Ranky- Taguchi Calculator for The Employee Rapport Database (ERD) using the Taguchi Method

STATEMENT:

Explaination of Factors:
factor D: Design of the ERD system using secure transmission and software design

factor T: Testing of the systems at ERD for process and quality control of the specified system, to ensure the customer requirements are met.

factor L: labor unskilled vs. skilled labor to ensure the product requirement are met per the production specifications

factor M: Material for development of the ERD System and kiosk foundation are to be deisgned

In this experiment we will consider four factors which we think contribute to the high or low cost

1	Labor		L-ERD
2	Testing		T-ERD
3	Design		D-ERD
4	Material		M-ERD

Factors	Levels	
	1	2
L-ERD	skill	unskill
T-ERD	T1	T2
D-ERD	D1	D2
M-ERD	M1	M2

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factor L: labor unskilled vs. skilled labor to ensure the product requirement are met per the production specifications

factor M: Material for development of the ERD System and kiosk foundation are to be deisgned per quality assuarnce standards and process controls of material used in design.

A: CALCULATION OF S/N RATIO

$$\eta_j = -10 \log(\sigma_j^2)$$

$$\sigma_j^2 = \frac{1}{n} \sum_{i=1}^{i=n} y_{ij}^2$$

				Cost per Product		
Run	T	D	M	L_1	L_2	η_j
1	1	2	1	**75**	**75**	**-37.50**
2	1	2	2	**89**	**79**	**-38.50**
3	1	1	2	**69**	**59**	**-36.15**
4	1	2	1	**70**	**85**	**-37.83**

(B) CALCULATION OF EFFECTS

$$P_l = \sum \eta \ where P \ appears \ at \ level \ l$$

LEVEL	D	M	P
1	-76.00	-73.65	-76.33
2	-73.98	-76.33	-73.65

(C)CALCULATION OF VARIATIONS OF FACTORS

$$S_p = \frac{(P_1 - P_2)^2}{k}$$

$$S_T = \sum S_p$$

FACTORS	D	M	P	L
VARIATIONS	1.02579	1.79053	1.79052773	4.606847203

(D) CALCULATION OF DEGREES OF FREEDOM

FACTORS	D	M	P	L
f	1	1	1	3

FACTORS	D	M	P	L
VARIANCE	1.02579	1.79053	1.79052773	1.535615734

(E)CALCULATION OF ERROR VARIANCE AND ERROR VARIATION

$$S_e = \sum S_M \quad M : factors\ designated\ as\ error\ sources$$

S_e=	**3.58**
f_e=	**2**
V_e=	**1.79**

(F) CALCULATION OF PURE VARIATONS

$$S'_P = S_P - V_e \times f_P$$

$$S'_e = S_e + V_e \times \sum f_{factors\ considered\ as\ significant}$$

	H	ERROR
PURE VARIATION	-0.76474	5.37

(G) CALCULATION OF DEGREE OF CONTRIBUTION

$$\rho_P = \frac{S'_P}{S_T} \times 100$$

$$\rho_e = \frac{S'_e}{S_T} \times 100$$

	H	error
p%	-16.6	116.6

LEVEL	D	M	P
1	-76.00	-73.65	-76.33
2	-73.98	-76.33	-73.65

ACCORDING TO THESE VALUES THE OPTIMUM CONDITION IS:

FACTOR	D	M	P
LEVEL	1	1	1

ESTIMATION OF PROCESS AVERAGE UNDER OPTIMUM CONDITION:

$$\overline{T} = \frac{\sum_{j=1}^{j=k} \eta_j}{k} \qquad \overline{H_o} = \frac{H_{opt}}{number\ of\ runs\ \ where\ H\ \ appears\ at\ optimal\ level}$$

$\overline{T}$ = **.49**

$\overline{H_2}$ **-38.0011**

Finally: μ= -38.00