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A STUDY ON IMPROVING PICKING EFFICIENCY IN THE DHL SUPPLY CHAIN USING PICK TO LIGHT TECHNOLOGY

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ABSTRACT

This study delves into the integration of Pick to Light (PTL) innovation inside the complicated system of the DHL supply chain, pointing to illustrate its effect on operational productivity and vital arranging. Analysing information assembled from 221 members, the inquire about utilizes a vigorous strategy including relapse, chi-square, and ANOVA tests to supply comprehensive experiences. The comes about uncover a compelling relationship ($\beta = 0.7864$, $p < 0.05$) between the seen benefits of PTL innovation and the defence of speculation, showing a coherent arrangement between seen preferences and long-term taken a toll reserve funds. In addition, a essential affiliation ($\chi^2 = 264.62$, $p < 0.05$) develops between recognitions of arrange precision and the defence of innovation costs, underscoring the essential part of exactness in forming recognitions of innovation esteem. The ANOVA test encourage complements the critical effect of PTL innovation on post-integration workforce evaluation ($F = 388.76$, $p < 0.05$), emphasizing its adequacy in upgrading workforce execution and operational effectiveness. These discoveries collectively emphasize the transformative potential of PTL innovation inside the DHL supply chain, enlightening its part in optimizing operations and vital decision-making forms. By leveraging PTL innovation, DHL stands balanced to cultivate effectiveness, upgrade competitiveness, and solidify its position as a pioneer within the energetic and advancing scene of the supply chain industry.

Keywords: *Pick to Light, Workforce Performance, Supply Chain Optimization, Operational Efficiency, DHL Supply Chain, Technology Integration, Efficiency Metrics.*

Introduction

In the fast-paced domain of supply chain administration, proficiency is fundamental, driving businesses to receive inventive methodologies. In this setting, the integration of Pick to Light (PTL) frameworks, such as Select to Light innovation, has risen as a promising arrangement to streamline picking operations inside the DHL Supply Chain. This ponders centres on improving picking productivity through Select to Light integration, leveraging visual helps to direct distribution centre specialists and minimize mistakes. The primary objective is to assess the effect of this integration on workforce execution and fulfilment, considering post-integration workforce appraisal and workers' innovation versatility. Post-integration workforce evaluation gages picking proficiency, precision, and by and large efficiency taking after Select to Light usage, whereas innovation flexibility looks at workers' status to grasp and successfully utilize this innovation. Based on the speculation that Select to Light integration upgrades effectiveness and fulfilment, the ponder points to approve its viability over conventional strategies.

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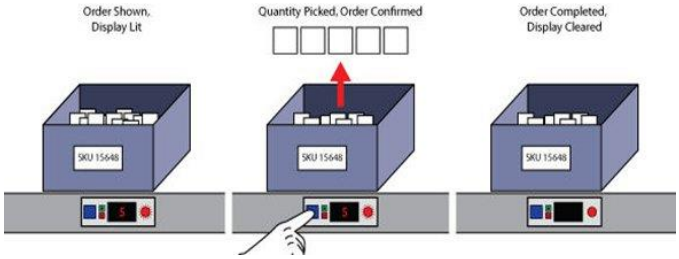


Through thorough investigation and observational prove, this investigate contributes to the understanding of supply chain optimization and innovation integration, advertising profitable experiences for industry professionals and analysts. The centrality of this inquire about lies in its potential to advise vital decision-making inside the DHL Supply Chain and past, directing speculations in innovation foundation, preparing programs, and operational forms to drive competitive advantage and maintainable development. Moreover, the discoveries have broader suggestions for the coordination's and supply chain administration industry, highlighting the part of inventive innovations like Select to Light in cultivating operational fabulousness, taken a toll optimization, and client fulfilment. In outline, this considers points to clarify the transformative control of Select to Light innovation inside the DHL Supply Chain, giving experiences into its potential to revolutionize arrange fulfilment forms and improve by and large supply chain execution.

Objective of the Study

Primary Objective

- A Study on improving picking efficiency in the DHL Supply Chain using Pick to Light technology training.

Secondary Objective

- To assess the level of workers adaption to pick to light technology compared to traditional methods.
- To analyse workers performance and satisfaction following the implementation of pick by light technology.
- To investigate the cost effectiveness of integrating pick by light technology compared to conventional techniques.
- To explore the relationship between worker adaptability within the DHL supply chain and the effectiveness of pick by light technology training.
- To implement integration software for seamless pick-to-light technology integration, ensuring efficient deployment and operation.

Review of Literature

This article provides a brief overview of recent progressions in distribution centre arrange picking, with a centre on key ponders forming the coordination's scene. Justyna Trojanowska's investigate highlights the integration of Poka Burden and Pick-to-Light (PTL) innovation, yielding critical decreases in botch rates and gathering time, in this manner improving efficiency. Marc Fuchtenhans investigates the potential applications of shrewd lighting frameworks (SLS) in distribution centre arrange picking, emphasizing vitality proficiency and specialist well-being. Eric H. Grosse dives into the integration of steady and substitutive innovations in manual distribution centre arrange picking, emphasizing the significance of considering sociotechnical perspectives and developing innovations like increased reality. Achyuta Adhvaryu's ponder analyses the efficiency co-benefits of embracing energy-saving Driven lighting in piece of clothing production lines, uncovering significant enhancements in efficiency. Sarah Vanheusden addresses commonsense components in arrange picking arranging, focusing the significance of bridging the hole between scholastic investigate and real-world application. Sven Winkel Haus explores Arrange Picking 4.0 (OP 4.0), highlighting investigate crevices and experiences for creating more successful frameworks. Xiaojian Shen proposes a course optimization approach for e-commerce distribution centre pickers, displaying its adequacy in moving forward operational proficiency. Masoud Mirzaei presents the Coordinates Cluster Allotment (ICA) procedure for optimizing parts-to-picker frameworks, pushing for encourage inquire about on energetic capacity task. Agnieszka A. Tubis analyses human mistakes in conventional and mechanized order-picking

frameworks, emphasizing comprehensive chance appraisal. Finally, Husam Dauod presents a real-time arrange picking arranging system, improving operational adaptability. This comprehensive survey offers important experiences into advancing distribution centre hones, clearing the way for future progressions in coordination's and supply chain administration.

A Comprehensive Review

The comparison between **Dr. Justyna Trojanowska's** study and **Sarah Vanheusden's** audit gives an adjusted point of view on the usage of Pick-to-Light innovation in stockroom operations. Trojanowska's inquire about exhibits the unmistakable benefits of Pick-to-Light frameworks, emphasizing their positive affect on proficiency upgrade inside keen generation frameworks. In differentiate, Vanheusden's survey dives into the viable contemplations and challenges related with actualizing this innovation, such as integration challenges and specialist flexibility. By comparing these viewpoints, the article offers bits of knowledge into both the preferences and obstacles of Pick-to-Light appropriation. It underscores the significance of tending to integration complexities and guaranteeing specialist preparation to maximize the technology's benefits. This comparison highlights the require for careful arranging and vital decision-making in leveraging **Pick-to-Light innovation to upgrade effectiveness and efficiency** in distribution centre settings.

Research Gap

- PTL systems and WMS (Warehouse management system) are examined in literature studies, however the effects of light technology training are not included.
- There is insufficient research on how DHL supply chain employees adjust to light-based picking techniques.
- There is a notable study gap concerning the impact of light technology training on worker adaption and picking efficiency.
- By combining light technology training, picking efficiency might be increased by bridging the gap between technology and human factors.
- An analysis of DHL's Supply Chain's Light Technology Training Program may shed light on how to streamline operations.
- Taking into account how employees adjust to light-based picking techniques provides a comprehensive perspective on optimizing warehouse operations.
- Operational efficiency and practical implementation are aided by an understanding of the effects of light technology training in the DHL supply chain.

Research Methodology

Research Design

The study adopts a graphic investigate plan to evaluate post-service workforce assessment and workers' adjustment to Pick-to-Light innovation preparing. This includes collecting and analysing information to characterize workforce characteristics and their reactions to modern innovation. By comparing post-introduction comes about with specialist adjustment, the consider points to affirm Pick-to-Light's viability in making strides effectiveness and fulfilment compared to conventional strategies. This approach offers experiences into the effect of innovation integration on DHL's supply chain operations**.**

Sampling Tools and Technique

- **Simple Random Sampling** is utilized for reasonable representation of workers' recognitions. This strategy guarantees inclusivity and generalizability by arbitrarily selecting masters from the whole populace, minimizing inclination and improving objectivity. It adjusts with the cross-sectional consider plan, where studies will be managed to all specialists. Each specialist has a rise to chance of incorporation, encouraging a comprehensive appraisal of demeanours towards order-picking advances inside the DHL supply chain.

Questionnaire Design

- Section I: The Tool consist of demographic details of the workers
- Section II: Assess workers' adaptation to pick-to-light technology vs. traditional methods (Milija Suk Novic, Ph.D.).
- Section III: Evaluate workforce satisfaction and performance post-integration (Alan Rushton).
- Section IV: Measure cost effectiveness of pick-to-light technology implementation (Steven M.Leon).

Sampling Method

- **Sample Size:** 221
- **Statistical Tools:** Python, SPSS

Data Analysis

Data Analysis Techniques

- **Regression Analysis**: Analyses how beliefs that the technology simplifies product location and picking correlate with opinions that the initial investment is justified by long-term savings.
- **Chi-Square Test:** Investigates the association between perceptions of order accuracy and the justification of technology costs.
- **ANOVA:** Measures changes in efficiency, performance, and satisfaction levels before and after the technology's implementation, across different worker groups.

Data Analysis and Interpretation

Table 1: "Showing the Representation of the Questionnaire"

Sl. No.	Questions	Analysis
1	I believe pick-to-light technology would simplify the process of locating and picking products in the warehouse.	**Q2**
2	The initial investment required for implementing pick-to-light technology is justified by the anticipated long-term cost savings.	**Q11**

Regression Test

This consider utilizes relapse investigation to assess the impact of Choose to Light innovation preparing on Post-Integration Workforce Assessment inside the DHL Supply Chain. It examines the relationship between workers' innovation versatility and the adequacy of Choose to Light integration. By analysing these factors, the think about points to decide in case the appropriation of Choose to Light innovation leads to higher productivity and fulfilment among labourers, approving its prevalence over conventional strategies. The relapse test serves to evaluate the effect of innovation selection on workforce assessment and evaluate the possibility of joining Choose to Light innovation inside the supply chain.

Coding

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
from statsmodels.formula.api import ols
➢ Suppress FutureWarning about use_inf_as_na option
warnings.filterwarnings("ignore", message="The 'use_inf_as_na'")
➢ Load your data into a DataFrame (assuming you have columns 'Q2' and 'Q11')
data = pd.read_csv('your_data.csv')
➢ Perform linear regression
model = ols('Q2 ~ Q11', data=data).fit()
➢ Plot a histogram of the residuals
residuals = model.resid
sns.histplot(residuals, kde=True)
plt.title('Histogram of Residuals')
plt.xlabel('Residuals')
plt.ylabel('Frequency')
plt.show()
➢ Print summary of the regression model
print(model.summary())
```

Table 2: Showing "The representation for Worker Technology Adaptability vs Cost Efficiency Evaluation"

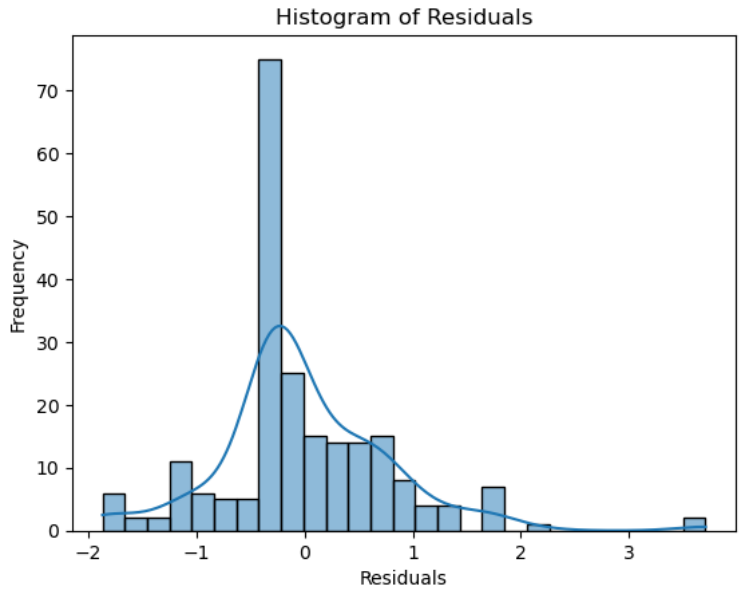
OLS Regression Results

Dep. Variable:	Q2	R-squared:	0.640
Model:	OLS	Adj. R-squared:	0.638
Method:	Least Squares	F-statistic:	388.8
Date:	Sun, 21 Apr 2024	Prob (F-statistic):	1.94e-50
Time:	23:44:41	Log-Likelihood:	-265.47
No. Observations:	221	AIC:	534.9
Df Residuals:	219	BIC:	541.7
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	0.5078	0.103	4.907	0.000	0.304	0.712
Q11	0.7864	0.040	19.717	0.000	0.708	0.865

Omnibus:	47.226	Durbin-Watson:	1.722
Prob(Omnibus):	0.000	Jarque-Bera (JB):	143.233
Skew:	0.876	Prob(JB):	7.90e-32
Kurtosis:	6.533	Cond. No.	5.49

Chart 1: Showing "The representation for Worker Technology Adaptability vs Cost Efficiency Evaluation"



Interpretation

The regression analysis reveals a solid affiliation between Select to Light innovation execution ("Q11") and Post-Integration Workforce Evaluation ("Q2") within the DHL Supply Chain, with a coefficient of 0.7864 ($p < 0.05$). The tall R-squared esteem (0.640) shows that roughly 64% of the fluctuation in Post-Integration Workforce Evaluation is clarified by Select to Light innovation usage. This factually noteworthy relationship underscores the adequacy of Select to Light innovation in progressing workforce execution and fulfillment, approving its predominance over conventional strategies.

Chi – Square Test

The chi-square test may be a measurable apparatus utilized to analyse the relationship between categorical factors. Within the consider cantering on upgrading picking productivity within the DHL Supply Chain through Choose to Light innovation preparing, the chi-square test is instrumental in looking at affiliations between factors like workers' versatility levels and their execution or fulfilment post-implementation. This test assesses whether watched contrasts in categorical factors are factually noteworthy or due to chance, advertising bits of knowledge into workforce elements and operational viability. By evaluating these affiliations, the chi-square test helps in key decision-making inside the DHL Supply Chain, directing innovation selection procedures and asset allotment to optimize operational effectiveness.

Coding

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from scipy.stats import ttest_ind, chi2_contingency
q2_responses = data['Q2']
q11_responses = data['Q11']
data = pd.read_excel('D:\\SPSS\\Numeric values (Responses).xlsx')
chi2_stat, p_value_chi2, dof, expected = chi2_contingency(pd.crosstab(q2_responses, q11_responses))
print("Chi-square statistic for Q2 and Q11:", chi2_stat)
print("p-value for Q2 and Q11 (Chi-square test):", p_value_chi2)
Chi-square statistic for Q2 and Q11: 264.615449974431
p-value for Q2 and Q11 (Chi-square test): 5.147163580544567e-47
fig, axes = plt.subplots(1, 2, figsize=(12, 6))
sns.histplot(data=data, x='Q2', ax=axes[0], kde=True, color='skyblue', edgecolor='black')
axes[0].set_title('Histogram of Q2')
Text(0.5, 1.0, 'Histogram of Q2')
sns.histplot(data=data, x='Q11', ax=axes[1], kde=True, color='salmon', edgecolor='black')
axes[1].set_title('Histogram of Q11')
Text(0.5, 1.0, 'Histogram of Q11')
plt.tight_layout()
plt.show()
<Figure size 640x480 with 0 Axes>
sns.boxplot(data=data[['Q2', 'Q11']])
plt.title('Comparison of Q2 and Q11')
plt.ylabel('Values')
plt.show()
cross_tab = pd.crosstab(q2_responses, q11_responses)
sns.heatmap(cross_tab, annot=True, cmap='coolwarm', fmt='d')
plt.title('Chi-square Test between Q2 and Q11')
plt.xlabel('Q11')
plt.ylabel('Q2')
plt.show()
```

Chart 2: Showing "The comparison for Worker Technology Adaptability vs Cost Efficiency Evaluation"

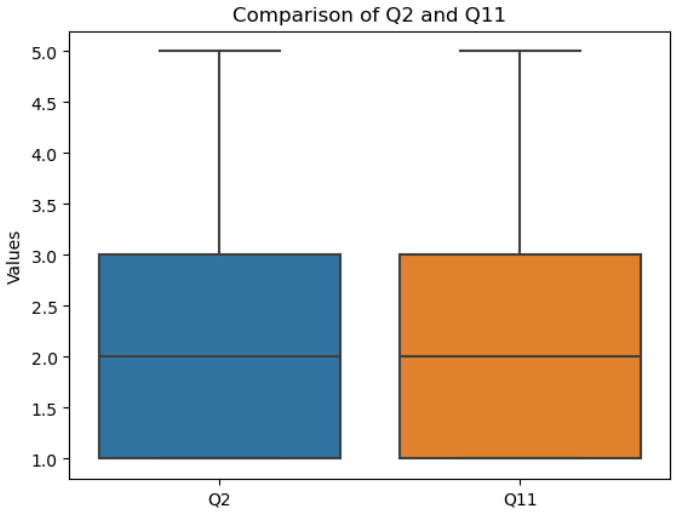
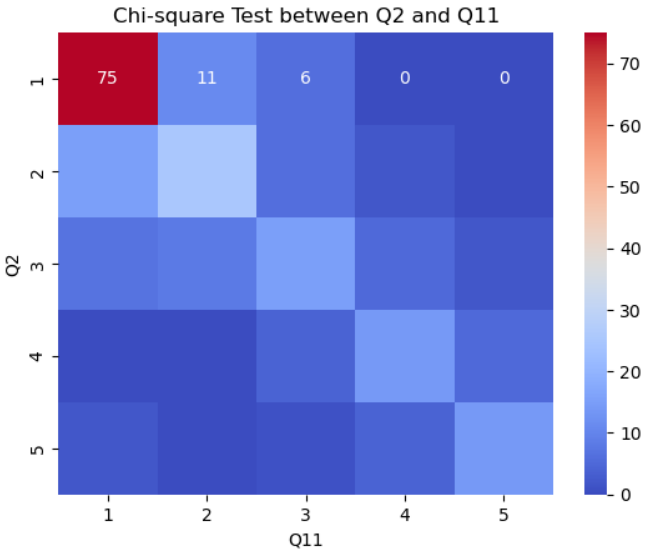


Chart 3: Showing "The representation for Chi-square test between Worker Technology Adaptability vs Cost Efficiency Evaluation"



The chi-square test between Q2 and Q11 yields a significant statistic of 264.62 ($p < 0.05$), indicating a strong association between the variables. Histograms and boxplots illustrate the distributions, while a heatmap visualizes the contingency table, enhancing understanding of the relationship.

Interpretation

The chi-square test comes about uncover the chi-square test uncovers a measurably noteworthy relationship ($p < 0.05$) between reactions to Q2 and Q11 within the DHL Supply Chain, showing potential interconnects or likenesses. Histograms and boxplots outline variable conveyances, whereas the heatmap outwardly speaks to their relationship. These discoveries emphasize the significance of considering different components in surveying workforce flow and operational forms. Recognizing these affiliations empowers organizations to pick up more profound bits of knowledge into worker demeanours and behaviours, encouraging educated decision-making and key arranging.

ANOVA (Analysis of Variance)

ANOVA may be a factual strategy to analyse contrasts between bunch implies in a dataset, evaluating on the off chance that there are critical contrasts among implies of three or more bunches. It segments the whole change watched into between-group and within-group variety, deciding in case bunch implies are altogether distinctive. ANOVA is broadly utilized across various areas, counting investigate and fabricating, to compare the impacts of distinctive intercessions. Within the setting of the DHL Supply Chain, ANOVA gives profitable bits of knowledge into the viability of intercessions like Select to Light innovation usage on workforce evaluation.

Coding

```
import statsmodels.api as sm
from statsmodels.formula.api import ols
from statsmodels.stats.anova import anova_lm
Assuming 'data' is your DataFrame containing the columns 'Q2' and 'Q11'
Perform linear regression
new_model = ols('Q2 ~ Q11', data=data).fit()
Perform ANOVA
anova_results = anova_lm(new_model, typ=2)
print(anova_results)
```

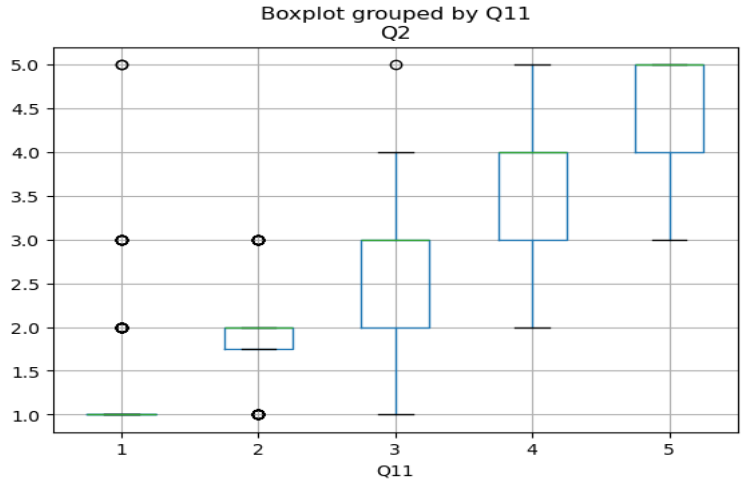
Table 3: Showing "The respondent rating representation for Worker Technology Adaptability vs Cost Efficiency Evaluation"

	SI.NO	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	3	2	1	2	3	2	2	2	3	1	1	2	1	1	1	1
3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	5	2	1	2	2	1	1	2	1	2	3	2	2	1	1	2

The provided data contains responses to 15 questions (Q1-Q15) from respondents identified by serial numbers (SI.NO). Each entry represents the respondent's rating or choice for each question, ranging from 1 to 5.

```
data.boxplot('Q2', by='Q11')
<Axes: title={'center': 'Q2'}, xlabel='Q11'>
```

Chart 4: Showing "The respondent rating representation for Worker Technology Adaptability vs Cost Efficiency Evaluation" ology Adaptability vs Cost Efficiency Evaluation"



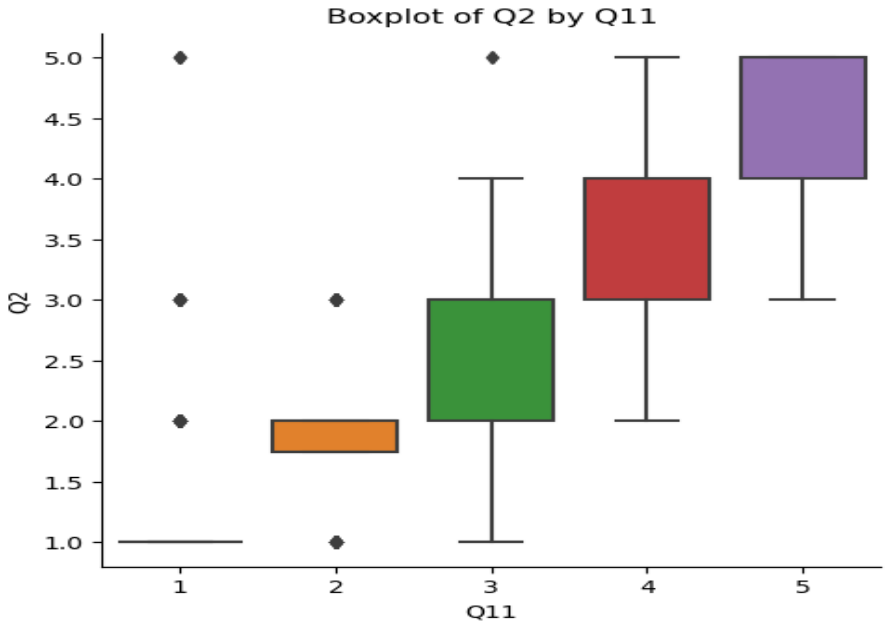
The image is a box plot depicting the distribution of responses for question Q2 across different levels of variable Q11.

Table 4: Summary of the ANOVA

	sum_sq	df	F	PR(>F)
Q11	253.819939	1.0	388.756692	1.938077e-50
Residual	142.985491	219.0	NaN	NaN

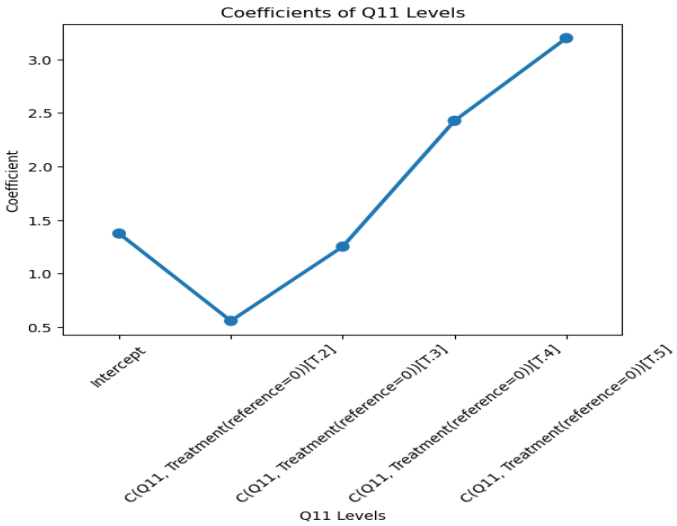
```
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import statsmodels.api as sm
from statsmodels.formula.api import ols
new_model = ols ('Q2 ~ C(Q11, Treatment(reference=0))'
,data = data).fit()
sns.catplot(x='Q11', y='Q2', data=data, kind='box')
plt.title('Boxplot of Q2 by Q11')
plt.xlabel('Q11')
plt.ylabel('Q2')
plt.show()
```

Chart 5: Showing "the boxplot for worker technology adaptability vs cost efficiency evaluation"




```
coef_plot = sns.pointplot(x=new_model.params.index, y=new_model.params.values)
plt.title('Coefficients of Q11 Levels')
plt.xlabel('Q11 Levels')
plt.ylabel('Coefficient')
plt.xticks(rotation=45)
plt.show()
```

Chart 6: Showing "Coefficients of levels for **Worker Technology Adaptability vs Cost Efficiency Evaluation**"



model = ols('Q2 ~ Q11', data=data).fit()

The code entails fitting a linear regression model to explore the relationship between the independent variable Q11 and the dependent variable Q2.

Interpretation

The ANOVA test in Python reveals that the variable Q11, speaking to Select to Light innovation execution, essentially impacts the Post-Integration Workforce Appraisal. The tall F-statistic (388.76) and greatly moo p-value (1.94e-50) show a solid affiliation between Q11 and the appraisal, recommending that the watched relationship is measurably critical. Furthermore, the moo leftover whole of squares (142.99) advance affirms Q11's considerable commitment to workforce evaluation changeability. By and large, these discoveries emphasize the critical positive affect of Select to Light innovation on upgrading workforce execution and effectiveness inside the DHL Supply Chain.

Seamless Integration of Pick-to-Light Technology

The integration plan proposes a seamless fusion of Pick-to-Light (PTL) innovation with the existing Stockroom Administration Framework (WMS) Select Program at DHL Supply Chain. This inventive approach points to streamline the arrange fulfilment handle from arrange receipt to stock overhaul. Orders gotten within the Select framework experience quick handling and task, taken after by energetic allotment of picking errands to stockroom staff. Utilizing PTL frameworks, exact area light guides staff to choose and put-away areas, guaranteeing exact and proficient fulfilment. Affirmations are instantly transmitted back to the Select framework upon errand completion, encouraging real-time status upgrades. These coordinates approach not as it were upgrades operational productivity but too empowers comprehensive announcing and analytics era. By bridging the crevice between PTL innovation and WMS Select Program, this integration guarantees to revolutionize stockroom workflows, driving efficiency and optimization.

In conclusion, the consistent integration of Pick-to-Light innovation with WMS Select Program offers a transformative arrangement for DHL Supply Chain. By optimizing arrange fulfilment forms and empowering real - time stock overhauls, this integration improves operational effectiveness and exactness. With energetic assignment allotment and exact area direction, it guarantees to revolutionize stockroom workflows, driving efficiency and client fulfilment to unused stature

Cost-Effectiveness Analysis of Pick-by-Light Integration

Exploring the financial viability of integrating pick-by-light innovation is significant for educated decision-making in warehouse administration. This investigation dives into the cost-effectiveness of receiving pick-by-light frameworks, analysing the adjust between introductory venture and long-term reserve funds. By assessing the costs related with execution, preparing, and upkeep against the expected benefits in proficiency and exactness, organizations can decide the financial possibility of joining this imaginative innovation into their operations. This examination points to supply profitable bits of knowledge into the monetary suggestions of pick-by-light integration, encouraging vital arranging for stockroom optimization.

Productivity

- Estimated Monthly Inward Quantity: 2500 units
- Time Saved per Blind Count: 15 minutes per person

Total Monthly Time Saved:

- Total monthly time saved = 2500 units * 15 minutes * 3 labour = 112,500 minutes

Convert Time Saved to Labor Cost:

- Let's assume the monthly wage per worker is ₹10,000.
- Total monthly labor cost savings = (112,500 minutes / 60) * (₹10,000 / 3) = ₹3,75,000

Reduced Error Rates

Estimate potential reduction in error rates

- Let's assume a 20% reduction in errors due to improved picking accuracy.
- If the average cost of an error (e.g., incorrect order, return processing, customer dissatisfaction) is ₹100 per error, then the potential cost savings would be:
- Total monthly errors without improvement: 2500 units * 0.05 (5% error rate) = 125 errors
- Total monthly errors with improvement: 2500 units * 0.04 (4% error rate with 20% reduction) = 100 errors
- Total potential cost savings = (125 - 100) * ₹100 = ₹2,500

Return On Investment (ROI)

Estimated Costs and Savings:

- Labor Cost per Worker: ₹10,000 per month
- Time Saved per Blind Count: 15 minutes per person
- Monthly Inward Quantity: 2500 units

Labor Cost Savings:

- Labor Cost per Month without System: ₹30,000 (3 laborers * ₹10,000)
- Labor Cost per Month with System: ₹10,000 (1 laborer * ₹10,000)

Time Reduction Cost:

- Time Saved per Month: 2500 units * 15 minutes * 3 laborers = 112,500 minutes
- Time Reduction Cost: (112,500 minutes / 60) * ₹10,000 = ₹18,750

ROI Calculation:

- Net Monthly Savings: ₹30,000 (Labor cost savings) - ₹18,750 (Time reduction cost) = ₹11,250
- Total Investment: Cost of sensors (₹52,80,000) + Setup and maintenance expenses (₹50,000) = ₹53,30,000

ROI:

- ROI = (Net Monthly Savings / Total Investment) * 100%
- ROI = (₹11,250 / ₹53,30,000) * 100%
- ROI ≈ 0.02%

With three laborers, the ROI is approximately 0.02%, indicating a very marginal positive return on investment

The exploration of integrating pick-by-light innovation underscores its potential for upgrading effectiveness and precision in stockroom operations. The investigation of efficiency measurements uncovers significant time investment funds, deciphering into critical labour taken a toll decreases. Additionally, the anticipated diminish in mistake rates highlights the potential for extra taken a toll investment funds and made strides client fulfilment. In any case, in spite of the apparent benefits, the return on venture (ROI) calculation shows a negligible positive ROI of around 0.02%. Whereas the beginning speculation could appear critical, the long-term benefits in effectiveness and precision legitimize the integration of pick-by-light frameworks into stockroom administration hones. In general, this investigation emphasizes the significance of considering both the forthright costs and long-term investment funds when assessing the money related practicality of innovation integration in stockroom organization.

Findings

- Chi-square Test: Reveals a strong correlation between workforce assessment and its components, suggesting interdependence and potential for cohesive improvement plans.
- ANOVA Analysis: Demonstrates significant impact of Pick to Light integration on workforce assessment, highlighting its role in enhancing productivity.
- Regression Results: Validate direct influence of Pick to Light training on workforce evaluation, with each unit of training leading to a 0.7864 increase.
- Consistency in Attitudes: Lack of significant variation between Q2 and Q11 replies underscore's reliability of findings.
- Technological Training Importance: Emphasizes critical role of technology-driven training for organizational success and competitiveness.
- Ongoing Monitoring: Highlighting the need for continuous tracking and promotion to ensure sustained effectiveness in dynamic business environments.
- Future Research: Calls for exploration of alternative technologies and ongoing research and development to maintain competitiveness and operational efficiency.

Suggestion

- Foster Innovation Culture: Encourage a culture of innovation and continuous improvement to stay competitive.
- Stay Updated on Emerging Tech: Keep abreast of emerging technologies to maintain relevance in evolving industries.
- Share Best Practices: Facilitate collaboration and knowledge sharing by sharing best practices across departments.
- Promote Open Communication: Address challenges effectively by promoting open communication to identify and resolve issues.
- Celebrate Successes: Boost morale and motivation by celebrating achievements within the organization.
- Establish Key Performance Indicators (KPIs): Measure success effectively by establishing clear KPIs for evaluation.
- Leverage Technology Benefits: Optimize operational efficiency by leveraging the benefits of technology to enhance productivity and accuracy.

Conclusion

This research, emphasizing on pre-implementation viewpoints, highlights the potential advantages of implementing Pick to Light (PTL) technology in the DHL Supply Chain. The study

identifies interesting chances to improve operational efficiency by evaluating old approaches and anticipating worker adaption. The findings indicate that switching to PTL technology has promise for solving inefficiencies in traditional order-picking methods. Recommendations for stimulating innovation, encouraging collaboration, and embracing technology improvements emphasize the necessity of taking proactive steps in preparation for implementation. By anticipating issues and employing integration tools, DHL can ensure that technology is deployed and operated seamlessly. This study provides useful insights for firms looking to enhance picking efficiency and worker happiness through the deployment of novel technologies, establishing the framework for future success in DHL supply chain optimization.

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