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Format Ujian	: Individu (in Excel sheet)
Waktu dan Durasi	: Selasa, 13 April 2021 150 menit
Level Kompetensi (Tertinggi)	: C4
Kompetensi Diuji	:

1. Kemampuan menerapkan siklus PDCA ke dalam pendekatan Six Sigma beserta alat – alat bantu untuk peningkatan kualitas (C3)
2. Kemampuan menggunakan kemampuan menggunakan alat – alat peningkatan kualitas dalam studi kasus peningkatan kualitas (C3)
3. Kemampuan menelaah data kuantitatif dan kualitatif untuk menemukan akar masalah dalam peningkatan kualitas (C4)

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Java Corporation (JC) is a manufacturing company located in Jakarta which produce paper cup to be used by other enterprises like food and beverages enterprises. As a multinational company in Indonesia, Java has been implementing make-to-order manufacturing concept which produce based on order since it was found. Besides that, Java is also allowed to implement make-to-stock manufacturing concept in some products.

JC has supplied various products such as paper cup for food companies (e.g. KFC, McD, etc.), catering company, beverage company (e.g. Starbucks, Top Coffee, Kapal Api), and others. In order to make those products, JC needs some materials like paper and plastic which are usually supplied from Surabaya and Semarang.

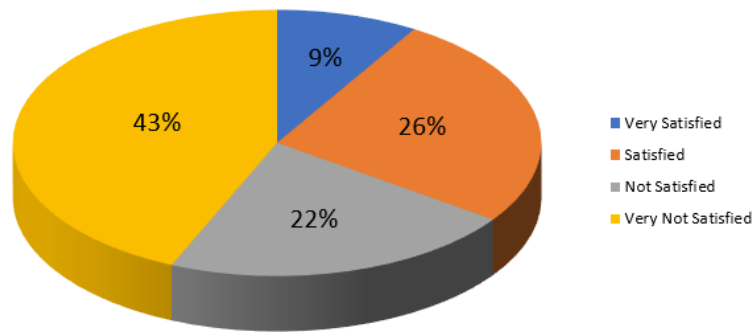
Below are some of the JC's customers:

- Kentucky Fried Chicken
- McDonald
- AW
- Dunkin Donuts
- Top Coffee
- Kapal Api
- Starbucks

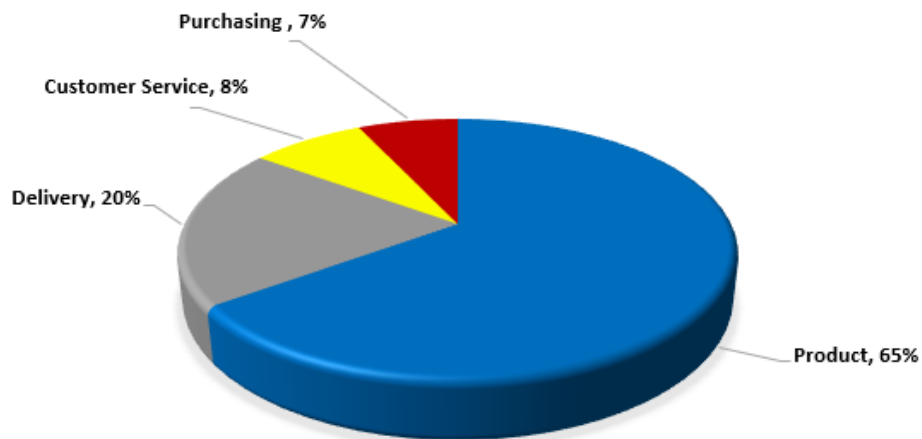


However, JC realizes that customers are everything for them. That's why JC make a special survey for customer satisfaction on their products. They hope this survey can help them to increase their service so that customer will be more satisfied. Below is JC Customer Satisfaction Survey from January-June 2020:

Pie Chart of Customer Satisfaction Survey



Pie Chart of Issues Breakdown from Dissatisfied Customers



After the survey is done, JC arrange a meeting which is attended by all JC top management. At last, they conclude that there must be improvement in customer satisfaction. This situation leads them to find an experienced and world class manufacturing consultant (You) to increase their product quality for improving customer satisfaction on JC's products.

As a consultant, you start by observing, identifying, and analyzing those defects that has been existing in JC. One of the JC's quality staff gives you Customer Complaints Data which is recorded from January-June 2020 within 50.000 items inspected:

Table of Customer Complaints in Java Corporation, Jakarta from January-June 2020

Number	Customer	Date (Month / Day / Year)	Quantity ¹	Type of Defect
1	KFC	1/1/2020	123	The Paper cup leaks
2	KFC	1/1/2020	34	Wrong item production
3	MCD	1/1/2020	29	Packaging seal is broken down
4	AW	1/2/2020	120	Cup is easily out of order
5	AW	1/2/2020	60	Cup is easily out of order
6	AW	1/2/2020	39	Bent cup
7	Starbucks	1/15/2020	85	The Paper cup leaks
8	Starbucks	1/15/2020	72	Wrong item production

Number	Customer	Date (Month / Day / Year)	Quantity ¹	Type of Defect
9	Dunkin Donuts	1/15/2020	76	Packaging seal is broken down
10	Dunkin Donuts	1/16/2020	42	Bent cup
11	Dunkin Donuts	1/16/2020	50	The Paper cup leaks
12	Top Coffee	1/16/2020	62	Cup is easily out of order
13	Top Coffee	1/25/2020	67	Packaging seal is broken down
14	Top Coffee	1/25/2020	65	Wrong item production
15	Kopi Tiam	1/25/2020	82	Cup is easily out of order
16	Kopi Tiam	1/26/2020	57	Bent cup
17	Hoka Hoka Bento	1/26/2020	68	The Paper cup leaks
18	Hoka Hoka Bento	1/26/2020	58	Bent cup
19	Hoka Hoka Bento	1/27/2020	79	Cup is easily out of order
20	Dunkin Donuts	2/1/2020	80	Cup is easily out of order
21	Dunkin Donuts	2/1/2020	72	The Paper cup leaks
22	AW	2/1/2020	78	Cup is easily out of order
23	AW	2/2/2020	65	Wrong item production
24	Hoka Hoka Bento	2/2/2020	56	Bent cup
25	Hoka Hoka Bento	2/2/2020	78	Packaging seal is broken down
26	Hoka Hoka Bento	2/15/2020	70	Packaging seal is broken down
27	MCD	2/15/2020	32	Cup is easily out of order
28	Starbucks	2/15/2020	102	The Paper cup leaks
29	Starbucks	2/16/2020	21	Bent cup
30	Starbucks	2/16/2020	69	Packaging seal is broken down
31	KFC	2/16/2020	59	Wrong item production
32	Hoka Hoka Bento	2/25/2020	71	Cup is easily out of order
33	Hoka Hoka Bento	2/25/2020	90	The Paper cup leaks
34	Hoka Hoka Bento	2/25/2020	71	Packaging seal is broken down
35	Hoka Hoka Bento	2/26/2020	64	Wrong item production
36	Dunkin Donuts	2/26/2020	69	Cup is easily out of order
37	Dunkin Donuts	2/26/2020	100	The Paper cup leaks
38	Top Coffee	3/1/2020	70	Packaging seal is broken down
39	Top Coffee	3/1/2020	15	Bent cup
40	AW	3/1/2020	66	Wrong item production
41	AW	3/2/2020	24	Bent cup
42	Kopi Tiam	3/2/2020	99	The Paper cup leaks
43	Kopi Tiam	3/2/2020	72	Packaging seal is broken down
44	Kopi Tiam	3/15/2020	104	The Paper cup leaks
45	MCD	3/15/2020	68	Wrong item production
46	MCD	3/15/2020	62	Cup is easily out of order
47	Dunkin Donuts	3/16/2020	73	Packaging seal is broken down
48	Starbucks	3/16/2020	110	The Paper cup leaks
49	Top Coffee	3/16/2020	112	The Paper cup leaks
50	Top Coffee	3/25/2020	70	Packaging seal is broken down
51	Top Coffee	3/25/2020	25	Bent cup

Number	Customer	Date (Month / Day / Year)	Quantity ¹	Type of Defect
52	Top Coffee	3/25/2020	59	Wrong item production
53	AW	4/2/2020	60	Cup is easily out of order
54	AW	4/3/2020	68	Packaging seal is broken down
55	AW	4/4/2020	63	Cup is easily out of order
56	AW	4/15/2020	60	Wrong item production
57	Dunkin Donuts	4/15/2020	70	Packaging seal is broken down
58	Dunkin Donuts	4/15/2020	97	The Paper cup leaks
59	Dunkin Donuts	4/16/2020	64	Cup is easily out of order
60	MCD	4/16/2020	61	Wrong item production
61	Starbucks	4/16/2020	72	Packaging seal is broken down
62	Starbucks	4/25/2020	67	Cup is easily out of order
63	Starbucks	4/25/2020	92	The Paper cup leaks
64	KFC	4/25/2020	20	Bent cup
65	KFC	4/26/2020	62	Wrong item production
66	Kopi Tiam	4/26/2020	62	Cup is easily out of order
67	Kopi Tiam	4/26/2020	77	Packaging seal is broken down
68	Kopi Tiam	5/1/2020	19	Bent cup
69	AW	5/2/2020	93	The Paper cup leaks
70	AW	5/3/2020	22	Bent cup
71	AW	5/4/2020	70	Packaging seal is broken down
72	AW	5/5/2020	60	Wrong item production
73	AW	5/6/2020	65	Cup is easily out of order
74	Dunkin Donuts	5/7/2020	70	Packaging seal is broken down
75	Dunkin Donuts	5/8/2020	103	The Paper cup leaks
76	Dunkin Donuts	5/9/2020	25	Bent cup
77	Dunkin Donuts	5/10/2020	61	Wrong item production
78	Top Coffee	5/11/2020	69	Packaging seal is broken down
79	Top Coffee	5/28/2020	104	The Paper cup leaks
80	Starbucks	5/29/2020	59	Wrong item production
81	Starbucks	6/1/2020	72	Packaging seal is broken down
82	Starbucks	6/2/2020	58	Wrong item production
83	Kopi Tiam	6/6/2020	59	Cup is easily out of order
84	Kopi Tiam	6/7/2020	98	The Paper cup leaks
85	AW	6/15/2020	64	Cup is easily out of order
86	AW	6/16/2020	58	Wrong item production
87	MCD	6/17/2020	30	Bent cup
88	MCD	6/18/2020	96	The Paper cup leaks
89	MCD	6/18/2020	70	Cup is easily out of order
90	Top Coffee	6/19/2020	63	Wrong item production
91	Starbucks	6/19/2020	24	Bent cup
92	Starbucks	6/19/2020	82	The Paper cup leaks
93	Dunkin Donuts	6/21/2020	20	Bent cup
94	Dunkin Donuts	6/22/2020	68	Cup is easily out of order

Number	Customer	Date (Month / Day / Year)	Quantity ¹	Type of Defect
95	MCD	6/23/2020	85	The Paper cup leaks
96	Kopi Tiam	6/24/2020	19	Bent cup
97	KFC	6/24/2020	19	Bent cup
98	Starbucks	6/24/2020	60	Wrong item production
99	AW	6/25/2020	65	Cup is easily out of order
100	Dunkin Donuts	6/25/2020	85	Bent cup

¹ multiply the values in this column with the last number (10th) of your NPM.

Moreover, as a well-known consultant, it is not enough to solve problems with one point of view (from JC data). Then, you observe and find other defects from JC manufacturing system by interviewing JC staff, analyzing JC manufacturing system, and concluding that some defects pass through JC's quality control system. This case happens due to some factors, including:

- Indisciplinary staff in working at JC
- Many defective products pass quality control system
- Less coordination between production manager and staff
- imprecision die-cut machine to produce a high-quality paper cup
- Customer usually finds their product packaging is not well sealed
- Infeasible work by maintenance staff
- Company's electricity is usually a breakdown
- Some of the raw materials supplied from Surabaya is out of order
- Most of the production staff seldom record what they have produced at that time
- Regularly, all machines in JC stop producing for at least half of a day
- When customers come to JC, there is usually no standby employee
- Many employees have multiple works to do
- JC has some unused machines and idle workers
- Imbalance human resource allocation
- Irregular machine inspection by JC engineer
- Some of JC's products aren't well qualified
- Less good communication between sales and production division
- JC usually has stock out condition when there is a fluctuating demand

After getting some factors that cause defects to pass through the QC system, you continue to find more data. When interviewing production operators to identify specific factors causing product as major issues in the recently conducted survey. Below are his/her observation data:

Timestamp	changeover/setup time	time to cut the paper* (s)	paper quality (gsm)
06.00 – 06.10		110	476.02
06.12 – 06.15		110	475.26
06.20 – 06.23		120	476.4
06.40 – 06.45		130	474.88
07.05 – 07.10		130	439.26
07.12 – 07.14		140	438.12
07.20 – 07.23		150	437.36
07.40 – 07.45		150	436.6
07.48 – 07.53		150	416.9
07.55 – 08.00		160	400.98
08.05 – 08.09		160	400.6
08.10 – 08.17		170	399.46
08.20 – 08.26		170	399.46
08.30 – 08.35		180	398.7
08.36 – 08.39		180	398.32
08.40 – 08.47		190	379
08.50 – 08.58		190	371.42
15.18 - 15.30		200	367.63
15.32 - 15.40		220	360.05
15.42 - 15.48		220	356.26
16.00 - 16.10		240	341.1
16.12 - 16.20		240	337.31
16.22 - 16.25		260	318.36
16.35 - 16.48		260	316.08
16.56 - 17.00		280	284.25
17.13 - 17.16		300	272.88
17.17 - 17.24		300	270.98
17.25 - 17.30		320	265.3
17.32 - 17.40		320	269.09
17.45 - 17.55		340	257.72

- Changeover / Setup Time can be obtained from the timestamp column: (start time – stop time)
- * multiply the values in this column with 9th number of your NPM. If it is a zero ("0"), pick the 8th number. If only none of these rules suit you, pick the 10th.

Furthermore, you obtain that JC's manufacturing system in average can produce 1000/week of paper cups. Below are the defects in various category during 30 weeks of observation periods:

Week	% of Defects **
1	14
2	13
3	15
4	17
5	10
6	12
7	13
8	18
9	19
10	15
11	12
12	14
13	17
14	14
15	12

Week	% of Defects **
16	15
17	16
18	12
19	13
20	17
21	18
22	19
23	12
24	13
25	14
26	15
27	16
28	13
29	12
30	14

- ** multiply the values in this column with the last number (10th) of your NPM.
- If it is zero ("0"), pick the previous number (9th), add with the 8th number, then multiply with % of Defects

Instructions:

1. As a consultant, you have to understand those cases and solve them with the 7 Tools that you have studied before
2. Pick the tools that you believe are the most appropriate tools to solve the cases and use your tools form to design, measure, and analyze the results
3. Compose a short recommendation to the top management of Java Corporation to improve customer satisfaction based on your analysis.

Appendix

Production Processes

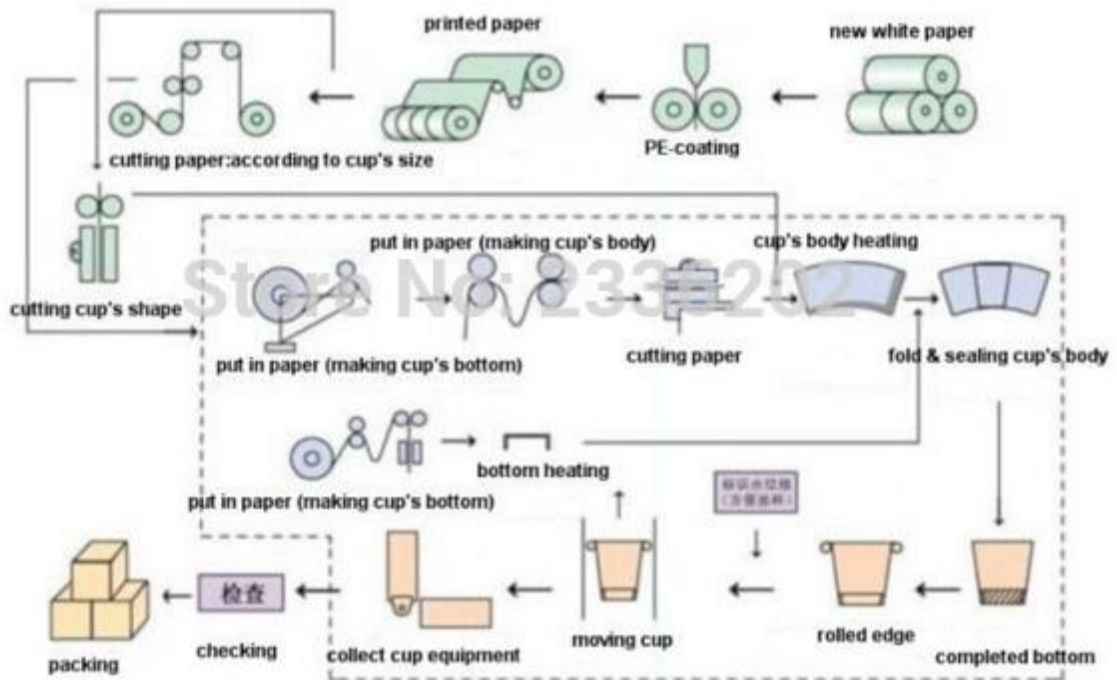


Image Source: Fuzhou Green Pack Trading Co., Ltd