

Bergforsk- och STRIMdagarna 2019



SIP | STRIM

Improving Data Quality for LCC Prediction Using Cloud Computing (IDQ4LCC)

Projektledare

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Med stöd från

VINNOVA
Sveriges innovationsmyndighet

 **Energimyndigheten**

FORMAS 

Strategiska
innovations-
program

The project's aim and objectives

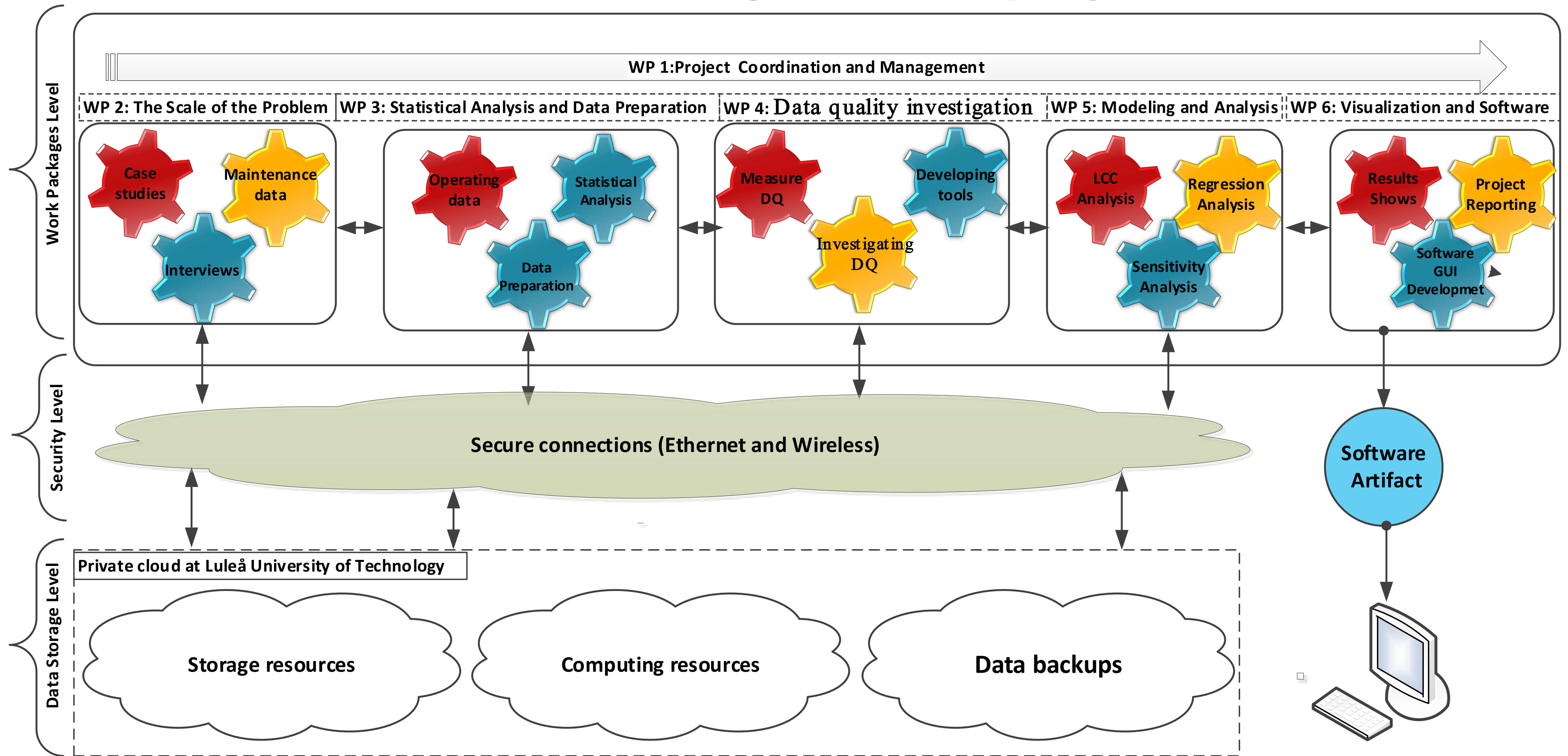
The aim of this project is to:

1. Develop a framework for data quality analytics (DQA);
2. Develop, validate and demonstrate an economic replacement time (ERT) model for mining equipment;
3. Develop a generic software that can perform LCC and suggest best possible ERT for mining equipment.

The project objectives are the following:

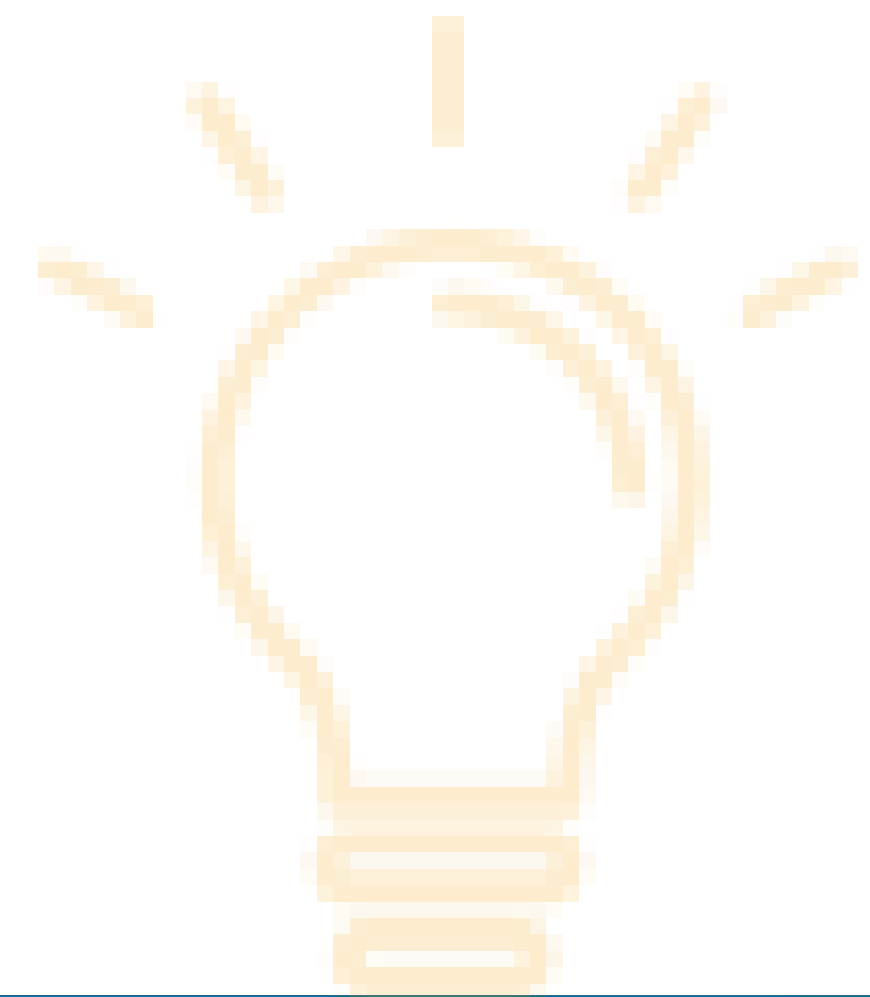
1. Measuring and diagnosing data quality problems;
2. Investigating the root-cause analysis for these problems;
3. Develop application tools for improving the quality of MAXIMO data;
4. Minimize the total ownership cost of production machinery or assets;
5. Identify the cost factors influencing the ERT of mining assets;
6. Develop, validate and demonstrate a decision-making tool for the ERT estimation of production machinery or assets;
7. Supply mining companies with a generic software to estimate the ERT of both old and new assets of the same type of production machinery.

The main stages of the project



Results so far . . .

1. Tara mine in Ireland is selected for data from Long Hole Drilling Machines-Epiroc Simba. The data includes:
 - Actual Operating time
 - Historical failure data from maintenance CMMS
 - Operating costs
 - Maintenance costs
 - Acquisition/ownership cost data
2. Data sorting & preparation
3. Statistical analysis



Data Sample



Report Title
Sub Title

Report Title

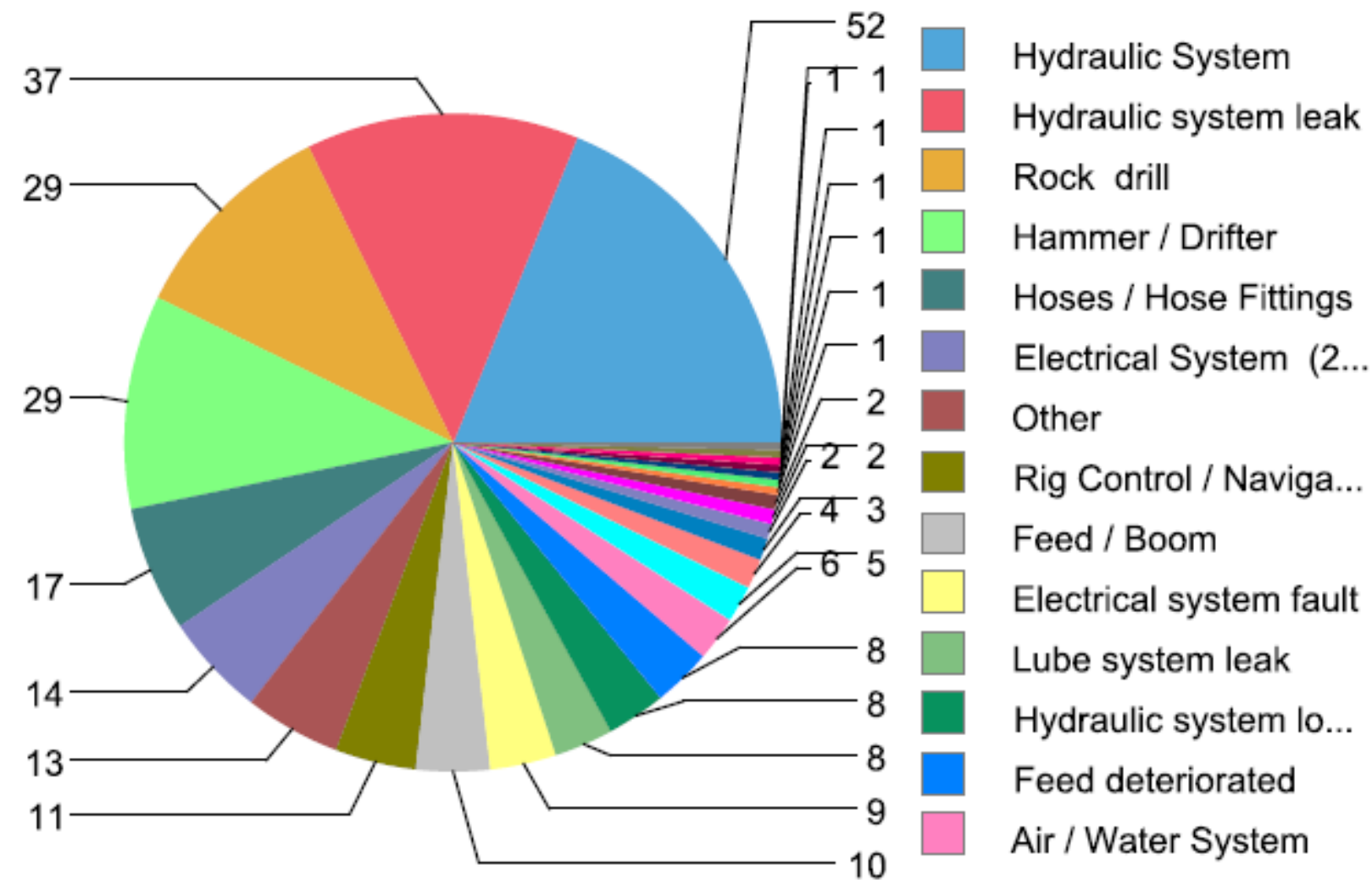
Boliden Tara Mines DAC

Asset: 017
Asset Description: Atlas Copco Simba ME7 C (Long Hole)
Location: 101A

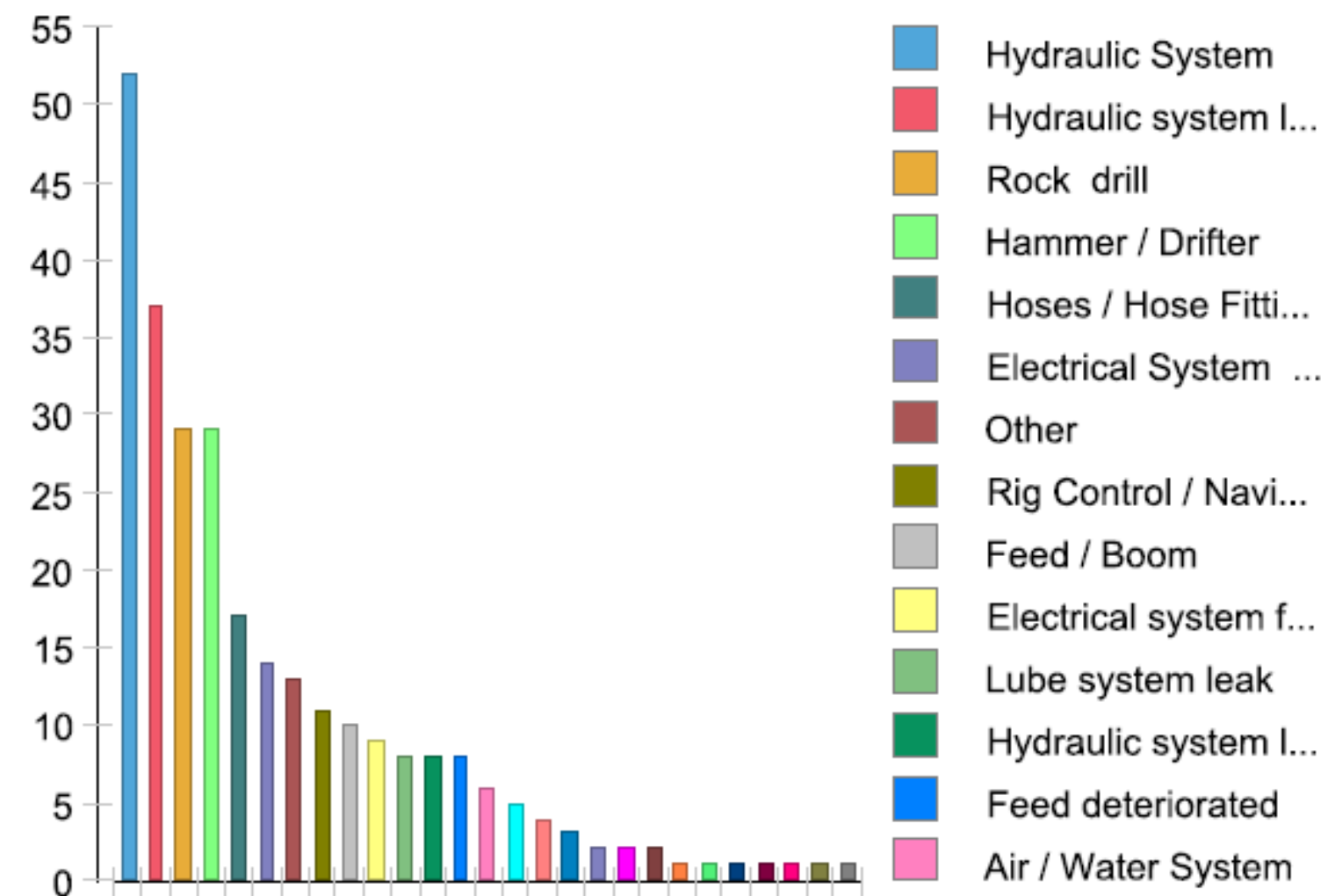
Work Order Target Start Date: 13/09/2015
Work Order Target End Date: 13/09/2018
Interval (days) 1096

Workorder Count 276
Confidence 96.38%
Cause missing 20

#No Failure by Problem codes



Pareto Analysis



Data Sample

1								
2	Asset Cost							
3	Asset Number: =017							
4	WO	Asset	Date	Hours	Labor Cost	Material Cost	Service Cost	Descripti
5	380883	017	09-04-2016	3,00	150,00	0,00	0,00	
6	381955	017	12-04-2016	2,00	100,00	0,00	0,00	
7	381955	017	12-04-2016	2,00	100,00	0,00	0,00	
8	383117	017	15-04-2016	1,00	50,00	0,00	0,00	
9	383117	017	15-04-2016	1,00	50,00	0,00	0,00	
10	384390	017	19-04-2016	2,00	100,00	0,00	0,00	
11	384390	017	19-04-2016	2,00	100,00	0,00	0,00	
12	385893	017	21-04-2016	2,00	100,00	0,00	0,00	
13	385893	017	21-04-2016	2,00	100,00	0,00	0,00	
14	387224	017	25-04-2016	1,00	50,00	0,00	0,00	
15	387224	017	25-04-2016	1,00	50,00	0,00	0,00	
16	387626	017	15-05-2016	8,00	400,00	0,00	0,00	
17	387626	017	15-05-2016	8,00	400,00	0,00	0,00	
18	387626	017	16-05-2016	8,00	400,00	0,00	0,00	
19	388168	017	27-04-2016	2,00	100,00	0,00	0,00	
20	391074	017	04-05-2016	2,00	100,00	0,00	0,00	
21	391074	017	04-05-2016	2,00	100,00	0,00	0,00	
22	400003	017	27-05-2016	3,00	150,00	0,00	0,00	
23	400003	017	27-05-2016	3,00	150,00	0,00	0,00	
24	400446	017	29-05-2016	1,00	50,00	0,00	0,00	
25	401139	017	31-05-2016	3,00	150,00	0,00	0,00	
26	402826	017	03-06-2016	3,00	150,00	0,00	0,00	
27	402826	017	03-06-2016	3,00	150,00	0,00	0,00	
28	403287	017	05-06-2016	1,00	50,00	0,00	0,00	
29	403287	017	05-06-2016	1,00	50,00	0,00	0,00	
30	404967	017	08-06-2016	2,00	100,00	0,00	0,00	
31	404967	017	08-06-2016	2,00	100,00	0,00	0,00	



Results so far . . .

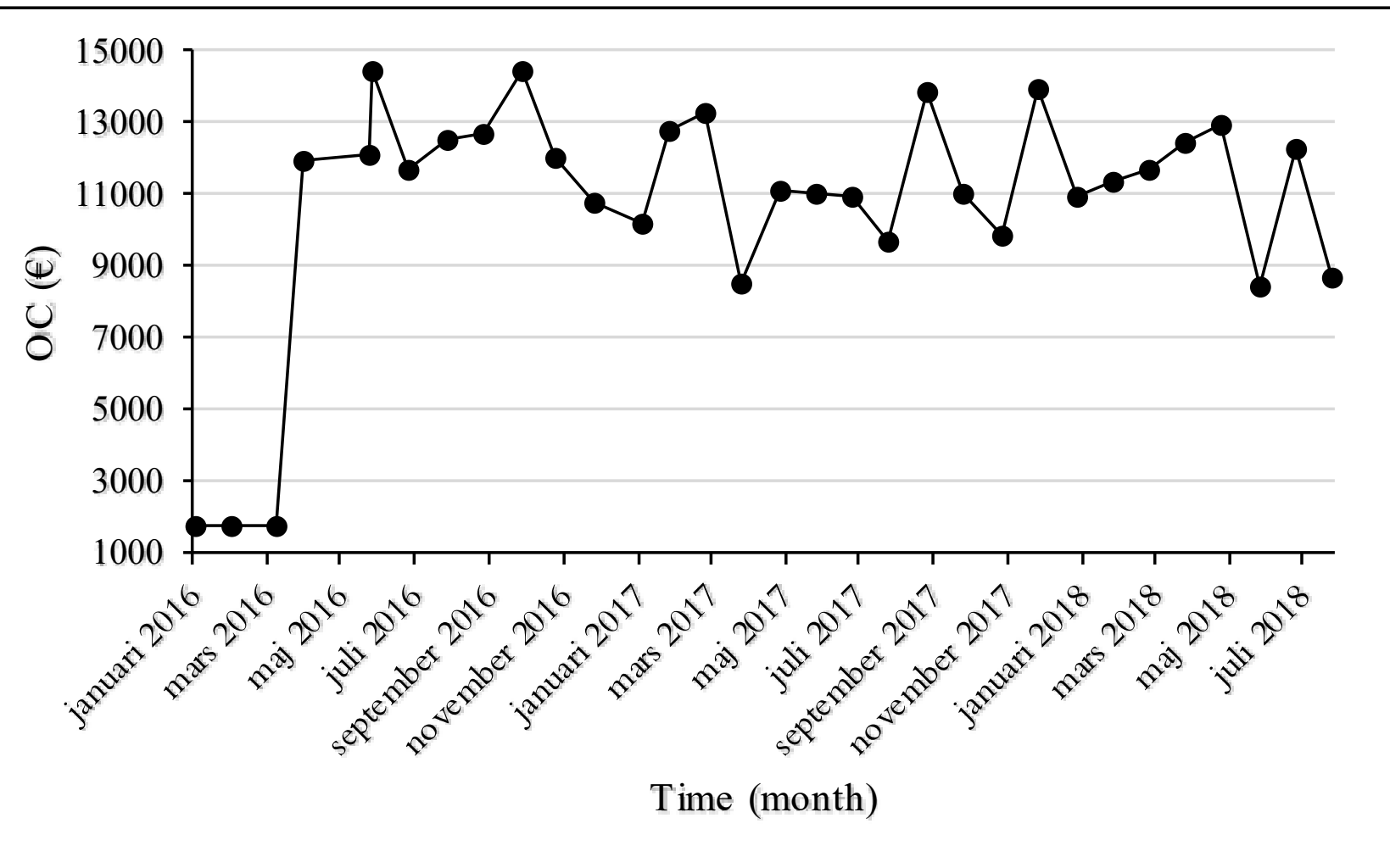
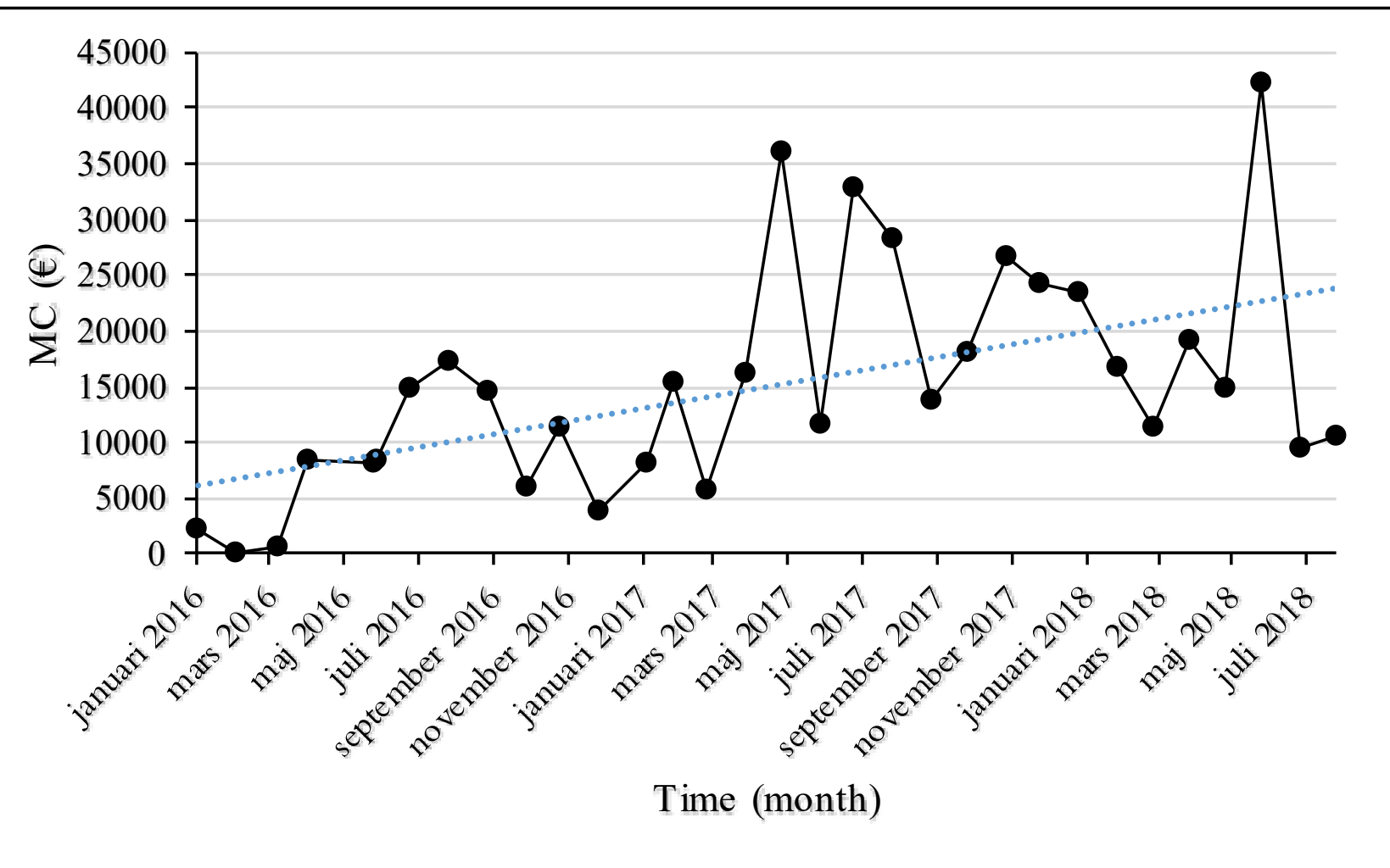
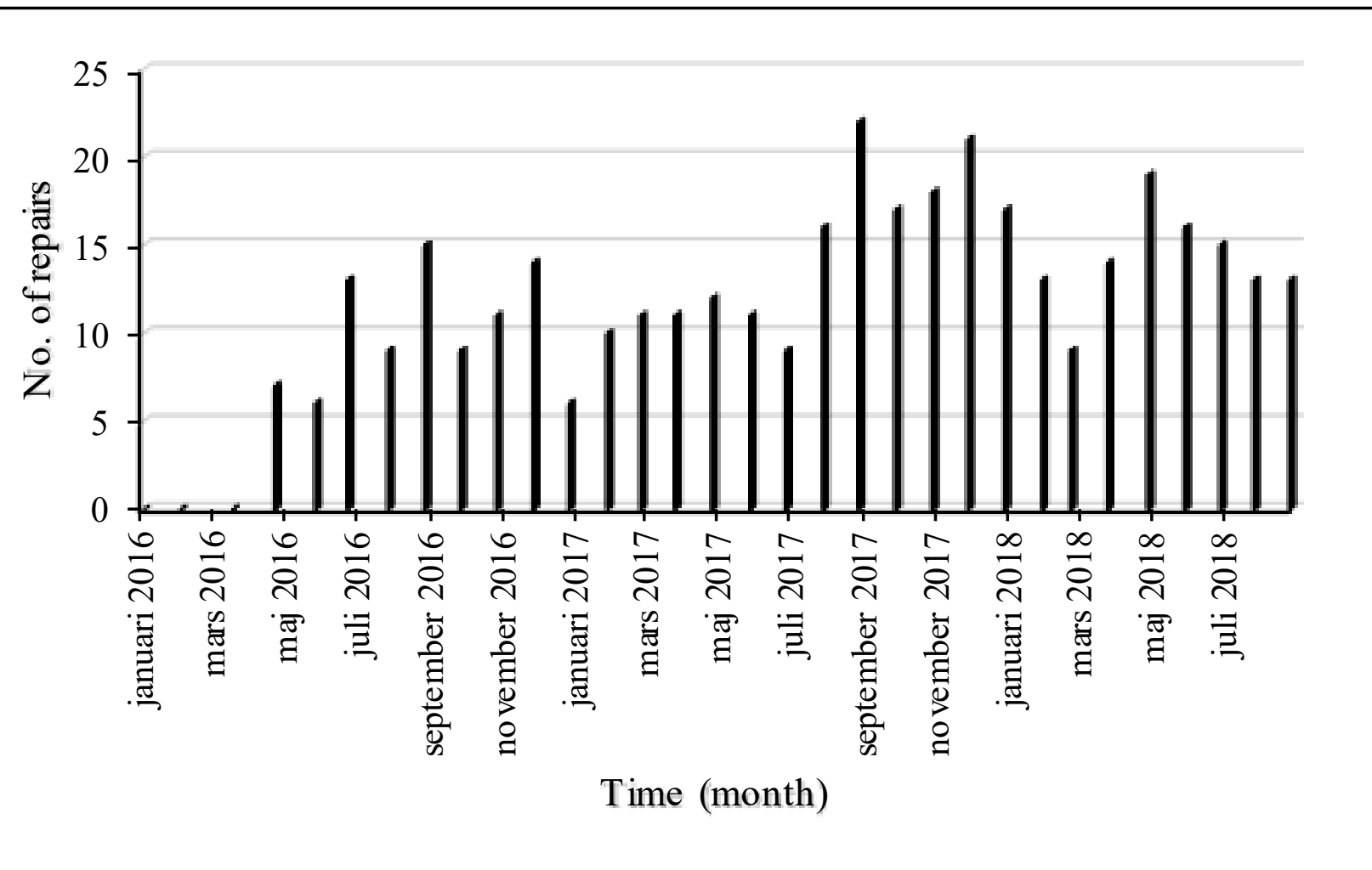
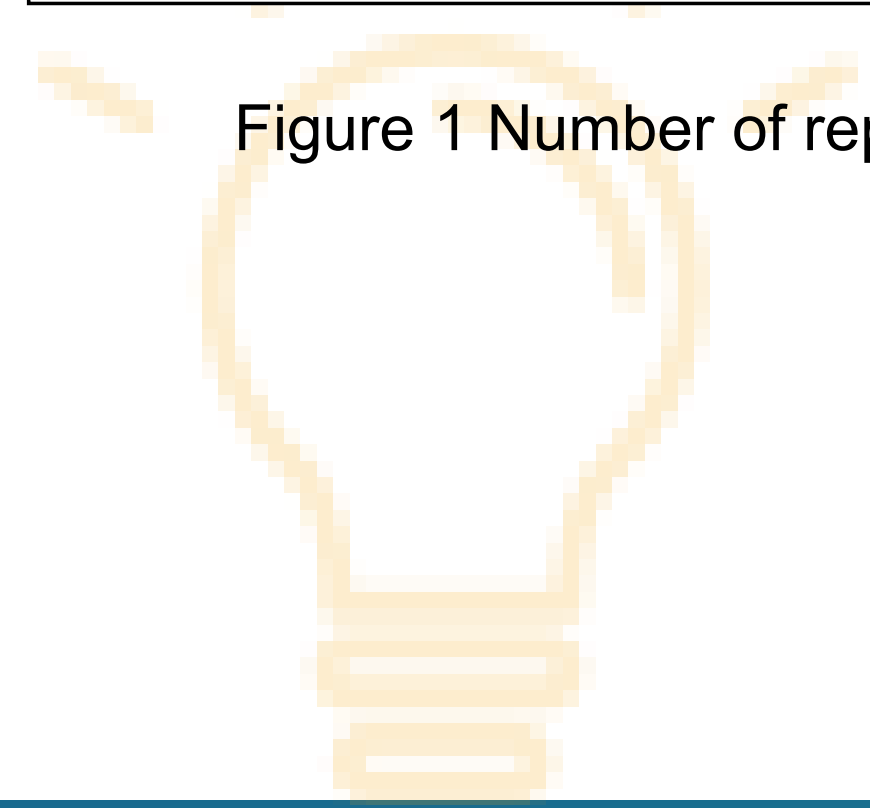


Figure 1 Number of repairs per calendar date

Figure 2 Maintenance cost data

Figure 3 Estimated operating cost data



Upcoming activities and next steps

- The focus will be on algorithm development of data quality analytics (DQA) such as data sorting, cleaning and preparation. This include the following:
 - **measuring and diagnosing data quality problems,**
 - Investigating the root-cause
 - Developing application tool for DQA

Deliverables

D4.1: A framework for data quality analytics of MAXIMO database.

D4.2: Report on possible solution for improving the quality of data.

D4.3: Mid-project report.

Thank you!