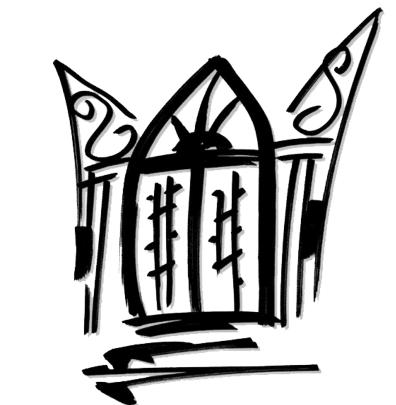


Global Supplier Quality Performance Monitoring Scorecard

Author: Sabrina Gendes Alonso Advisor: Dra. Maria Garcia Sandoval





1. Define

Problem:

- Supplier Monitoring is currently performed through the supplier audit program on a global scale, but supplier audit scores do not correlate to the supplier's quality.
- Because not all KPIs are monitored on a global level, the new Global Supplier Quality team cannot effectively monitor the performance of the suppliers on a global scale and determine which suppliers need increased monitoring and improvement projects.
- There is no way to assess the supplier improvement or decline in quality of the suppliers on a yearly basis on a global scale

Goal:

Supplier Audit Score

CAPA

13%

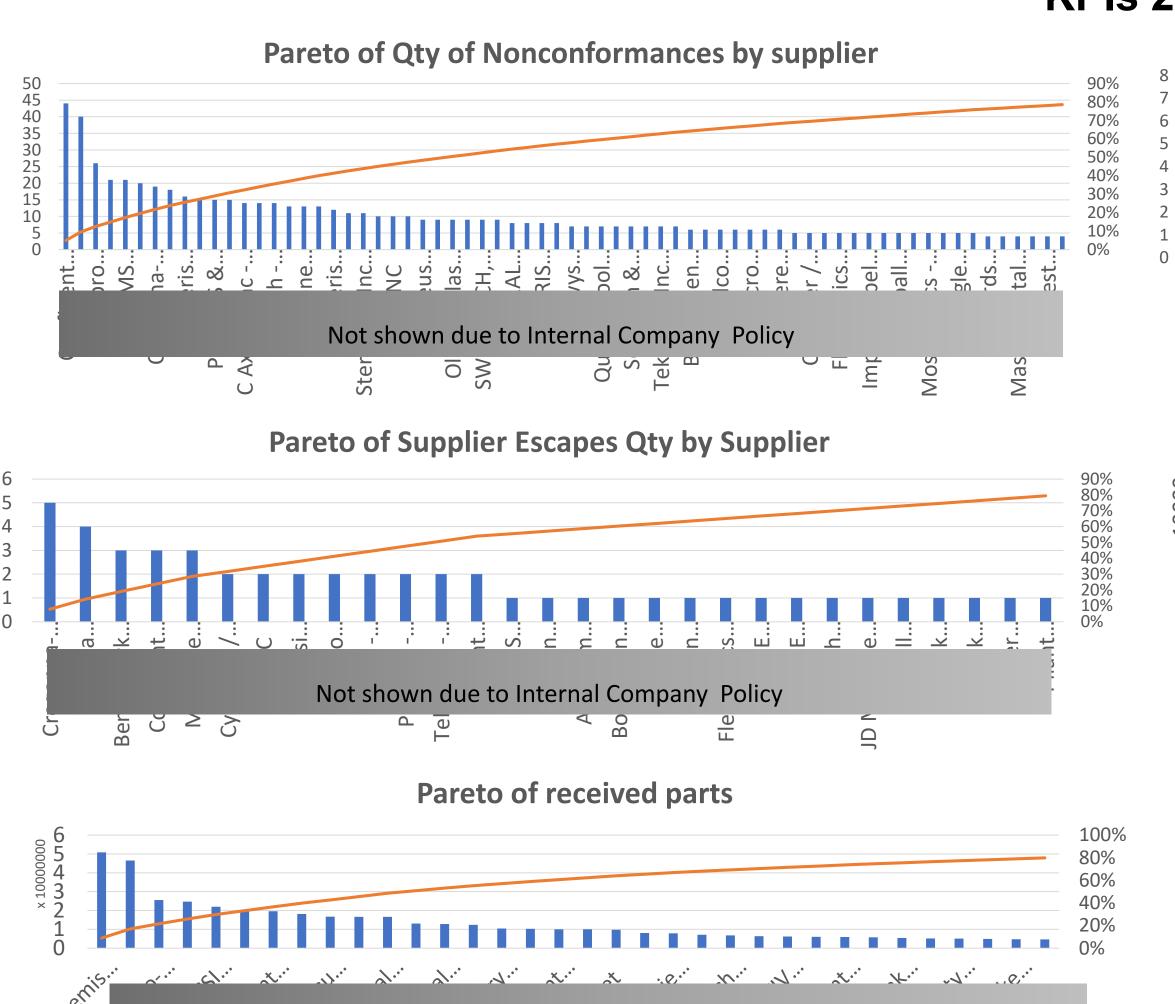
Create a new supplier quality performance Scorecard, which utilizes defined Quality KPI and weights, each one based on risk, in order to score and rank each supplier with the final goal of identifying which monitoring process (either improvement project, audit, or no actions) will be utilized to assess and improve the supplier quality and regulatory compliance expectations.

Current Process

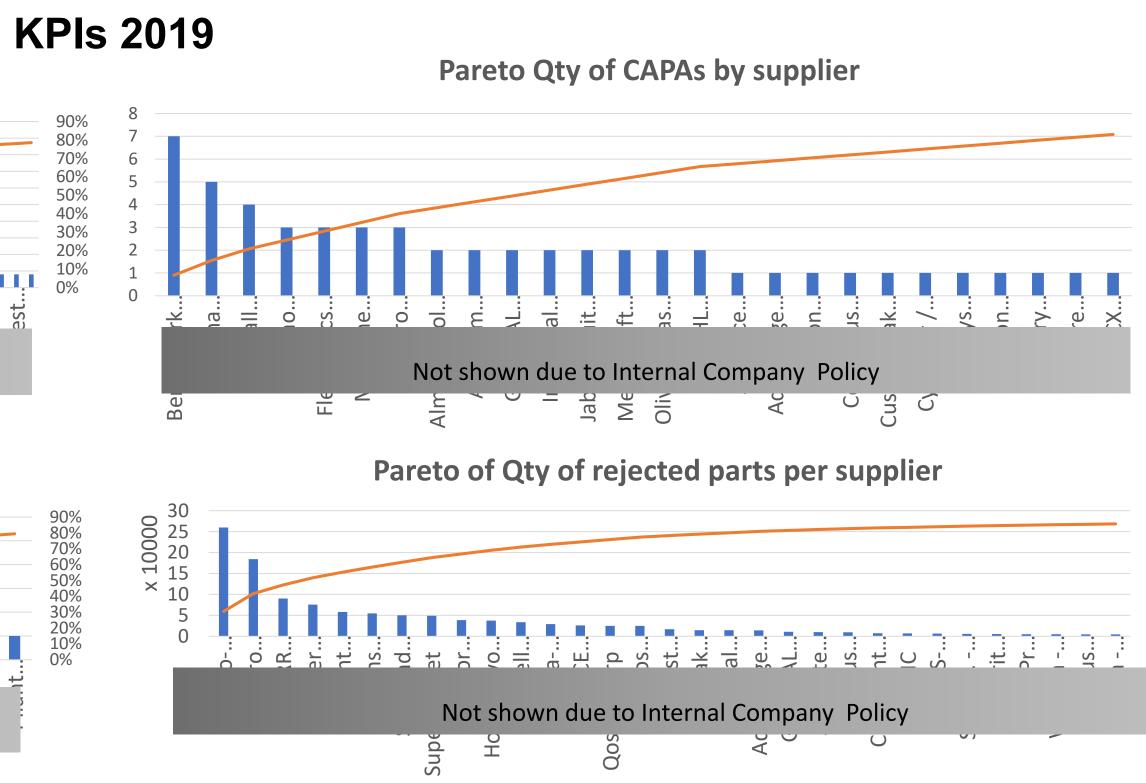
- Global Supplier Monitoring is performed through Supplier Audit, for which the frequency is a function of the Supplier Type and Risk.
- Quality metrics are recorded and maintained for individual site purposes, to identify trends potential CAPA escalations.
- There is no tool to score supplier quality performance on a global scale

KPI	Current Monitoring level	Future
Nonconformance investigations	Site level	Global level
CAPA investigations (Corrective Action/Preventive Action)	Site level	Global level
Escapes (Complaints or confirmed escapes)	Site level	Global level
Defects per million (DPM=parts rejected/parts received *1000000)	Site level/Global level	Global level
Supplier Audit Score	Global level	Global level

2. Measure

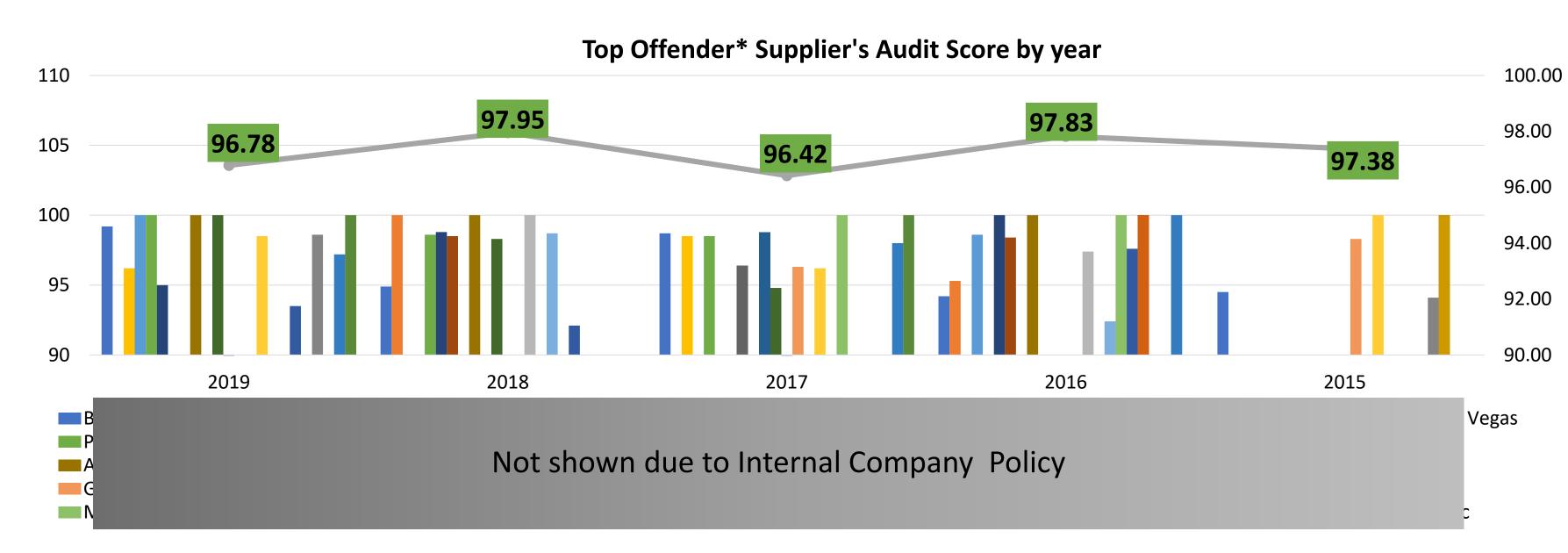


Not shown due to Internal Company Policy



Critical	Major	Minor
97.7	95.4	99.1
97.7	97.5	-
99.2	80.0	-
97.8	95.8	97.0
98.8	96.2	100.0
99.0	-	-
	97.7 97.7 99.2 97.8 98.8	97.7 95.4 97.7 97.5 99.2 80.0 97.8 95.8 98.8 96.2

3. Analyze



*Note: Each supplier in the Top 10 offenders for each KPI was pooled together and their audit scores were averaged each year since 2015. As per current company standard, audit scores ≥ 96 are considered "good standing"

	Top 10 Supplier Offenders for each KPI- 2019											
Rank	Top Supplier- Qty of Parts	Top Qty NCs	Top Qty of CAPAs	Top Qty of Product Escapes	Top Qty Part Rejections	Worst Audit Scores						
1	Supplier #1	Supplier #11	Supplier #20	Supplier #16	Supplier #3	Supplier #39						
2	Supplier #2	Supplier #12	Supplier #21	Supplier #21	Supplier #4	Supplier #40						
3	Supplier #3	Supplier #4	Supplier #22	Supplier #20	Supplier #31	Supplier #41						
4	Supplier #4	Supplier #13	Supplier #19	Supplier #11	Supplier #32	Supplier #42						
5	Supplier #5	Supplier #14	Supplier #23	Supplier #24	Supplier #33	Supplier #43						
6	Supplier #6	Supplier #15	Supplier #24	Supplier #27	Supplier #34	Supplier #44						
7	Supplier #7	Supplier #16	Supplier #4	Supplier #28	Supplier #35	Supplier #45						
8	Supplier #8	Supplier #17	Supplier #25	Supplier #29	Supplier #36	Supplier #46						
9	Supplier #9	Supplier #18	Supplier #26	Supplier #4	Supplier #37	Supplier #47						
10	Supplier #10	Supplier #19	Supplier #2	Supplier #30	Supplier #38	Supplier #48						

Observations:

- A total of 31 suppliers compose the top 10 offenders for all Quality KPIs.
- None of the 31 suppliers correlate to the top 10 worst audit scores.
- The supplier that is repeated the most (Supplier #4, has an audit score of 100%).
- Only 6/31 suppliers have less than 96% (minimum acceptable) in their audit scores.
- The average audit score for all top offender suppliers is 97.6%.
- The average audit score for the top offender suppliers for Audit Scores (worst audit scores) is 70.5%.

4. Improve

2019 Supplier Performance Monitoring Scorecard

Factor Weights		Name of				Supplier Type	Supplier	Adj.	Supplier		Adj.	NCs Score		Adj.	CAPA		Adj.	Escapes	Oty parts	Δdi	Rejected	Qty Parts		Received	Total Index
racioi vveiginis		Supplie -	Supplier Type (g)	Risk Class	Score	& Risk Score	Audit	Ratin _	Audit Score	NCs	Rati	(13%)	CAPA	Rati 🗸	Score	Escapes	Ratir 🖵	Score	Qty parts Reject	Ratin _		Receive	Adj. Rating	(16%) ₊	
		Supplie \$	· · · · · · · · · · · · · · · · · · ·	0.111	40	(20%)	Score T	Ľ	(13%)	26	F.0		7	110	(13%)			(15%)		7.4		Ľ	10		Score 🚚
Supplier Type and Risk	Score	N C	Contract Manufacturer (CM) Contract Manufacturer (CM)	Critical Critical	10 10	2.00	100 100	10 10	0.00	12	5.9 3.0	0.77 0.38	7	10.0	0.56 1.30	2	10 10	1.50 1.50	184410	0.0	0.71	24652035 70997	4.9 0.0	0.78	6.31 5.19
Supplier Type and Risk	OCOLG	M	Contract Manufacturer (CM)	Critical	10	2.00	99.1	9.91	0.00	13	3.0	0.38	3	4.3	0.56	3	10	1.50	0	0.0	0.00	63817	0.0	0.00	4.45
CM Critical	10	Ki	Contract Manufacturer (CM)	Critical	10	2.00	100	10	0.00	5	1.1	0.15	4	5.7	0.74	1	10	1.50	303	0.0	0.00	39465	0.0	0.00	4.39
		FI te	Contract Manufacturer (CM)	Critical	10	2.00	98.4	9.84	0.02	5	1.1	0.15	3	4.3	0.56	1	10	1.50	0	0.0	0.00	343781	0.1	0.01	4.24
CM Major	8	_ <mark>Te</mark> n	OEM Device Supplier (OEM)	Minor	7	1.40	94.1	9.41	0.08	10	2.3	0.30	5	7.1	0.93	4	10	1.50	125	0.0	0.00	72720	0.0	0.00	4.20
CM Minor	6	. <mark>Ri</mark>	Contract Manufacturer (CM) Contract Manufacturer (CM)	Critical Critical	10 10	2.00	97.5 100	9.75 10	0.03	21	4.8 3.2	0.62 0.41	0	0.0	0.00	1	10 10	1.50 1.50	1353	0.0	0.00	23211 1001499	0.0	0.00	4.15 4.14
Component Sup Critical	6	Bi —	Contract Manufacturer (CM)	Critical	10	2.00	94.9	9.49	0.07	2	0.5	0.41	0	0.0	0.00	0	0	0.00	260010	10.0	1.00	25542663	5.0	0.80	3.93
<u> </u>			Contract Manufacturer (CM)	Critical	10	2.00	100	10	0.00	13	3.0	0.38	0	0.0	0.00	2	10	1.50	3769	0.1	0.01	323684	0.1	0.01	3.91
Component Sup Major	5	<u>~</u> +	Component Supplier	Major	5	1.00	100	10	0.00	44	10.0	1.30	0	0.0	0.00	3	10	1.50	7045	0.3	0.03	199429	0.0	0.01	3.83
Component Supp Minor	Λ	Sh I	Component Supplier	Critical	7	1.40	100	10	0.00	9	2.0	0.27	2	2.9	0.37	1	10	1.50	0	0.0	0.00	8032315	1.6	0.25	3.79
<u> </u>		<u>4</u> 7	OEM Device Supplier (OEM)	Critical	10	2.00	100	10	0.00	2	0.5	0.06	1	1.4	0.19	1	10	1.50	0	0.0	0.00	58345	0.0	0.00	3.75
Consultant Critical		St S	Service Provider Service Provider	Critical Critical	9	1.80 1.80	93.7 98.9	9.37 9.89	0.08 0.01	11	2.5	0.33 0.35	0	0.0	0.00	1	10 10	1.50 1.50	0	0.0	0.00	0 18313	0.0	0.00	3.71 3.67
Consultant Major	5		Contract Manufacturer (CM)	Major	8	1.60	97.2	9.72	0.01	5	1.1	0.35	2	2.9	0.37	1	10	1.50	0	0.0	0.00	215	0.0	0.00	3.66
	1	<u>Pr</u> Q	Contract Manufacturer (CM)	Critical	10	2.00	98.5	9.85	0.02	4	0.9	0.12	0	0.0	0.00	2	10	1.50	331	0.0	0.00	3215	0.0	0.00	3.64
Consultant Minor	1		Contract Manufacturer (CM)	Critical	10	2.00	94.4	9.44	0.07	2	0.5	0.06	0	0.0	0.00	1	10	1.50	2	0.0	0.00	29440	0.0	0.00	3.63
Contractor Critical	8		Contract Manufacturer (CM)	Major	8	1.60	86.4	8.64	0.18	5	1.1	0.15	0	0.0	0.00	1	10	1.50	827	0.0	0.00	50045	0.0	0.00	3.43
Contractor Major	6		Contract Manufacturer (CM)	Major	8	1.60	100	10	0.00	9	2.0	0.27	0	0.0	0.00	1	10	1.50	583	0.0	0.00	840608	0.2	0.03	3.39
•	0	# 5	Contractor Service Provider	Critical Critical	9	1.60 1.80	98.1 100	9.81	0.02	2	1.8 0.5	0.24 0.06	0	0.0	0.00	1	10 10	1.50 1.50	0	0.0	0.00	27495	0.0	0.00 sdad	3.36
Contractor Minor	4	E te	Service Provider	Critical	9	1.80	100	10	0.00	2	0.5	0.06	0	0.0	0.00	1	10	1.50	0	0.0	0.00	0	0.0	0.00	3.36
Man. Material Critical	6	<u> </u>	Contract Manufacturer (CM)	Major	8	1.60	97.6	9.76	0.03	5	1.1	0.15	0	0.0	0.00	2	10	1.50	1300	0.0	0.00	1743667	0.3	0.05	3.34
		<u> </u>	Contract Manufacturer (CM)	Major	8	1.60	98.2	9.82	0.02	7	1.6	0.21	0	0.0	0.00	2	10	1.50	0	0.0	0.00	70939	0.0	0.00	3.33
Man. Material Major	4		Contractor	Critical	8	1.60	100	10	0.00	7	1.6	0.21	0	0.0	0.00	1	10	1.50	0	0.0	0.00	86100.49	0.0	0.00	3.31
		N ()	Component Supplier	Critical	8	1.40	93.5	9.35	0.08	3	0.7	0.09	0	0.0	0.00	1	10	1.50	14400	0.6	0.06	5412999	1.1	0.17	3.30
Man Matarial Minar	2	H A	Contract Manufacturer (CM) Component Supplier	Major Critical	7	1.60 1.40	91.8 96.2	9.18 9.62	0.11 0.05	2	0.2	0.03	1	1.4	0.00	1	10 10	1.50 1.50	175 260	0.0	0.00	9036 33577	0.0	0.00	3.24
Man. Material Minor	3	5 5	Contract Manufacturer (CM)	Critical	10	2.00	100	10	0.00	40	9.1	1.18	0	0.0	0.00	0	0	0.00	792	0.0	0.00	44412	0.0	0.00	3.19
OEM Critical	10	an	Component Supplier	Major	5	1.00	100	10	0.00	8	1.8	0.24	2	2.9	0.37	0	0	0.00	10583	0.4	0.04	46484416	9.2	1.46	3.11
OEM Major	8		Component Supplier	Critical	7	1.40	92.6	9.26	0.10	0	0.0	0.00	0	0.0	0.00	0	0	0.00	4000	0.2	0.02	50800369	10.0	1.60	3.11
	<u> </u>	Cr To to	Component Supplier	Major	5	1.00	97.3	9.73	0.04	19	4.3	0.56	0	0.0	0.00	5	10	1.50	3320	0.1	0.01	52131	0.0	0.00	3.11
OEM Minor	7	Po	Component Supplier	Critical	7	1.40	98.8	9.88	0.02	3	0.7	0.09	0	0.0	0.00	1	10	1.50	144	0.0	0.00	3295224	0.6	0.10	3.11
Service Provider Critical	9		Component Supplier Component Supplier	Major Major	5	1.00	90.9 100	9.09	0.12 0.00	1/1	3.2	0.15 0.41	0	0.0	0.19	1	10 10	1.50 1.50	98 4663	0.0	0.00	710 440938	0.0	0.00	2.95 2.95
		vi 🔾 💆	Component Supplier	Major	5	1.00	90.6	9.06	0.12	4	0.9	0.12	0	0.0	0.00	1	10	1.50	2603	0.1	0.02	4223249	0.1	0.13	2.88
Service Provider Major		Bc In	Component Supplier	Major	5	1.00	90.4	9.04	0.12	6	1.4	0.18	0	0.0	0.00	1	10	1.50	0	0.0	0.00	2412388	0.5	0.08	2.88
Service Provider Minor	4	De F	Component Supplier	Major	5	1.00	98.4	9.84	0.02	3	0.7	0.09	0	0.0	0.00	1	10	1.50	960	0.0	0.00	7865967	1.5	0.25	2.86
GOTTIOG T TO VIGOT TVIIITOT	•	<u>LF</u>	Component Supplier	Major	5	1.00	98.5	9.85	0.02	10	2.3	0.30	0	0.0	0.00	2	10	1.50	6616	0.3	0.03	95254	0.0	0.00	2.84
		GF F	Component Supplier	Major	5	1.00	96.3	9.63	0.05	6	1.4	0.18	0	0.0	0.00	1	10	1.50	26007	1.0	0.10	213662	0.0	0.01	2.83
		Dr. OI	Component Supplier Component Supplier	Major Major	5	1.00	91.1 98	9.11 9.8	0.12 0.03	2	0.5	0.18 0.06	1	0.0	0.00	1	10 10	1.50 1.50	1132	0.0	0.00	116852 70174	0.0	0.00	2.80 2.78
Category	Weight	SC Ik	Component Supplier	Major	5	1.00	100	10	0.00	8	1.8	0.24	0	0.0	0.00	1	10	1.50	5769	0.2	0.02	395413	0.1	0.00	2.77
		Pl	Component Supplier	Maior	5	1.00	96.9	9.69	0.04	5	1.1	0.15	0	0.0	0.00	1	10	1.50	2194	0.1	0.01	2336630	0.5	0.07	2.77
Supplier Type and Risk	20%																								

*Note: Each of the KPIs analyzed determined the suppliers which conglomerate to make up 80% of the total amount of units in the KPI. These suppliers Qtys are marked in Red for each KPI for analysis purposes. Output

Escapes	15%	
Qty parts Rejected	10%	Dotplot of Index
Qty Parts Received	16%	
*Note: Prioritization Movere utilized with a teat Supplier Quality Engine Supplier Controls to detail the weights	am of eers and	0.8 1.6 2.4 3.2 4.0 4.8 5.6 6.4

≥3.01RedTake Action- Assign and develop Quality Improvement Project (QIP)348%2.01 ≥x≥ 3.00Yellow Plow Sees Deep dive and decide upon the need of QIP7818%≤2.00GreenMonitored through the Audit Program31174%	Index Score	Color	Action	Qty Sup	% Sup
3.00 Yellow need of QIP 78 18%	≥3.01	Red		34	8%
≤2.00 Green Monitored through the Audit Program 311 74%		Yellow	•	78	18%
	≤2.00	Green	Monitored through the Audit Program	311	74%

5. Control

	Top 10 Supplier Offenders for each KPI- 2019												
Ra nk	Top Qty of Parts Received	Top Qty NCs	Top Qty of CAPAs	Top Qty of Escapes	Top Qty Part Rejected	Worst Audit Scores	Top 10 Index Scores	•					
1	Sup #1	Sup #11	Sup #20	Sup #16	Sup #3	Sup #39	Sup #4	•					
2	Sup #2	Sup #12	Sup #21	Sup #21	Sup #4	Sup #40	Sup #20						
3	Sup #3	Sup #4	Sup #22	Sup #20	Sup #31	Sup #41	Sup #24						
4	Sup #4	Sup #13	Sup #19	Sup #11	Sup #32	Sup #42	Sup #22						
5	Sup #5	Sup #14	Sup #23	Sup #24	Sup #33	Sup #43	Sup #23	•					
6	Sup #6	Sup#15	Sup #24	Sup #27	Sup #34	Sup #44	Sup #21						
7	Sup #7	Sup #16	Sup #4	Sup #28	Sup #35	Sup #45	Sup #14						
8	Sup #8	Sup #17	Sup #25	Sup #29	Sup #36	Sup #46	Sup #49	•					
9	Sup #9	Sup #18	Sup #26	Sup #4	Sup #37	Sup #47	Sup #3						
10	Sup #10	Sup #19	Sup #2	Sup #30	Sup #38	Sup #48	Sup #30						

Results:

scores correlates to top offenders in at least one (1) KPI. Suppliers in Red and Yellow are part of the 80% suppliers from the analysis in at least one (1)

9/10 suppliers with the top 10 offender index

- 34 suppliers shall be assigned to Supplier Quality Engineers to partner with the suppliers
- and improve their processes. 15 additional suppliers may be assigned to
- perform a deep dive of the metrics and assess if QIP is needed

Future Work

- Standardize the type of Quality Improvement tool, training, or processes to be implemented in partnership with the supplier, depending on the score.
- Create a Power BI portal where data and Scorecard may be viewed "real-life"
- Create a portal where suppliers can actively review how they compare to other suppliers in their same commodity/risk category.
- Trend year after year to assess the improvement and effectiveness of the program and the supplier performance.

References

- I. C. Giannoulis. "Rescaling sets of variables to be on the same scale." Theanalysisfactor.com. https://www.theanalysisfactor.com/rescalingvariables-to-be-same/ (accessed Apr. 01, 2020)
- 2. M. Krivokuca, et al. "Supply Chain Management," in The Certified Manager of Quality and Organizational Excellence Handbook, 4th ed. Milwaukee, WI, USA: Quality Press, 2013, ch. 18, sec. C-D, pp. 497–504.
- 3. S. Talluri and J. Sarkis, "A model for performance monitoring of suppliers", International Journal of Production Research, vol. 40, no. 16, p. 4257- 4269, Nov 2002. Available: EBSCOhost Research Database, search.ebscohost.com/. [Accessed March 14, 2020].
- 4. S. Parkash and V. K. Kaushik, "Supplier Performance Monitoring and Improvement (SPMI) through SIPOC Analysis and PDCA Model to the ISO 9001 QMS In Sports Goods Manufacturing Industry", Scientific Journal of Logistics, vol. 7, no. 1, pp. 1-15, 2011. Available: EBSCOhost Research Database, search.ebscohost.com/. [Accessed March14, 2019].
- 5. Medical Devices ISO13485:2015

