

Appendices

Table 12: Significant deviation analysis for 'General Environment'

General Environment	Mean	μ	Significant
Social	4	4	NO
Economics	3	4	YES
Honesty	4	4	NO
Technological	4	4	NO
Ecological	3	4	YES
Political	4	4	NO

Table 1b: Frequency analysis for general environment level diagnosis

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Social	0%	0%	0%	100%	0%
Economics	0%	0%	100%	0%	0%
Honesty	0%	0%	0%	100%	0%
Technological	0%	0%	0%	100%	0%
Ecological	0%	0%	100%	0%	0%
Political	0%	0%	0%	100%	0%
Means	0%	0%	33.33%	66.66%	0%

Table 13: Significant deviation analysis for 'Industry Structure'

Industry Structure	Mean	μ	Significant
Suppliers	3	4	YES
Buyers	4	4	NO
Rivalry among competitors	3	4	YES
Threat of substitutes	2	4	YES
Threat of entry	2	4	YES
Threat of complementary	4	4	NO

Table 2b: Frequency analysis for industry structure level diagnosis

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Suppliers	0%	0%	100%	0%	0%
Buyers	0%	0%	0%	100%	0%
Rivalry among Competitors	0%	0%	100%	0%	0%
Threat of substitutes	0%	100%	0%	0%	0%
Threat of entry	0%	100%	0%	0%	0%
Threat of complementary	0%	0%	0%	100%	0%
Means	0%	33.33%	33.33%	33.33%	0%

Table 14: Significant deviation analysis for ‘Strategic orientation’

Strategic orientation	Mean	μ	Significant
Strategy	4	4	NO
Core activity systems	3	4	YES
Human Resource Systems	2	4	YES
Structural system	4	4	NO
Measurements systems	3	4	YES
Culture	3	4	YES

Table 3b: Frequency analysis for strategic orientation diagnosis

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Strategy	0%	0%	0%	100%	0%
Core activity systems	0%	0%	100%	0%	0%
Human Resource Systems	0%	100%	0%	0%	0%
Structural system	0%	0%	0%	100%	0%
Measurements systems	0%	0%	100%	0%	0%
Culture	0%	0%	100%	0%	0%
means	0%	16.66%	50%	33.33%	0%

Table 15: Significant deviation analysis for 'Self-actuation Diagnosis'

Self-Actuation	Mean	μ	Significant
Self-influencing	4	4	NO
Self-regulating	2	4	YES
Self-organizing	4	4	NO
Self-sustaining	2	4	YES
Self-producing	2	4	YES
Self-referential	4	4	NO
Self-conscious	3	4	YES

Table 4b: Frequency analysis for self-actuation diagnosis

Frequency Analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Self-influencing	0%	0%	0%	100%	0%
Self-regulating	0%	100%	0%	0%	0%
Self-organizing	0%	0%	0%	100%	0%
Self-sustaining	0%	100%	0%	0%	0%
Self-producing	0%	100%	0%	0%	0%
Self-referential	0%	0%	0%	100%	0%
Self-conscious	0%	0%	100%	0%	0%
Means	0%	42.86%	14.28%	42.86%	0%

Table 16: Significant deviation analysis for ‘Dissipativeness’

Dissipativeness	Mean	μ	Significant
Structural orientation	4	4	NO
Action towards deviation	2	4	YES
Dynamic	4	4	NO
Tendency of form	3	4	YES
Internal condition	3	4	YES
Referent	3	4	YES
Logical orientation	4	4	NO
System type	4	4	NO

Table 5b: Frequency analysis for Dissipativeness Diagnosis

Frequency Analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Structural orientation	0%	0%	0%	100%	0%
Action towards deviation	0%	100%	0%	0%	0%
Dynamic	0%	0%	0%	100%	0%
Tendency of form	0%	0%	100%	0%	0%
Internal condition	0%	0%	100%	0%	0%
Referent	0%	0%	100%	0%	0%
Logical orientation	0%	0%	0%	100%	0%
System type	0%	0%	0%	100%	0%
Means	0%	12.5%	37.5%	50%	0%

Table 17: Significant deviation analysis for 'Group Level'

Group Level	Mean	Upper Limit	Lower Limit	Z obs	Significant
Goal Clarity	3.75	4.49	3.51	-1	NO
Task Structure	4.00	4.00	4.00	0	NO
Group functioning	3.50	4.98	3.02	-1	NO
Performance norms	4.00	4.00	4.00	0	NO
Group composition	3.75	4.49	3.51	-1	NO

Table 6b: Frequency analysis for group (department) level diagnosis

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Goal Clarity	0%	0%	25%	75%	0%
Task Structure	0%	0%	0%	100%	0%
Group functioning	0%	25%	0%	75%	0%
Performance norms	0%	0%	0%	100%	0%
Group composition	0%	0%	25%	75%	0%
Means	0%	5%	10%	85%	0%

Table 18: Significant deviation analysis for 'Actor System – Generic Level'

Generic Level	Mean	Upper Limit	Lower Limit	Z obs	Significant
Wholeness	3.50	4.57	3.43	-1.73	NO
Propositional	3.50	4.98	3.02	-1.00	NO
Normative	3.50	4.98	3.02	-1.00	NO
Extension	2.75	4.49	3.51	-5.00	YES
Qualities	3.75	4.49	3.51	-1.00	NO
Generic identity	4.00	4.00	4.00	0	NO

Table 7b: Frequency analysis for Actor System – generic level diagnosis

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Wholeness	0%	0%	75.00%	25.00%	0%
Propositional	0%	0%	25.00%	75.00%	0%
Normative	0%	0%	0%	100.00%	0%
Extension	0%	0%	100.00%	0%	0%
Qualities	0%	0%	100.00%	0%	0%
Generic identity	0%	0%	12.50%	87.50%	0%
means	0%	0%	52.08	47.92%	0%

Table 19: Significant deviation analysis for ‘Actor System – Individual Level’

Individual Level	Mean	Upper Limit	Lower Limit	Z obs	Significant
Self-referencing	3.78	4.18	3.81	-2.35	YES
Altruism	3.14	4.16	3.84	-10.36	YES
Self-reflective evolution	2.83	4.20	3.80	-11.58	YES

Table 8b: Frequency analysis for actor system – individual level diagnosis.

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Self-referencing	0%	9.30%	23.26%	47.67%	19.77%
Altruism	0%	18.60%	53.49%	23.26%	4.65%
Self-reflective evolution	0%	50.00%	20.93%	25.58%	3.49%
Means	0%	25.97%	32.56%	32.17%	9.30%

Table 20: Significant deviation analysis for 'Personal characteristics'

Personal characteristics	Mean	Upper Limit	Lower Limit	Z obs	Significant
Age	4.00	4.00	4.00	0	NO
Experience	3.49	4.13	3.87	-7.53	YES
Abilities	3.16	4.09	3.91	-18.05	YES
Growth Needs	3.41	4.11	3.89	-10.18	YES
Educations	3.20	4.08	3.92	-18.59	YES
Skills	3.31	4.12	3.88	-10.96	YES
Needs Expectation	2.90	4.09	3.91	-23.81	YES
Family Needs	3.85	4.08	3.92	-3.59	YES

Table 9b: Frequency analysis for personal characteristics level diagnosis

Frequency Analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Age	0%	0%	0%	100%	0%
Experience	0%	1.16%	54.65%	38.37%	5.81%
Abilities	0%	0%	83.72%	15.12%	1.16%
Growth Needs	0%	0%	58.14%	41.86%	0%
Educations	0%	0%	80.23%	19.77%	0%
Skills	0%	0%	72.09%	23.26%	4.65%
Needs Expectation	0%	15.12%	80.23%	4.65%	0%
Family Needs	0%	1.16%	11.63%	87.21%	0%
Means	0%	2.18%	55.09%	41.28%	1.45%

Table 21: Significant deviation analysis for ‘Job level – individual effectiveness’

Job Level (Individual effectiveness)	Mean	Upper Limit	Lower Limit	Z obs	Significant
Skill variety	3.41	4.12	3.88	-9.82	YES
Task identity	3.00	4.11	3.89	-17.49	YES
Autonomy	3.93	4.05	3.95	-2.49	YES
Task significant	3.74	4.16	3.84	-3.16	YES
Feedback results	3.86	4.07	3.93	-3.70	YES

Table 10b: Frequency analysis for individual effectiveness diagnosis

Frequency Analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
Skill variety	0%	3.49%	52.33%	44.19%	0%
Task identity	0%	1.16%	54.65%	38.37%	5.81%
Autonomy	0%	0%	83.72%	15.12%	1.16%
Task significant	0%	13.95%	2.33%	79.07%	4.65%
Feedback results	0%	0%	13.95%	86.05%	0%
Means	0	3.72%	41.40%	52.56	2.33%

Table 22: Significant deviation analysis for 'Internal Quality Assessment'

Internal Quality Assessment	Mean	μ	Significant
Management Commitment	4	4	NO
Customer Focus	4	4	NO
Quality Policy	2	4	YES
Quality Planning	3	4	YES
Administration	3	4	YES
Management Review	2	4	YES
Provision of resources	3	4	YES
Human Resource	3	4	YES
Infrastructure	4	4	NO
Work Environment	4	4	NO
Planning of Product Realization	2	4	YES
Customer related processes	4	4	NO
Design and Development	2	4	YES
Purchasing	2	4	YES
Production & service provision	4	4	NO
Planning	1	4	YES
Measurement & monitoring	1	4	YES
Control of nonconforming product	4	4	NO
Analysis of data	1	4	YES
Improvement	3	4	YES

Table 11b: Frequency analysis for Internal Quality Assessment

Frequency analysis	Poor 1	Fair 2	Satisfactory 3	Good 4	Excellent 5
V1	0%	0%	0%	100%	0%
V2	0%	0%	0%	100%	0%
V3	0%	100%	0%	0%	0%
V4	0%	0%	100%	0%	0%
V5	0%	0%	100%	0%	0%
V6	0%	100%	0%	0%	0%
V7	0%	0%	100%	0%	0%
V8	0%	0%	100%	0%	0%
V9	0%	0%	0%	100%	0%
V10	0%	0%	0%	100%	0%
V11	0%	100%	0%	0%	0%
V12	0%	0%	0%	100%	0%
V13	0%	100%	0%	0%	0%
V14	0%	100%	0%	0%	0%
V15	0%	0%	0%	100%	0%
V16	100%	0%	0%	0%	0%
V17	100%	0%	0%	0%	0%
V18	0%	0%	0%	100%	0%
V19	100%	0%	0%	0%	0%
V20	0%	0%	100%	0%	0%
mean	15.00%	25.00%	25.00%	35.00%	0%

Appendix

Testing hypothesis for organisation performance

I) Self-actuation	<u>Score</u>		
	4	1.00	1
	2	-1.00	1
	4	1.00	1
	2	-1.00	1
	2	-1.00	1
	4	1.00	1
	3	0.00	0
Total scores	21		
Mean	3		
SUM of squared deviation			6
SUM of squared dev./((n-1), variance			1
Square root of variance, S			1
Square root of n			2.65
Sx			0.377358
Z*Sx			0.739623
Critical value - lower limit			3.26
Critical value -upper limit			4.74
Z obs			-2.65
II) Actor System	<u>Score</u>		
	3.78	0.36	0.132011
	3.14	-0.28	0.076544
	2.83	-0.59	0.344178
	3.5	0.08	0.006944
	3.5	0.08	0.006944
	3.5	0.08	0.006944
	2.75	-0.67	0.444444
	3.75	0.33	0.111111
	4	0.58	0.340278
Total scores	30.75		
Mean	3.42		
SUM			1.47
SUM/n-1			0.18
Square R (D14)			0.42
Square-R of n			3.00
15/16 (Sx)			0.14
Z*SX			0.28
Critical value - lower limit			3.72
Critical value -upper limit			4.28

Z obs

-4.13

III) Dissipativeness	Score		
	4	0.63	0.390625
	2	-1.38	1.890625
	4	0.63	0.390625
	3	-0.38	0.140625
	3	-0.38	0.140625
	3	-0.38	0.140625
	4	0.63	0.390625
	4	0.63	0.390625
Total scores	27		
Mean	3.38		

SUM of squared deviation3.875

SUM of squared dev./((n-1), variance0.553571

Square root of variance, S0.74

Square root of n2.83

Sx0.261484

Z*Sx0.512509

Critical value - lower limit

3.49

Critical value -upper limit

4.51

Zobs

-2.39

IV) Six-level organization diagnosis	Score		
General Environment	Social	4	0.55 0.30403
	Economics	3	-0.45 0.201252
	Honesty	4	0.55 0.30403
	Technological	4	0.55 0.30403
	Ecological	3	-0.45 0.201252
	Political	4	0.55 0.30403
Industry Structure	Suppliers	3	-0.45 0.201252
	Buyers	4	0.55 0.30403
	Rivalry	3	-0.45 0.201252
	Threats sub	2	-1.45 2.098474
	Threats entry	2	-1.45 2.098474
	Threats compl.	4	0.55 0.30403
Strat. Orientation	Strategy	4	0.55 0.30403
	Core activity	3	-0.45 0.201252
	HRM	2	-1.45 2.098474
	Struc. Syst	4	0.55 0.30403
	Measurements	3	-0.45 0.201252
	Culture	3	-0.45 0.201252
Group level	Goal Clarity	3.75	0.30 0.090835
	Task	4	0.55 0.30403
	Group funct	3.5	0.05 0.002641
	Perform. Norm	4	0.55 0.30403

Personal Charac	Group comp.	3.75	0.30	0.090835
	Age	4	0.55	0.30403
	Exp	3.65	0.20	0.040557
	Abilities	3.24	-0.21	0.043519
	Growth needs	3.55	0.10	0.01028
	Education	3.37	-0.08	0.00618
	Skills	3.58	0.13	0.017263
	Needs	2.99	-0.46	0.210324
	Family	3.83	0.38	0.145457
	Skills	3.41	-0.04	0.001491
Individual effect	Task	3	-0.45	0.201252
	Autonomy	3.93	0.48	0.231735
	Task	3.74	0.29	0.084907
	Feedback	3.86	0.41	0.169241
Total scores		124.15		
Mean		3.45		

SUM of squared deviation	12.40
SUM of squared dev./ (n-1), variance	0.35
Square root of variance, S	0.59
Square root of n	6.00
Sx	0.10
Z*Sx	0.19

Critical value - lower limit 3.81

Critical value -upper limit 4.19

Zobs -5.59

V) Internal quality audit

		<u>Score</u>		
General Environment	V1	4	1.2	1.44
	V2	4	1.2	1.44
	V3	2	-0.8	0.64
	V4	3	0.2	0.04
	V5	3	0.2	0.04
	V6	2	-0.8	0.64
Industry Structure	V7	3	0.2	0.04
	V8	3	0.2	0.04
	V9	4	1.2	1.44
	V10	4	1.2	1.44
	V11	2	-0.8	0.64
	V12	4	1.2	1.44
Strat. Orientation	V13	2	-0.8	0.64
	V14	2	-0.8	0.64
	V15	4	1.2	1.44
	V16	1	-1.8	3.24
	V17	1	-1.8	3.24
	V18	4	1.2	1.44
Group level	V19	1	-1.8	3.24

	V20	3	0.2	0.04
Total scores		56		
Mean		2.80		
SUM of squared deviation				23.20
SUM of squared dev./ $(n-1)$, variance				1.22
Square root of variance, S				1.11
Square root of n				4.47
Sx				0.25
Z*Sx				0.49
Critical value - lower limit				3.51
Critical value -upper limit				4.49
Zobs				-4.83

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gnificant deviation analysis for "Group Level"

Variables	Description																			
V1	Goal clarity																			
V2	Task Structure																			
V3	Group function																			
V4	Performance norms																			
V5	Group composition																			
	V1				V2				V3				V4				V5			
UE	4	0.25	0.0625		4	0	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625			
UC	4	0.25	0.0625		4	0	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625			
JP	4	0.25	0.0625		4	0	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625			
JM	3	-0.75	0.5625		4	0	0	2	-1.50	2.25	4	0	0	0	3	-0.75	0.5625			
total scores	15				16				14				16				15			
mean (divide total by 8)	3.75				4.00				3.50				4.00				3.75			
UM of squared deviation					0.75				0.00				3.00				0.00			
UM of squared dev / (n-1), variance					0.25				0				1				0			
quare root of variance, S					0.5				0				1				0			
quare root of n					2				2				2				2			
k					0.25				0				0.5				0			
*Sx					0.49				0				0.98				0			
critical value - lower limit					3.51				4				3.02				4			
critical value -upper limit					4.49				4				4.98				4			
obs					-1				#DIV/0!				-1				#DIV/0!			

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Significant deviation analysis for "Group Level"

	Variables		Description													
	V1	V2	V1	V2	V3	V4	V5	V1	V2	V3	V4	V5	V1	V2	V3	V4
UE	4	0.25	0.0625	4	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625	0.0625
UC	4	0.25	0.0625	4	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625	0.0625
UP	4	0.25	0.0625	4	0	0	4	0.50	0.25	4	0	0	4	0.25	0.0625	0.0625
UM	3	-0.75	0.5625	4	0	0	2	-1.50	2.25	4	0	0	3	-0.75	0.5625	0.5625
total scores	15			16			14			16			15			
mean (divide total by 8)	3.75			4.00			3.50			4.00			3.75			
SUM of squared deviation			0.75			0.00			3.00			0.00			0.75	
SUM of squared dev. / (n-1), variance			0.25			0			1			0			0.25	
square root of variance, S			0.5			0			1			0			0.5	
square root of n			2			2			2			2			2	
ix			0.25			0			0.5			0			0.25	
*Sx			0.49			0			0.98			0			0.49	
Critical value - lower limit			3.51			4			3.02			4			3.51	
Critical value -upper limit			4.49			4			4.98			4			4.49	
Tobs			-1			#DIV/0!			-1			#DIV/0!			-1	

Appendix
Significant deviation analysis for "Actor System - Generic Level"

	Variables			Description																	
	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21
JE	4	0.50	0.25	4	0.50	0.25	4	0.50	0.25	4	0.50	0.25	3	0.25	0.0625	4	0.25	0.0625	4	0	0
JC	4	0.50	0.25	4	0.50	0.25	4	0.50	0.25	3	0.25	0.0625	4	0.25	0.0625	4	0.25	0.0625	4	0	0
JP	3	-0.50	0.25	4	0.50	0.25	4	0.50	0.25	3	0.25	0.0625	4	0.25	0.0625	4	0.25	0.0625	4	0	0
JM	3	-0.50	0.25	2	-1.50	2.25	2	-1.50	2.25	2	-0.75	0.5625	3	-0.75	0.5625	4	0	0	4	0	0
Total scores	14			14			14			11			15			16					
Mean (divide total by 8)	3.50			3.50			3.50			2.75			3.75			4.00					
RM of squared deviation		1.00			3.00			3.00			0.75			0.75			0.25			0.00	
RM of squared dev / (n-1), variance		0.333333			1			1			0.25			0.25			0.25			0	
square root of variance, S		0.57735			1			1			0.5			0.5			0.5			0	
square root of n		2			2			2			2			2			2			2	
s		0.288675			0.5			0.5			0.25			0.25			0.25			0	
Sx		0.565623			0.98			0.98			0.49			0.49			0.49			0	
critical value - lower limit		3.43			3.02			3.02			3.51			3.51			3.51			4.59	
critical value - upper limit		4.57			4.98			4.98			4.49			4.49			4.49			4.00	
obs		-1.73			-1.00			-1.00			-5.00			-1.00			-1.00			NDIVIM	

Appendix

Significant deviation analysis for "Actor System - Individual level"

Variables	Description		Self-referencing		Altruism		Self-reflective evolution			
	V1	V2	V1	V2	V1	V2	V1	V2		
Position	Name	V1	Dev. Score	Square	V2	Dev. Score	Square	V3	Dev. Score	Square
President	KIPP	4	0.22	0.0484	4	0.86	0.7396	5	2.17	4.7089
Sales & Marketing Director	Patrick	5	1.22	1.4884	5	1.86	3.4596	5	2.17	4.7089
National Sales Manager	Karen	3	-0.78	0.6084	2	-1.14	1.2996	4	1.17	1.3689
Business Manager	LOI	4	0.22	0.0484	3	-0.14	0.0196	4	1.17	1.3689
	Rosko	4	0.22	0.0484	3	-0.14	0.0196	4	1.17	1.3689
	Simon	4	0.22	0.0484	4	0.86	0.7396	4	1.17	1.3689
Training Manager	Alfred Lee	2	-1.78	3.1684	2	-1.14	1.2996	3	0.17	0.0289
Product Manager	CCW	4	0.22	0.0484	3	-0.14	0.0196	4	1.17	1.3689
	LLL	4	0.22	0.0484	4	0.86	0.7396	4	1.17	1.3689
	Sandy	4	0.22	0.0484	2	-1.14	1.2996	4	1.17	1.3689
	Shawn	4	0.22	0.0484	2	-1.14	1.2996	4	1.17	1.3689
District Sales Manager	Jack	4	0.22	0.0484	4	0.86	0.7396	4	1.17	1.3689
	Stanford	4	0.22	0.0484	3	-0.14	0.0196	4	1.17	1.3689
	Chris	4	0.22	0.0484	4	0.86	0.7396	4	1.17	1.3689
	Leslie	4	0.22	0.0484	2	-1.14	1.2996	4	1.17	1.3689
	Adam	4	0.22	0.0484	3	-0.14	0.0196	4	1.17	1.3689
	Adrian	3	-0.78	0.6084	2	-1.14	1.2996	3	0.17	0.0289
	Alvin	4	0.22	0.0484	4	0.86	0.7396	5	2.17	4.7089
Key Account Manager	Nathan	3	-0.78	0.6084	2	-1.14	1.2996	2	-0.83	0.6889
Sales Representatives	Chang Poh Wan	5	1.22	1.4884	4	0.86	0.7396	3	0.17	0.0289
	Michael Sze	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Ang Eng Keong	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Tay CK	4	0.22	1.4884	4	0.86	0.7396	3	0.17	0.0289
	One Ahk Seong	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Gan SC	5	1.22	1.4884	3	-0.14	0.0196	3	0.17	0.0289
	Andrew Au	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	David Choi	5	1.22	1.4884	4	0.86	0.7396	3	0.17	0.0289
	Jason Raah	5	1.22	1.4884	4	0.86	0.7396	4	1.17	1.3689
	Strahlen	5	1.22	1.4884	4	0.86	0.7396	4	1.17	1.3689
	Joseph Nondy	2	-1.78	3.1684	3	-0.14	0.0196	2	-0.83	0.6889
	Abdul Aziz	3	-0.78	0.6084	3	-0.14	0.0196	3	0.17	0.0289
	John Gurdas	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Offery Tai	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Shah Pih Hoon	4	0.22	0.0484	4	0.86	0.7396	2	-0.83	0.6889
	Shamuddin	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Peter Tan	3	1.22	1.4884	3	-0.14	0.0196	3	0.17	0.0289
	Cosmos	4	0.22	0.0484	3	-0.14	0.0196	3	0.17	0.0289
	Cheah Kik Leong	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Low Wen Si	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Yvonne Wool	5	1.22	1.4884	4	0.86	0.7396	4	1.17	1.3689
	India	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Low Hal Beng	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Priscilla Chong	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Karen Hui	5	1.22	1.4884	3	-0.14	0.0196	3	0.17	0.0289
	Richard The	4	0.22	0.0484	3	-0.14	0.0196	3	0.17	0.0289
	Jasmine	4	0.22	0.0484	2	-1.14	1.2996	2	-0.83	0.6889
	Sunny	4	0.22	0.0484	4	0.86	0.7396	2	-0.83	0.6889
	Stephanie	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Ganesh	4	0.22	0.0484	2	-1.14	1.2996	2	-0.83	0.6889
	Ann Ding	4	0.22	0.0484	4	0.86	0.7396	3	0.17	0.0289
	Yvonne Chew	5	1.22	1.4884	5	1.86	3.4596	4	1.17	1.3689
	Dinash	2	-1.78	3.1684	2	-1.14	1.2996	2	-0.83	0.6889
	Khai SL	3	-0.78	0.6084	2	-1.14	1.2996	2	-0.83	0.6889
	Eng Chew Sze	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Azhar	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Eric Gordon	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
	Valentino	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Wendy	4	0.22	0.0484	2	-1.14	1.2996	2	-0.83	0.6889
	Eric Ng	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Chen	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Sue Kang	4	0.22	0.0484	2	-1.14	1.2996	2	-0.83	0.6889
	Yow	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Tan Khan	4	0.22	0.0484	2	-1.14	1.2996	3	0.17	0.0289
	Jason Chan	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Sabrina Leong	3	-0.78	0.6084	2	-1.14	1.2996	2	-0.83	0.6889
	Vivian Chok	5	1.22	1.4884	4	0.86	0.7396	3	0.17	0.0289
	Barry	5	1.22	1.4884	4	0.86	0.7396	4	1.17	1.3689
	Richard Liaw	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Deborah	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Deemian	5	1.22	1.4884	3	-0.14	0.0196	2	-0.83	0.6889
	Raymond Teoh	4	0.22	0.0484	3	-0.14	0.0196	2	-0.83	0.6889
	Allen Kung	5	1.22	1.4884	3	-0.14	0.0196	2	-0.83	0.6889
	Tan See Ching	5	1.22	1.4884	6	1.86	3.4596	4	1.17	1.3689
Senior Secretary	Doreen Gan	3	-0.78	0.6084	3	-0.14	0.0196	3	0.17	0.0289
	Mimi Foo	2	-1.78	3.1684	4	0.86	0.7396	2	-0.83	0.6889
Marketing Secretary	Lai Wan Yan	3	-0.78	0.6084	3	-0.14	0.0196	3	0.17	0.0289
Sales Secretary	Lyn	2	-1.78	3.1684	3	-0.14	0.0196	2	-0.83	0.6889
Sales Statistician	Jackie	2	-1.78	3.1684	3	-0.14	0.0196	2	-0.83	0.6889
Medical Affairs Manager	Anita	4	0.22	0.0484	3	-0.14	0.0196	3	0.17	0.0289
Regulatory Manager	Daphne	3	-0.78	0.6084	4	0.86	0.7396	2	-0.83	0.6889
IT Manager	Kelly	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
HR Director	Vivian	3	-0.78	0.6084	3	-0.14	0.0196	2	-0.83	0.6889
Finance Manager	Sylvia	3	-0.78	0.6084	4	0.86	0.7396	4	1.17	1.3689
Finance Assistant	PCY	2	-1.78	3.1684	3	-0.14	0.0196	4	1.17	1.3689
	Vivian Chia	2	-1.78	3.1684	3	-0.14	0.0196	2	-0.83	0.6889
Total scores		325			270			243		
Mean (divide total by #)		3.78			3.14			2.83		
SUM of squared deviation			64.8024			50.3256			74.3864	
SUM of squared dev./(n-1), variance			0.762381			0.592058			0.875122	
Square root of variance, S			0.87			0.77			0.94	
Square root of n			9.27			9.27			9.27	
Sx			0.090351			0.082064			0.101402	
Z/Sx			0.183648			0.162805			0.198749	
Critical value - lower limit			3.82			3.84			3.89	
Critical value -upper limit			4.18			4.16			4.29	
Zobs			-2.35			-16.36			-11.58	

Most deviation analysis for "personal characteristics"

Description		1997		1998		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035		2036		2037		2038		2039		2040		2041		2042		2043		2044		2045		2046		2047		2048		2049		2050		2051		2052		2053		2054		2055		2056		2057		2058		2059		2060		2061		2062		2063		2064		2065		2066		2067		2068		2069		2070		2071		2072		2073		2074		2075		2076		2077		2078		2079		2080		2081		2082		2083		2084		2085		2086		2087		2088		2089		2090		2091		2092		2093		2094		2095		2096		2097		2098		2099		2100		2101		2102		2103		2104		2105		2106		2107		2108		2109		2110		2111		2112		2113		2114		2115		2116		2117		2118		2119		2120		2121		2122		2123		2124		2125		2126		2127		2128		2129		2130		2131		2132		2133		2134		2135		2136		2137		2138		2139		2140		2141		2142		2143		2144		2145		2146		2147		2148		2149		2150		2151		2152		2153		2154		2155		2156		2157		2158		2159		2160		2161		2162		2163		2164		2165		2166		2167		2168		2169		2170		2171		2172		2173		2174		2175		2176		2177		2178		2179		2180		2181		2182		2183		2184		2185		2186		2187		2188		2189		2190		2191		2192		2193		2194		2195		2196		2197		2198		2199		2200		2201		2202		2203		2204		2205		2206		2207		2208		2209		2210		2211		2212		2213		2214		2215		2216		2217		2218		2219		2220		2221		2222		2223		2224		2225		2226		2227		2228		2229		2230		2231		2232		2233		2234		2235		2236		2237		2238		2239		2240		2241		2242		2243		2244		2245		2246		2247		2248		2249		2250		2251		2252		2253		2254		2255		2256		2257		2258		2259		2260		2261		2262		2263		2264		2265		2266		2267		2268		2269		2270		2271		2272		2273		2274		2275		2276		2277		2278		2279		2280		2281		2282		2283		2284		2285		2286		2287		2288		2289		2290		2291		2292		2293		2294		2295		2296		2297		2298		2299		2300		2301		2302		2303		2304		2305		2306		2307		2308		2309		2310		2311		2312		2313		2314		2315		2316		2317		2318		2319		2320		2321		2322		2323		2324		2325		2326		2327		2328		2329		2330		2331		2332		2333		2334		2335		2336		2337		2338		2339		2340		2341		2342		2343		2344		2345		2346		2347		2348		2349		2350		2351		2352		2353		2354		2355		2356		2357		2358		2359		2360		2361		2362		2363		2364		2365		2366		2367		2368		2369		2370		2371		2372		2373		2374		2375		2376		2377		2378		2379		2380		2381		2382		2383		2384		2385		2386		2387		2388		2389		2390		2391		2392		2393		2394		2395		2396		2397		2398		2399		2400		2401		2402		2403		2404		2405		2406		2407		2408		2409		2410		2411		2412		2413		2414		2415		2416		2417		2418		2419		2420		2421		2422		2423		2424		2425		2426		2427		2428		2429		2430		2431		2432		2433		2434		2435		2436		2437		2438		2439		2440		2441		2442		2443		2444		2445		2446		2447		2448		2449		2450		2451		2452		2453		2454		2455		2456		2457		2458		2459		2460		2461		2462		2463		2464		2465		2466		2467		2468		2469		2470		2471		2472		2473		2474		2475		2476		2477		2478		2479		2480		2481		2482		2483		2484		2485		2486		2487		2488		2489		2490		2491		2492		2493		2494		2495		2496		2497		2498		2499		2500		2501		2502		2503		2504		2505		2506		2507		2508		2509		2510		2511		2512		2513		2514		2515		2516		2517		2518		2519		2520		2521		2522		2523		2524		2525		2526		2527		2528		2529		2530		2531		2532		2533		2534		2535		2536		2537		2538		2539		2540		2541		2542		2543		2544		2545		2546		2547		2548		2549		2550		2551		2552		2553		2554		2555		2556		2557		2558		2559		2560		2561		2562		2563		2564		2565		2566		2567		2568		2569		2570		2571		2572		2573		2574		2575		2576		2577		2578		2579		2580		2581		2582		2583		2584		2585		2586		2587		2588		2589		2590		2591		2592		2593		2594		2595		2596		2597		2598		2599		2600		2601		2602		2603		2604		2605		2606		2607		2608		2609		2610		2611		2612		2613		2614		2615		2616		2617		2618		2619		2620		2621		2622		2623		2624		2625		2626		2627		2628		2629		2630		2631		2632		2633		2634		2635		2636		2637		2638		2639		2640		2641		2642		2643		2644		2645		2646		2647		2648		2649		2650		2651		2652		2653		2654		2655		2656		2657		2658		2659		2660		2661		2662		2663		2664		2665		2666		2667		2668		2669		2670		2671		2672		2673		2674		2675		2676		2677		2678		2679		2680		2681		2682		2683		2684		2685		2686		2687		2688		2689		2690		2691		2692		2693		2694		2695		2696		2697		2698		2699		2700		2701		2702		2703		2704		2705		2706		2707		2708		2709		2710		2711		2712		2713		2714		2715		2716		2717		2718		2719		2720		2721		2722		2723		2724		2725		2726		2727		2728		2729		2730		2731		2732		2733		2734		2735		2736		2737		2738		2739		2740		2741		2742		2743		2744		2745		2746		2747		2748		2749		2750		2751		2752		2753		2754		2755		2756		2757		2758		2759		2760		2761		2762		2763		2764		2765		2766		2767		2768		2769		2770		2771		2772		2773		2774		2775		2776		2777		2778		2779		2780		2781		2782		2783		2784		2785		2786		2787		2788		2789		2790		2791		2792		2793		2794		2795		2796		2797		2798		2799		2800		2801		2802		2803		2804		2805		2806		2807		2808		2809		2810		2811		2812		2813		2814		2815		2816		2817		2818		2819		2820		2821		2822		2823		2824		2825		2826		2827		2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1	Age	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00</																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Mid value - lower limit	4.00	3.87	3.91	3.88	3.85	3.88	3.91	3.85
Mid value - upper limit	4.00	4.12	4.09	4.11	4.08	4.12	4.09	4.06

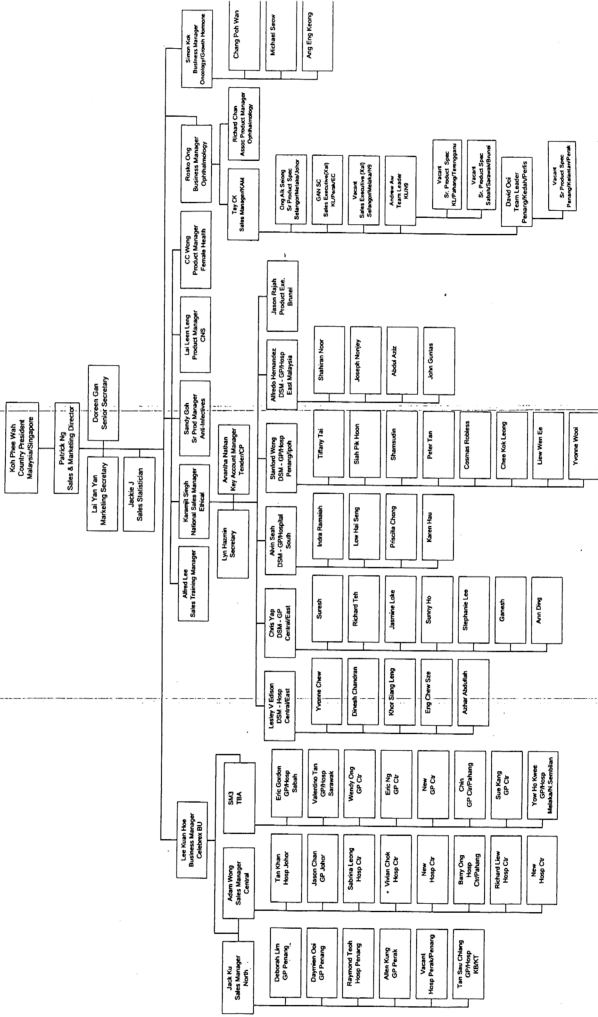
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Appendix

Significant deviation analysis for "Job level - individual effectiveness"

Variables		Description											
V1		Skill variety											
V2		Task identity											
V3		Autonomy											
V4		Task significant											
V5		Feedback results											
Position	Name	Score 1	Dev. Score	Score 2	Dev. Score	Score 3	Dev. Score	Score 4	Dev. Score	Score 5	Dev. Score	Score 6	Dev. Score
President	KFW	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
Sales & Marketing Director	Patrice	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
National Sales Manager	Karen	3	-0.41	0.1681	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
Business Manager	LKH	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Rosko	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Simon	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	5	1.26	1.5676
Training Manager	Afred Lee	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	3	-0.74	0.5476
Product Manager	CCW	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	LLL	3	-0.41	0.1681	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Sandy	3	-0.41	0.1681	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
District Sales Manager	Shawn	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Jack	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Stanford	3	-0.41	0.1681	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Chris	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Leslie	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Adam	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
	Adrian	2	-1.41	1.9881	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Alvin	4	0.59	3.481	4	1.00	1	4	0.07	0.0049	4	0.26	0.0676
Key Account Manager	Nathan	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
Sales Representatives	Chang Pui Wan	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	5	1.26	1.5676
	Michael Siew	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	5	1.26	1.5676
	Ang Eng Keong	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	5	1.26	1.5676
	Tay Oi	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	ONG AK Siewing	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Gen SC	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Andrew Joo	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	David Ooi	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Jason Rajah	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Shantanu	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Joseph Norley	2	-1.41	1.9881	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Abdul Aziz	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	John Gurles	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Tiffany Tai	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Slah Pih Hoon	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Shamouni	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Peter Tan	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Connas	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Chew Kok Lening	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Lee Wen Ee	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Yvonne Wool	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Indira	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Low Hui Sang	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Priscilla Cheng	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Karen Hsu	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Suresh	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Richard Tse	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Jasmine	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Sunny	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Shaphania	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Genesh	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Aun Ding	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Yvonne Chew	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Dinesh	2	-1.41	1.9881	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Khor SL	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Eng Chew Sze	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Ashar	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Eric Gordon	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Vasanthini	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Wendy	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Eric Ng	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Chis	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Sue King	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Yow	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Tan Khan	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Jasen Chan	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Seahna Leong	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Vivian Chik	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Berry	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Richard Liaw	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Deborah	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Dayneen	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Raymond Teoh	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Alan Kung	3	-0.41	0.1681	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
	Tan Sau Ching	4	0.59	3.481	3	0.00	0	4	0.07	0.0049	4	0.26	0.0676
Senior Secretary	Doreen Gan	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
	Mini Fao	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
Marketing Secretary	Lei Van Yan	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
Sales Secretary	Lyn	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
Sales Distribution	Jackie	3	-0.41	0.1681	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
Assistant Office Manager	Annie	4	0.59	3.481	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
Regulatory Manager	Daphne	4	0.59	3.481	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
IT Manager	Kelly	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
HR Director	Voon	3	-0.41	0.1681	2	-1.00	1	4	0.07	0.0049	2	-1.74	3.0276
Finance Manager	Sylvia	4	0.59	3.481	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
Finance Assistant	PCY	3	-0.41	0.1681	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
	Vivian Chis	3	-0.41	0.1681	2	-1.00	1	3	-0.93	0.8649	2	-1.74	3.0276
Total scores		293		258		338		322		322		322	
Mean (divide total by 16)		3.41		3.98		3.83		3.74		3.74		3.74	
SUM of squared deviation			26.7566		24.00		5.5814		48.3716		10.3226		10.3226
SUM of squared dev.(n-1), variance			0.314794		0.282053		0.605668		0.581918		0.121478		0.121478
Square root of variance, s			0.56		0.53		0.26		0.75		0.35		0.35
Square root of n			9.27		9.27		9.27		9.27		9.27		9.27
3s			0.06		0.06		0.03		0.08		0.08		0.04
2*3s			0.12		0.11		0.05		0.16		0.16		0.07
Critical value - lower limit			3.88		3.89		3.95		3.84		3.93		3.93
Critical value -upper limit			4.12		4.11		4.05		4.16		4.07		4.07
Zobs			-8.82		-17.48		-4.85		-4.48		-3.16		-3.79

Pharmacia Corporation



Quality management systems — Requirements

1 Scope

1.1 General

This International Standard specifies requirements for a quality management system where an organization

- a) needs to demonstrate its ability to consistently provide product that meets customer and applicable regulatory requirements, and
- b) aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable regulatory requirements.

NOTE In this International Standard, the term "product" applies only to the product intended for, or required by, a customer.

1.2 Application

All requirements of this International Standard are generic and are intended to be applicable to all organizations, regardless of type, size and product provided.

Where any requirement(s) of this International Standard cannot be applied due to the nature of an organization and its product, this can be considered for exclusion.

Where exclusions are made, claims of conformity to this International Standard are not acceptable unless these exclusions are limited to requirements within clause 7, and such exclusions do not affect the organization's ability, or responsibility, to provide product that fulfils customer and applicable regulatory requirements.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 9000—¹⁾, *Quality management systems — Fundamentals and vocabulary*.

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 9000 apply.

¹⁾ To be published. (Revision of ISO 8402:1994 and ISO 9000-1:1994)

The following terms, used in this edition of ISO 9001 to describe the supply chain, have been changed to reflect the vocabulary currently used:



The term "organization" replaces the term "supplier" used in ISO 9001:1994, and refers to the unit to which this International Standard applies. Also, the term "supplier" now replaces the term "subcontractor".

Throughout the text of this International Standard, wherever the term "product" occurs, it can also mean "service".

4 Quality management system

4.1 General requirements

The organization shall establish, document, implement and maintain a quality management system and continually improve its effectiveness in accordance with the requirements of this International Standard.

The organization shall

- a) identify the processes needed for the quality management system and their application throughout the organization (see 1.2),
- b) determine the sequence and interaction of these processes,
- c) determine criteria and methods needed to ensure that both the operation and control of these processes are effective,
- d) ensure the availability of resources and information necessary to support the operation and monitoring of these processes,
- e) monitor, measure and analyse these processes, and
- f) implement actions necessary to achieve planned results and continual improvement of these processes.

These processes shall be managed by the organization in accordance with the requirements of this International Standard.

NOTE Processes needed for the quality management system referred to above should include processes for management activities, provision of resources, product realization and measurement.

Where an organization chooses to outsource any process that affects product conformity with requirements, the organization shall ensure control over such processes. Control of such outsourced processes shall be identified within the quality management system.

4.2 Documentation requirements

4.2.1 General

The quality management system documentation shall include

- a) documented statements of a quality policy and quality objectives,
- b) a quality manual,
- c) documented procedures required by this International Standard,
- d) documents needed by the organization to ensure the effective planning, operation and control of its processes¹⁾ and
- e) quality records required by this International Standard (see 4.2.4).

NOTE 1 Where the term "documented procedure" appears within this International Standard, this means that the procedure is established, documented, implemented and maintained.

NOTE 2 The extent of the quality management system documentation can differ from one organization to another due to

- a) the size of organization and type of activities,
- b) the complexity of processes and their interactions, and
- c) the competence of personnel.

NOTE 3 The documentation can be in any form or type of medium.

4.2.2 Quality manual

The organization shall establish and maintain a quality manual that includes

- a) the scope of the quality management system, including details of and justification for any exclusions (see 1.2),
- b) the documented procedures established for the quality management system, or reference to them, and
- c) a description of the interaction between the processes of the quality management system.

4.2.3 Control of documents

Documents required by the quality management system shall be controlled. Quality records are a special type of document and shall be controlled according to the requirements given in 4.2.4.

A documented procedure shall be established to define the controls needed

- a) to approve documents for adequacy prior to issue,
- b) to review and update as necessary and re-approve documents,
- c) to ensure that changes and the current revision status of documents are identified,
- d) to ensure that relevant versions of applicable documents are available at points of use,
- e) to ensure that documents remain legible and readily identifiable,
- f) to ensure that documents of external origin are identified and their distribution controlled, and
- g) to prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.

4.2.4 Control of quality records

Quality records shall be established and maintained to provide evidence of conformity to requirements and of the effective operation of the quality management system. Quality records shall remain legible, readily identifiable and retrievable. A documented procedure shall be established to define the controls needed for the identification, storage, protection, retrieval, retention time and disposition of quality records.

5 Management responsibility

5.1 Management commitment

Top management shall provide evidence of its commitment to the development and implementation of the quality management system and continually improving its effectiveness by

- a) communicating to the organization the importance of meeting customer as well as statutory and regulatory requirements,
- b) establishing the quality policy.

- c) ensuring that quality objectives are established,
- d) conducting management reviews, and
- e) ensuring the availability of resources.

5.2 Customer focus

Top management shall ensure that customer requirements are determined and fulfilled with the aim of enhancing customer satisfaction (see 7.2.1 and 8.2.1).

5.3 Quality policy

Top management shall ensure that the quality policy

- a) is appropriate to the purpose of the organization,
- b) includes a commitment to comply with requirements and continually improve the effectiveness of the quality management system,
- c) provides a framework for establishing and reviewing quality objectives,
- d) is communicated and understood within the organization, and
- e) is reviewed for continuing suitability.

5.4 Planning

5.4.1 Quality objectives

Top management shall ensure that quality objectives, including those needed to meet requirements for product (see 7.1 a)), are established at relevant functions and levels within the organization. The quality objectives shall be measurable and consistent with the quality policy.

5.4.2 Quality management system planning

Top management shall ensure that

- a) the planning of the quality management system is carried out in order to meet the requirements given in 4.1, as well as the quality objectives, and
- b) the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented.

5.5 Responsibility, authority and communication

5.5.1 Responsibility and authority

Top management shall ensure that the responsibilities, authorities and their interrelation are defined and communicated within the organization.

5.2 Management representative

Top management shall appoint a member of management who, irrespective of other responsibilities, shall have responsibility and authority that includes

ensuring that processes needed for the quality management system are established, implemented and maintained,

reporting to top management on the performance of the quality management system and any need for improvement, and

ensuring the promotion of awareness of customer requirements throughout the organization.

NOTE The responsibility of a management representative can include liaison with external parties on matters relating to the quality management system.

5.3 Internal communication

Top management shall ensure that appropriate communication processes are established within the organization and that communication takes place regarding the effectiveness of the quality management system.

6 Management review

6.1 General

Top management shall review the organization's quality management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. This review shall include assessing opportunities for improvement and the need for changes to the quality management system, including the quality policy and quality objectives.

Records from management reviews shall be maintained (see 4.2.4).

6.2 Review input

Input to management review shall include information on

results of audits,

customer feedback,

process performance and product conformity,

status of preventive and corrective actions,

follow-up actions from previous management reviews,

planned changes that could affect the quality management system, and

recommendations for improvement.

6.3 Review output

Output from the management review shall include any decisions and actions related to

improvement of the effectiveness of the quality management system and its processes,

improvement of product related to customer requirements, and

resource needs.

6 Resource management

6.1 Provision of resources

The organization shall determine and provide the resources needed

- a) to implement and maintain the quality management system and continually improve its effectiveness, and
- b) to enhance customer satisfaction by meeting customer requirements.

6.2 Human resources

6.2.1 General

Personnel performing work affecting product quality shall be competent on the basis of appropriate education, training, skills and experience.

6.2.2 Competence, awareness and training

The organization shall

- a) determine the necessary competence for personnel performing work affecting product quality,
- b) provide training or take other actions to satisfy these needs,
- c) evaluate the effectiveness of the actions taken,
- d) ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and
- e) maintain appropriate records of education, training, skills and experience (see 4.2.4).

6.3 Infrastructure

The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to product requirements. Infrastructure includes, for example

- a) buildings, workspace and associated utilities,
- b) process equipment, both hardware and software, and
- c) supporting services such as transport or communication.

6.4 Work environment

The organization shall determine and manage the work environment needed to achieve conformity to product requirements.

7 Product realization

7.1 Planning of product realization

The organization shall plan and develop the processes needed for product realization. Planning of product realization shall be consistent with the requirements of the other processes of the quality management system (see 4.1).

When planning product realization, the organization shall determine the following, as appropriate:

- a) quality objectives and requirements for the product;
- b) the need to establish processes, documents, and provide resources specific to the product;
- c) required verification, validation, monitoring, inspection and test activities specific to the product and the criteria for product acceptance;
- d) records needed to provide evidence that the realization processes and resulting product fulfil requirements (see 4.2.4).

The output of this planning shall be in a form suitable for the organization's method of operations.

NOTE 1 A document specifying the processes of the quality management system (including the product realization processes) and the resources to be applied to a specific product, project or contract, can be referred to as a quality plan.

NOTE 2 The organization may also apply the requirements given in 7.3 to the development of product realization processes.

2 Customer-related processes

2.1 Determination of requirements related to the product

The organization shall determine

- a) requirements specified by the customer, including the requirements for delivery and post-delivery activities,
- b) requirements not stated by the customer but necessary for specified use or known and intended use,
- c) statutory and regulatory requirements related to the product, and
- d) any additional requirements determined by the organization.

2.2 Review of requirements related to the product

The organization shall review the requirements related to the product. This review shall be conducted prior to the organization's commitment to supply a product to the customer (e.g. submission of tenders, acceptance of contracts orders, acceptance of changes to contracts or orders) and shall ensure that

- a) product requirements are defined,
- b) contract or order requirements differing from those previously expressed are resolved, and
- c) the organization has the ability to meet the defined requirements.

Records of the results of the review and actions arising from the review shall be maintained (see 4.2.4).

Where the customer provides no documented statement of requirement, the customer requirements shall be confirmed by the organization before acceptance.

Where product requirements are changed, the organization shall ensure that relevant documents are amended and that relevant personnel are made aware of the changed requirements.

NOTE In some situations, such as internet sales, a formal review is impractical for each order. Instead the review can cover relevant product information such as catalogues or advertising material.

7.2.3 Customer communication

The organization shall determine and implement effective arrangements for communicating with customers in relation to

- a) product information,
- b) enquiries, contracts or order handling, including amendments, and
- c) customer feedback, including customer complaints.

7.3 Design and development

7.3.1 Design and development planning

The organization shall plan and control the design and development of product.

During the design and development planning, the organization shall determine

- a) the design and development stages,
- b) the review, verification and validation that are appropriate to each design and development stage, and
- c) the responsibilities and authorities for design and development.

The organization shall manage the interfaces between different groups involved in design and development to ensure effective communication and clear assignment of responsibility.

Planning output shall be updated, as appropriate, as the design and development progresses.

7.3.2 Design and development inputs

Inputs relating to product requirements shall be determined and records maintained (see 4.2.4). These shall include

- a) functional and performance requirements,
- b) applicable statutory and regulatory requirements,
- c) where applicable, information derived from previous similar designs, and
- d) other requirements essential for design and development.

These inputs shall be reviewed for adequacy. Requirements shall be complete, unambiguous and not in conflict with each other.

7.3.3 Design and development outputs

The outputs of design and development shall be provided in a form that enables verification against the design and development input and shall be approved prior to release.

Design and development outputs shall

- a) meet the input requirements for design and development,
- b) provide appropriate information for purchasing, production and for service provision,
- c) contain or reference product acceptance criteria, and
- d) specify the characteristics of the product that are essential for its safe and proper use.

7.3.4 Design and development review

At suitable stages, systematic reviews of design and development shall be conducted

- a) to evaluate the ability of the results of design and development to fulfil requirements, and
- b) to identify any problems and propose necessary actions.

Participants in such reviews shall include representatives of functions concerned with the design and development stage(s) being reviewed. Records of the results of the reviews and any necessary actions shall be maintained (see 4.2.4).

7.3.5 Design and development verification

Verification shall be performed to ensure that the design and development outputs have satisfied the design and development input requirements. Records of the results of the verification and any necessary actions shall be maintained (see 4.2.4).

7.3.6 Design and development validation

Design and development validation shall be performed in accordance with planned arrangements (see 7.3.1) to ensure that the resulting product is capable of fulfilling the requirements for the specified or known intended use or application. Wherever practicable, validation shall be completed prior to the delivery or implementation of the product. Records of the results of validation and any necessary actions shall be maintained (see 4.2.4).

7.3.7 Control of design and development changes

Design and development changes shall be identified and records maintained. The changes shall be reviewed, verified and validated, as appropriate, and approved before implementation. The review of design and development changes shall include evaluation of the effect of the changes on constituent parts and delivered product.

Records of the results of the review of changes and any necessary actions shall be maintained (see 4.2.4).

7.4 Purchasing

7.4.1 Purchasing process

The organization shall ensure that purchased product conforms to specified purchase requirements. The type and extent of control applied to the supplier and the purchased product shall be dependent upon the effect of the purchased product on subsequent product realization or the final product.

The organization shall evaluate and select suppliers based on their ability to supply product in accordance with the organization's requirements. Criteria for selection, evaluation and re-evaluation shall be established. Records of the results of evaluations and any necessary actions arising from the evaluation shall be maintained (see 4.2.4).

7.4.2 Purchasing information

Purchasing information shall describe the product to be purchased, including where appropriate

- a) requirements for approval of product, procedures, processes and equipment,
- b) requirements for qualification of personnel, and
- c) quality management system requirements.

The organization shall ensure the adequacy of specified purchase requirements prior to their communication to the supplier.

7.4.3 Verification of purchased product

The organization shall establish and implement the inspection or other activities necessary for ensuring that purchased product meets specified purchase requirements.

Where the organization or its customer intends to perform verification at the supplier's premises, the organization shall state the intended verification arrangements and method of product release in the purchasing information.

7.5 Production and service provision

7.5.1 Control of production and service provision

The organization shall plan and carry out production and service provision under controlled conditions. Controlled conditions shall include, as applicable

- a) the availability of information that describes the characteristics of the product,
- b) the availability of work instructions,
- c) the use of suitable equipment,
- d) the availability and use of monitoring and measuring devices,
- e) the implementation of monitoring and measurement, and
- f) the implementation of release, delivery and post-delivery activities.

7.5.2 Validation of processes for production and service provision

The organization shall validate any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement. This includes any processes where deficiencies become apparent only after the product is in use or the service has been delivered.

Validation shall demonstrate the ability of these processes to achieve planned results.

The organization shall establish arrangements for these processes including, as applicable

- a) defined criteria for review and approval of the processes,
- b) approval of equipment and qualification of personnel,
- c) use of specific methods and procedures,
- d) requirements for records (see 4.2.4), and
- e) revalidation.

7.5.3 Identification and traceability

Where appropriate, the organization shall identify the product by suitable means throughout product realization.

The organization shall identify the product status with respect to monitoring and measurement requirements.

Where traceability is a requirement, the organization shall control and record the unique identification of the product (see 4.2.4).

NOTE In some industry sectors, configuration management is a means by which identification and traceability are maintained.

7.5.4 Customer property

The organization shall exercise care with customer property while it is under the organization's control or being used by the organization. The organization shall identify, verify, protect and safeguard customer property provided for use or incorporation into the product. If any customer property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the customer and records maintained (see 4.2.4).

NOTE Customer property can include intellectual property.

7.5.5 Preservation of product

The organization shall preserve the conformity of product during internal processing and delivery to the intended destination. This preservation shall include identification, handling, packaging, storage and protection. Preservation shall also apply to the constituent parts of a product.

7.6 Control of monitoring and measuring devices

The organization shall determine the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements (see 7.2.1).

The organization shall establish processes to ensure that monitoring and measurement can be carried out and are carried out in a manner that is consistent with the monitoring and measurement requirements.

Where necessary to ensure valid results, measuring equipment shall:

- a) be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification shall be recorded;
- b) be adjusted or re-adjusted as necessary;
- c) be identified to enable the calibration status to be determined;
- d) be safeguarded from adjustments that would invalidate the measurement result;
- e) be protected from damage and deterioration during handling, maintenance and storage.

In addition, the organization shall assess and record the validity of the previous measuring results when the equipment is found not to conform to requirements. The organization shall take appropriate action on the equipment and any product affected. Records of the results of calibration and verification shall be maintained (see 4.2.4).

When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application shall be confirmed. This shall be undertaken prior to initial use and reconfirmed as necessary.

NOTE See ISO 10012-1 and ISO 10012-2 for guidance.

8 Measurement, analysis and improvement

8.1 General

The organization shall plan and implement the monitoring, measurement, analysis and improvement processes needed

- a) to demonstrate conformity of the product,
- b) to ensure conformity of the quality management system, and
- c) to continually improve the effectiveness of the quality management system.

This shall include determination of applicable methods, including statistical techniques, and the extent of their use.

8.2 Monitoring and measurement

8.2.1 Customer satisfaction

As one of the measurements of the performance of the quality management system, the organization shall monitor information relating to customer perception as to whether the organization has fulfilled customer requirements. The methods for obtaining and using this information shall be determined.

8.2.2 Internal audit

The organization shall conduct internal audits at planned intervals to determine whether the quality management system

- a) conforms to the planned arrangements (see 7.1), to the requirements of this International Standard and to the quality management system requirements established by the organization, and
- b) is effectively implemented and maintained.

An audit programme shall be planned, taking into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. The audit criteria, scope, frequency and methods shall be defined. Selection of auditors and conduct of audits shall ensure objectivity and impartiality of the audit process. Auditors shall not audit their own work.

The responsibilities and requirements for planning and conducting audits, and for reporting results and maintaining records (see 4.2.4) shall be defined in a documented procedure.

The management responsible for the area being audited shall ensure that actions are taken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results (see 8.5.2).

NOTE See ISO 10011-1, ISO 10011-2 and ISO 10011-3 for guidance.

8.2.3 Monitoring and measurement of processes

The organization shall apply suitable methods for monitoring and, where applicable, measurement of the quality management system processes. These methods shall demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and corrective action shall be taken, as appropriate, to ensure conformity of the product.

8.2.4 Monitoring and measurement of product

The organization shall monitor and measure the characteristics of the product to verify that product requirements are fulfilled. This shall be carried out at appropriate stages of the product realization process in accordance with the planned arrangements (see 7.1).

Evidence of conformity with the acceptance criteria shall be maintained. Records shall indicate the person(s) authorizing release of product (see 4.2.4).

Product release and service delivery shall not proceed until all the planned arrangements (see 7.1) have been satisfactorily completed, unless otherwise approved by a relevant authority, and where applicable by the customer.

8.3 Control of nonconforming product

The organization shall ensure that product which does not conform to product requirements is identified and controlled to prevent its unintended use or delivery. The controls and related responsibilities and authorities for dealing with nonconforming product shall be defined in a documented procedure.

The organization shall deal with nonconforming product by one or more of the following ways:

- a) by taking action to eliminate the detected nonconformity;
- b) by authorizing its use, release or acceptance under concession by a relevant authority and, where applicable, by the customer;
- c) by taking action to preclude its original intended use or application.

Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, shall be maintained (see 4.2.4).

When nonconforming product is corrected it shall be subject to re-verification to demonstrate conformity to the requirements.

When nonconforming product is detected after delivery or use has started, the organization shall take action appropriate to the effects, or potential effects, of the nonconformity.

8.4 Analysis of data

The organization shall determine, collect and analyse appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the quality management system can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources.

The analysis of data shall provide information relating to

- a) customer satisfaction (see 8.2.1),
- b) conformance to product requirements (see 7.2.1),
- c) characteristics and trends of processes and products including opportunities for preventive action, and
- d) suppliers.

8.5 Improvement

8.5.1 Continual improvement

The organization shall continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

8.5.2 Corrective action

The organization shall take action to eliminate the cause of nonconformities in order to prevent recurrence. Corrective actions shall be appropriate to the effects of the nonconformities encountered.

A documented procedure shall be established to define requirements for

- a) reviewing nonconformities (including customer complaints),
- b) determining the causes of nonconformities,
- c) evaluating the need for action to ensure that nonconformities do not recur,
- d) determining and implementing action needed,
- e) records of the results of action taken (see 4.2.4), and
- f) reviewing corrective action taken.

8.5.3 Preventive action

The organization shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of the potential problems.

A documented procedure shall be established to define requirements for

- a) determining potential nonconformities and their causes,
- b) evaluating the need for action to prevent occurrence of nonconformities,
- c) determining and implementing action needed,
- d) records of results of action taken (see 4.2.4), and
- e) reviewing preventive action taken.