent dimension.

Table 2. Correlation matrix for the composite index Work Environment

Variable	Hygiene	Modern offices	Kitchen facilities	Equipment quality	Workspace air-conditioning
Hygiene	1				
Modern offices	-0,066	1			
Kitchen facilities	-0,047	0,190	1		
Equipment quality	0,176	-0,071	-0,111	1	
Workspace air-conditioning	0,158	-0,080	-0,030	0,130	1

Source: Authors' analysis based on the sample from Kukolj, Deretić & Kamiš (2023)

3. COMPOSITE INDEX – SUPPORT FOR PROFESSIONAL DEVELOPMENT

To assess employees' professional development, a composite Professional Development Index was constructed as the arithmetic mean of four key variables capturing different dimensions of workplace learning and advancement: training, promotion opportunities, time available for acquiring knowledge, and mentoring. These variables encompass a wide range of developmental processes – from formal and informal learning, through employees' subjective assessment of promotion prospects, to the evaluation of available time for learning and the quality of mentoring support received. All variables were measured on a 1–7 Likert scale, which enables their direct aggregation into a single index (Table 3). The resulting index indicates a notably high level of professional development within the organisation (M = 6.39; SD = 0.30). The value range (5.50–7.00) shows that all ratings fall within the upper segment of the scale, with no low scores recorded, indicating consistently positive employee experiences. The small standard deviation reflects a high level of homogeneity in responses, meaning that most employees share a very similar perception of the availability of learning and advancement opportunities. These findings suggest that the organisation provides a stable and stimulating environment for professional development, offering employees clear opportunities to enhance their knowledge, progress in their careers, and receive adequate mentoring support. As a composite measure of multiple aspects of workplace learning, the Professional

Development Index provides a comprehensive insight into the organisation's systematic approach to employee development and confirms the existence of a positive developmental and educational climate.

Table 3. Descriptive statistics of the composite index Support for Professional Development

N	Mean	Std	Min	Max	Median	1st quartile	3rd quartile	IQ
70	6,39	0,3	5,5	7	6,25	6,25	6,69	0,44

Source: Authors' analysis based on the sample from Kukolj, Deretić & Kamiš (2023)

The internal consistency of the composite measure formed from four indicators of employee development – professional training, promotion opportunities, time available for acquiring knowledge, and mentoring – was assessed using Cronbach's alpha. The obtained value of α = –0.158 indicates a complete absence of internal reliability. A negative alpha shows that the indicators do not share a common latent structure and do not measure a single psychological or organisational dimension. Their variability moves in opposing directions, reflected in negative inter-item covariances. Although conceptually linked to professional development, respondents evaluate these indicators as separate phenomena; high scores on one aspect (e.g., mentoring) do not imply higher scores on others. This explains the extremely low and negative coefficient. Methodologically, such a result shows that the indicators cannot be combined into a reliable composite index and should be analysed as independent measures of different facets of organisational support. Further analysis examined the impact of each indicator on internal consistency. Removing the mentoring indicator produced the most favourable change (α rising from –0.158 to –0.019), suggesting that mentoring is evaluated differently from the other dimensions. In contrast, excluding promotion opportunities further reduced alpha (α = –0.301), indicating that this indicator diverges most from the others. Regardless of item removal, alpha remains very low, which is expected given that the indicators represent substantively distinct aspects of employee development rather than a unified latent construct. Their separate treatment is therefore empirically justified.

The correlation matrix of the four variables shows that the relationships among the indicators are very weak, and in several cases negative (Table 4). The highest correlation is only r = 0.123, confirming the absence of a shared underlying factor. Although conceptually related, respondents perceive these aspects of professional development independently, which means they cannot be combined into a single reliable measure.

Table 4. Correlation matrix for the composite index Support for Professional Development

Variable	Hygiene	Modern offices	Kitchen facilities	Equipment quality
Hygiene	1			
Modern offices	0,123	1		
Kitchen facilities	-0,073	-0,049	1	
Equipment quality	-0,193	0,004	-0,009	1

Source: Authors' analysis based on the sample from Kukolj, Deretić & Kamiš (2023)

4. DISCUSSION

In SEM analysis, latent constructs may be conceptualised and measured in two principal ways: through reflective measurement models or formative measurement models. The choice between them depends on whether the indicators reflect the latent construct or whether they form it. This distinction directly affects how constructs are incorporated, tested, and interpreted within a SEM framework (Aguirre Urreta et al., 2024; De Giovanni, 2025). In reflective measurement models, constructs are treated as latent dimensions manifested through interconnected indicators, whereas formative constructs are modelled as composite entities formed from multiple mutually independent indicators. Reflective models require the assessment of factorial structure and internal reliability, while formative constructs are evaluated by examining the contribution of each indicator and the absence of multicollinearity. This approach allows both types of constructs to be combined within a single SEM model, depending on the nature of the phenomenon being measured. Furthermore, the choice of construct type determines how indicators are handled during modelling: reflective indicators may be removed if they compromise the measurement model, while formative indicators are essential components of the construct and must not be omitted without theoretical justification. This ensures that each construct is modelled in line with its conceptual logic, thereby increasing the validity and interpretative precision of the overall SEM model.

The Work Environment Composite Index was formed as the arithmetic mean of five indicators of

satisfaction with physical workplace elements. The results show a very high average level of satisfaction (M = 6.12) with minimal variability (SD = 0.33), indicating a homogeneous and consistently positive perception of the work environment. The response range (5.40–6.80) confirms the absence of negative evaluations and suggests that employees perceive physical working conditions as reliably high in quality. However, despite these favourable mean values, the indicators do not function as a unified psychometric construct. The low Cronbach's α (0.095) and the very weak inter-item correlations (–0.11 to 0.19) indicate that the individual dimensions – hygiene, air-conditioning, equipment quality, kitchen facilities, and modern office design – are not related. This means that employees evaluate each aspect independently rather than as part of a single latent construct. Methodologically, these items are therefore unsuitable for a reflective model, but the composite index can be used meaningfully as a formative measure, where each indicator represents an independent contribution to understanding physical working conditions. In summary:

- Physical working conditions receive very high ratings.
- The dimensions operate as independent indicators, which makes the index appropriate as a formative rather than a reflective measure.

The Professional Development Index comprises four dimensions: training, promotion opportunities, time available for learning, and mentoring support. Descriptive results (M = 6.39; SD = 0.30) indicate high and uniform evaluations of developmental opportunities, with no negative items, suggesting a stable level of organisational support for professional development. However, the psychometric structure of the composite indicates that these indicators are not interrelated. The negative Cronbach's α (–0.158) and the low correlations among the indicators (–0.09 to 0.123) demonstrate that the different aspects of professional development are perceived separately. A high rating for one component (e.g., mentoring) does not imply a corresponding rating for the others. Consequently, the Professional Development Index cannot be treated as a reflective scale representing a single latent construct. Instead, the indicators function as autonomous components that are conceptually related but empirically unconnected. Nonetheless, the index remains useful as a formative measure, where each indicator contributes uniquely to the overall assessment of developmental opportunities. In summary:

- Employees evaluate all aspects of professional development very positively.
- The indicators lack psychometric coherence and the index is therefore applicable only as a formative, not a reflective, measure.

5. CONCLUSION

In preparation for SEM modelling, the internal consistency of the Work Environment and Support for Professional Development constructs was examined to assess their suitability for further analytical use. The low values of Cronbach's alpha demonstrate that these constructs do not operate as reflective scales; however, this does not limit their application in SEM. Rather, it suggests that they are more appropriately conceptualised as formative structures.

Work Environment. The five indicators (hygiene, modern offices, kitchen facilities, equipment quality, and air-conditioning) produced α = 0.095, showing that employees evaluate these dimensions independently and that they do not share a common latent basis. This pattern is consistent with a formative conceptualisation, where physical working conditions are understood as separate but conceptually related aspects.

Support for Professional Development. The four indicators (training, promotion opportunities, time available for learning, and mentoring) yielded a negative reliability coefficient (α = –0.158), indicating that the dimensions vary independently and do not form a single latent structure. These findings support the treatment of the indicators as formative components or as independent variables within the SEM framework.

Although the α values clearly show that the constructs lack reflective internal consistency, this does not constitute a limitation for SEM analysis. Instead, the results suggest that both constructs are more appropriately viewed as formative composites, where each indicator contributes to the broader concept, or as separate independent variables depending on the theoretical framework. Such an approach ensures methodological accuracy and allows valid interpretation of the relationships within the model. Future research should focus on testing a SEM model based on the formative constructs Work Environment and Support for Professional Development. Particular attention should be given to assessing the stability of the model across different samples and organisational contexts. It is also recommended to explore alternative model specifications, including additional predictors and moderators, to enhance the robustness and validity of the findings.

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