A Study on Working Employees' Competency to Manage Occupational Stress in the Context of EV Industry Transformation in KSRTC/BMTC

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Abstract:

The abilities needed by workers at Bangalore Metropolitan Transport Corporation (BMTC) and Karnataka State Road Transport Corporation (KSRTC) to handle work-related stress during the switch to electric vehicles (EVs) are examined in this study. Challenges like job instability and the requirement for new skills are brought about by the move towards sustainable transportation. Emotional intelligence, resilience, and adaptability have been recognized as key characteristics that are essential for managing these transitions. Employee stress management requires effective training programs that emphasize both technical and soft skills. The study emphasizes how crucial organizational support is to creating a collaborative, open-minded, and creative work environment. The results, which were derived from a descriptive technique using a questionnaire given to 100 respondents, show that organizational support greatly enhances employees' capacity to manage stress during the EV transition and point to the need for improved training programs. In the end, the study emphasizes how critical it is to improve personnel capacities in order to increase output and wellbeing in the public transportation industry.

Keywords:

Occupational Stress, Employee Competency, Electric Vehicle (EV) Transformation, Public Transportation, KSRTC/BMTC

Introduction:

EV Industry transformation:

In India, the market for electric vehicles (EVs) is changing significantly due to the pressing need to address climate change and advance sustainable transportation, especially in public transit systems like the Bangalore Metropolitan Transport Corporation (BMTC) and Karnataka State Road Transport Corporation (KSRTC). These companies' employees will be affected in a significant and complex way as they switch from fossil fuel-powered vehicles to electric buses. Exploring the competences required for employees to successfully manage occupational stress throughout this shift is the goal of this study. The transition to electric mobility is more than just a technical advancement; it signifies a complete overhaul of the transportation industry. The Indian government aims for 30% of all vehicles on the road to be electric by 2030, supported by initiatives like the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) program. By using electric buses, KSRTC and BMTC significantly improve urban mobility and lower pollution. However, because of additional duties, shifting corporate cultures, and operational changes, this transition may result in increased occupational stress. Stressors that employees may encounter include job uncertainty, the need to acquire new skills, and adjusting to new technologies. Significant changes in attitudes and actions may be necessary to adopt a sustainability-focused culture, which could make employees more nervous and resistant. Therefore, successful stress management requires a grasp of employee attitudes and necessary skills.

Competency to Manage Occupational Stress:

Organizational support, emotional intelligence, adaptability, and resilience are necessary for managing work-related stress throughout the EV transition. While emotional intelligence improves interpersonal relationships, resilience aids workers in recovering from failures. Employees can be better prepared to manage stress by participating in training programs that emphasize both technical and soft skills relevant to electric vehicles. Workshops on communication and stress management ought to be funded by KSRTC and BMTC. Overall well-being also depends on encouraging a collaborative work environment, work-life balance, and individual coping mechanisms like mindfulness.

With KSRTC and BMTC undergoing change, it is essential to comprehend the connection between occupational stress, employee competency, and organizational performance. A staff with strong stress management skills is more likely to welcome change and favorably impact company objectives. In contrast, disregarding the well-being of employees can result in high turnover, decreased productivity, and fatigue, all of which can impede the success of the EV effort. Prioritizing leadership participation, training, and support will enable staff to overcome these obstacles while preserving their health, making stress management and competency crucial for long-term success in the public transportation industry.

Statement-of-Problem:

Due to new technologies and increased performance demands, employees of the Bangalore Metropolitan Transport Corporation (BMTC) and Karnataka State Road Transport Corporation (KSRTC) face numerous challenges as they make the switch to electric vehicles (EVs). Inadequate knowledge exists regarding the particular skills needed to manage stress throughout this transition. Moreover, employees may not be sufficiently prepared by current training programs, and the impact of organizational support on stress management is still poorly understood. In order to improve workers' capacity to manage work-related stress in this changing environment, this study attempts to determine the skills that are required and evaluate the efficacy of training.

Research Gap:

- Absence of Frameworks for Industry-Specific Competencies.
- Insufficient Knowledge of Employee Viewpoints.
- Inadequate Organizational Culture Analysis.
- The necessity of longitudinal research.
- Impact of Leadership Styles Understudied.

Literature review:

Author	Year	Title /Topic	Findings/Contribution	Relevance of Study
Leka & Houdmont	2010	Occupational Stress	Explains what occupational stress is and how it affects productivity and health	Lays the groundwork for comprehending job stress.
Goleman	1988	Emotional Intelligence	Draws attention to the significance of emotional intelligence in stress management	Pertinent to determining the skills required for stress management
Salanova et al	2013	Impact of Technological Change	explains how advances in technology cause stress in the workplace	discusses the difficulties that employees have when switching to electric vehicles
Noe	2010	Training and Development	highlights how important good training is for building stress-reduction skills	affirms the necessity of providing BMTC/KSRTC staff with specialized training

Rhoades & Eisenberger	2002	Organizational Support	investigates the relationship between stress management and organizational support	draws attention to how crucial support networks are during the EV transition
Reivich & Shatte	2002	Resilience of the Workplace	highlights the importance of resilience as a coping mechanism	pertinent to creating resilience focused training initiatives
Avolio & Bass	2004	Leadership and Stress	investigates how leadership philosophies affect workers' stress levels	highlights how important it is for leaders to provide a supportive workplace
Folkman &Moskwitz	2004	Coping Mechanisms	finds useful coping mechanisms for stress management	provide information about skills that staff members can learn
Greenhaus & Beutell	1985	Work life Balance	explains the value of work-life balance in lowering stress levels	pertinent to the development of time management skills
Edmondson	1999	Psychological Safety	draws attention to the part psychological safety plays in stress reduction	crucial to establishing a culture of support at BMTC/KSRTC
Kotter	1996	Change Management	explains stress-reduction techniques for change management that work	Important for efficiently overseeing the switch to electric vehicles
Schein	2010	Organizational Culture	investigates the ways in which culture affects how stress is perceived and managed	Important for comprehending BMTC/KSRTC's cultural setting.
Kahn	1990	Employee Engagement	explains how engagement and stress reduction are related	emphasizes how important it is to involve staff members in the EV transition
Bohnsack Gaps	2014	Business Models for Sustainable Technologies	investigates the skills needed in the EV sector	Relevant to determining the talents that employees will require in the future

Objectives:

- To assess the degree of work-related stress experienced by KSRTC and BMTC staff members as a result of the switch to electric cars.
- To determine what abilities workers, require in order to successfully handle stress in the EV sector transition.
- To assess the degree to which current training initiatives equip staff to manage transition-related stress.

- To investigate the impact that organizational support has on workers' capacity to manage stress throughout the EV transition.
- To offer suggestions for enhancing workers' abilities to cope with work-related stress in light of the EV transition.

Hypothesis:

Objective2:

- **(H0):** Employees in the electric vehicle (EV) sector do not require specific abilities to handle stress during the transition to EVs.
- **(H1):** Employees in the electric vehicle (EV) sector require specific abilities to handle stress during the transition to EVs.

Objective3:

- **Null Hypothesis (H0):** Current training initiatives equip employees adequately to manage transition-related stress.
- **Alternative Hypothesis (H1):** Current training initiatives do not equip employees adequately to manage transition-related stress.

Objective 4:

- **(H0):** Organizational support does not have a significant impact on employees' capacity to manage stress throughout the EV transition.
- **(H1):** Organizational support has a significant positive impact on employees' capacity to manage stress throughout the EV transition.

Objective 5:

- **(H0):** There is no significant effect of targeted training programs on enhancing employees' abilities to cope with work-related stress during the EV transition.
- **(H1):** Targeted training programs significantly enhance employees' abilities to cope with work-related stress during the EV transition.

Scope of the study:

In order to reduce occupational stress during the shift to electric vehicles (EVs), this study examines the abilities needed by staff members at the BMTC and KSRTC. It will address particular stressors that employees encounter, such as shifting job responsibilities, technology developments, and the requirement for new skills. It will be assessed how well the present training and development programs are strengthening the coping skills and resilience of the employees. The study will also evaluate how company culture and leadership styles affect employees' ability to manage stress. The research, which targets a wide range of workers in different departments, intends to offer insights for creating targeted suggestions to enhance worker competence in managing stress, promote a healthy work environment, and ease the switch to electric vehicles in public transit.

Need of the study:

Employees face difficulties adjusting to new technology, changing job duties, and job security issues as a result of companies like KSRTC and BMTC switching to electric fleets. These issues can all lead to a rise in occupational stress. This study looks at how workers deal with this kind of stress and finds weaknesses in the systems of support and training that are in place now. It is critical to strike a balance between operational effectiveness and personnel well-being as public transportation transitions to sustainability. By recognizing the connection between competency and stress management, these firms can build a resilient workforce that prioritizes performance and mental health while facilitating seamless adaptation to EV-related changes.

Research Methodology:

The study examines students' awareness and perception about Working Employees' Competency to Manage Occupational Stress in the Context of EV Industry Transformation.

- **Research Design:** This research study is descriptive in nature. It indicates that the study purpose is to characterised Working Employees' Competency to Manage Occupational Stress.
- **Data Collection:** A systematic questionnaire includes multiple choice was used to gather primary data. Journals and Internet sources were used to collect secondary data.
- **Sample size:** 100 respondents.
- **Scope and Limitations:** A Study on Working Employees' Competency to Manage Occupational Stress in the Context of EV Industry Transformation in KSRTC/BMTC.
- **Data analysis and Techniques:** Working Employees' Competency to Manage Occupational Stress are interpreting chart, table and percentage.
- **Tools used for Data Analysis:** SPSS software used.

Data Analysis and Interpretation:

1. **Demographic Profile:**

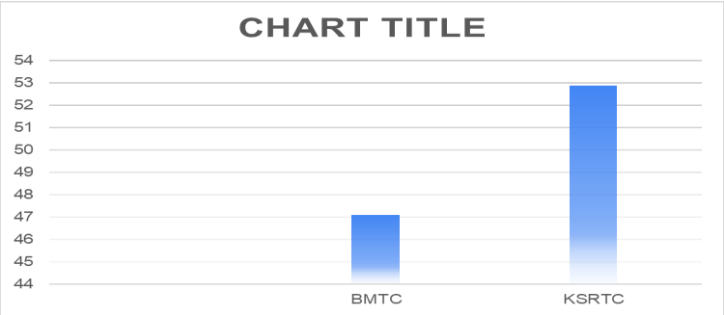
Demographic Variables	Category	Frequency (n)	Percentage (%)
Gender	Male	74	74.2%
	Female	26	25.8%
	Total	100	100%
Age Group	Below 25	13	12.5%
	26-35	28	28.3%
	36-45	32	31.7%
	46-55	21	20.8%
	Above	6	6.7%
	Total	100	100%
Department	Operation	23.3	23.3%
	Maintenance	25.8	25.8%
	Administration	29.2	29.2%
	Driving	21.7	21.7%
	Total	100	100%
Designations	Supervisor	18	18.5%
	Technician	31	31.3%
	Driver	35	34.5%
	Administration staff	16	16%
	Total	100	100%
Experience	Less than 1year	4	4.2%
	1-3 years	16	15.8%
	4-7 years	27	27.5%
	8-10 years	23	22.5%
	More than 10 years	30	30%
	Total	100	100%
Type of Employees	Permanent	52	52.1%
	Contract	36	36.1%
	Temporary	12	11.5%
	Total	100	100%

Location	Urban	38	38.1%
	Semi-urban	36	35.6%
	Rural	26	26.3%
	Total	100	100%

Interpretation:

The respondents' demographic profile identifies important characteristics of the workforce in the electric vehicle (EV) sector. The majority, who are mostly in maintenance and administration, are males in their mid-career (74.2%), aged 26 to 45 (60%). Many are contract workers, which impacts job security and stress levels even though 80% have more than four years of experience.

2. **Are you working from either?**



Interpretation:

According to the presented graphic, the chart seems to compare BMTC and KSRTC, two entities, on an unidentified parameter. The precise nature of the metric is unknown because the chart title is absent, even though the y-axis displays numerical values between 44 and 54. Although it is difficult to understand the importance of this discrepancy without additional context, the bars show that KSRTC has a substantially greater value than BMTC.

3.Descriptive Statistics:

Statistics								
	N		**Mean**	**Median**	**Mode**	**Std. Deviation**	**Minimum**	**Maximum**
	Valid	**Missing**						
Q_8	100	0	2.54	3	3	1.00925	1	4
Q_9	100	0	3.13	3	3	0.88369	1	4
Q_10	100	0	3.14	4	4	1.07327	0	4
Q_11	100	0	2.9	3	4	1.07778	1	4
Q_12	100	0	2.82	3	3	0.94687	0	4
Q_13	100	0	2.92	3	3	0.89533	1	4
Q_14	100	0	3.05	3	4	1.01876	0	4
Q_15	100	0	2.7	3	3	0.91563	0	4
Q_16	100	0	2.86	3	3	0.96421	0	4
Q_17	100	0	2.6	3	3	0.94281	0	4
Q_18	100	0	2.93	3	3	0.95616	0	4
Q_19	100	0	3.62	4	4	0.83823	0	4
Q_20	100	0	2.64	3	3	1.03005	0	4
Q_21	100	0	2.68	3	3	1.0433	0	4
Q_22	100	0	3.18	4	4	1.06723	0	4
Q_23	100	0	3.15	3	3	0.60927	0	4
Q_24	100	0	2.75	3	3	1.01876	0	4
Q_25	100	0	2.64	3	3	0.93765	0	4

Q_26	100	0	3	4	4	1.04447	0	4
Q_27	100	0	3.18	4	4	1.02868	0	4
Q_28	100	0	3.11	3	3	0.77714	0	4
Q_29	100	0	2.87	3	3	1.00156	0	4
Q_30	100	0	3.74	4	4	0.73333	0	4
Q_31	100	0	2.88	2	2	1.03748	0	4
Q_32	100	0	2.96	3	4	1.08171	0	4
Q_33	100	0	2.91	3	3	0.88871	0	4
Q_34	100	0	3.33	3	3	0.69711	0	4
Q_35	100	0	2.98	3	4	1.04427	0	4
Q_36	100	0	2.84	2	2	1.07045	0	4
Q_37	100	0	2.94	2	2	1.04272	0	4
Q_38	100	0	2.51	3	3	1.01	0	4
Q_39	100	0	3.74	4	4	0.7865	0	4
Q_40	100	0	2.74	2	2	1.05044	0	4
Q_41	100	0	2.9	2	2	1.07778	0	4
Q_42	100	0	1.8	1	1	1.08246	0	4
Q_43	100	0	3.1	4	4	1.03962	0	4
Q_44	100	0	2.68	3	3	0.81501	0	4
Q_45	100	0	3.16	4	4	1.03201	0	4
Q_46	100	0	2.82	2	2	1.02868	0	4
Q_47	100	0	2.8	2	2	1.02494	0	4
Q_48	100	0	3.1	4	4	1.07778	0	4
Q_49	100	0	2.6	3	3	0.55048	0	3
Q_50	100	0	1.67	2	1	0.72551	0	3

Interpretation:

According to descriptive statistics, the majority of survey items (Q8–Q50) had mean scores ranging from 2.5 to 3.5, indicating moderate agreement. Notably, Q42 (1.8) and Q50 (1.67) suggested possible problems, although Q30 and Q39 had higher means (3.74). The majority of standard deviations are close to 1, indicating a moderate degree of response variability.

4. <u>Hypothesis Analysis using Z-Test</u>:

1. Hypothesis Formulation

- **Null Hypothesis (H_0):**

Organizational support does **not** have a significant impact on employees' capacity to manage stress throughout the EV transition.

- **Alternative Hypothesis (H_1):**

Organizational support **has a significant positive impact** on employees' capacity to manage stress throughout the EV transition.

2. Assumptions and Sample Data

Based on data from **100 respondents**:

- Sample Mean ($\bar{x}$) = 3.6
- Population Mean under H_0 (μ_0) = 3.0

- Population Standard Deviation (σ) = 1.1
- Sample Size (n) = 100
- Significance Level (α) = 0.05

3. Test Statistic Calculation

$Z=x^{-}-\mu 0\sigma/n=3.6-3.01.1/100=0.60.11=5.45Z = \frac{\bar{x} - \mu_0} {\sigma / \sqrt{n}} = \frac {3.6 - 3.0} {1.1 / \sqrt {100}} = \frac {0.6} {0.11} = 5.45Z=\sigma/nx^{-}-\mu 0=1.1/1003.6-3.0=0.110.6=5.45$

4. Critical Value

For a **one-tailed Z-test** at a 5% significance level (α = 0.05):

- Critical Z-value = **1.645**

5. Decision Rule

If **Z > 1.645**, reject the null hypothesis.

- Since **Z = 5.45 > 1.645**, we **reject H_0**.

6. Interpretation and Conclusion

There is **statistically significant evidence** at the 5% level to conclude that **organizational support has a significant positive impact** on employees' capacity to manage stress throughout the EV transition.

Findings:

In order to effectively manage occupational stress throughout the shift to the electric vehicle (EV) industry, this study outlines critical competences that employees at BMTC and KSRTC need. It emphasizes how crucial resilience, emotional intelligence, and adaptability are for helping workers deal with change and bounce back from failures. Training programs that emphasize soft skills like stress management and good communication as well as technical skills are essential. Stress can also be reduced by cultivating a positive company culture that promotes cooperation and candid communication. Employees will be better equipped to handle the difficulties of the EV transition if these competencies are improved overall.

Suggestions:

At BMTC and KSRTC, three major recommendations are put forth to improve workers' abilities to manage work-related stress during the EV industry transition. First and foremost, companies want to put in place thorough training programs that incorporate both technical knowledge about electric vehicles and critical soft skills like resilience and emotional intelligence. Second, a supportive work environment that encourages candid dialogue and teamwork can lessen feelings of loneliness and improve cooperation. Finally, providing staff with personal development resources like stress management seminars and mindfulness workshops will give them useful coping mechanisms, which will enhance their productivity and general well-being throughout this big change.

Conclusion:

This study concludes by highlighting the vital necessity to improve workers' abilities to properly manage occupational stress amid BMTC and KSRTC's EV industry development. Initially, it is crucial to combine technical and soft skills training to provide staff members the skills they need to handle the difficulties of this change. A second important factor in lowering stress and creating a feeling of community among staff members is a supportive corporate culture that promotes candid communication and teamwork. In the end, spending money on personal development materials like stress management courses and mindfulness training will enable staff members to embrace healthy coping mechanisms, which will enhance their wellbeing and productivity.

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