

Optimal PLS software

Small guide

Step 1: Go to <http://optimal-pls.com/>, and create an account



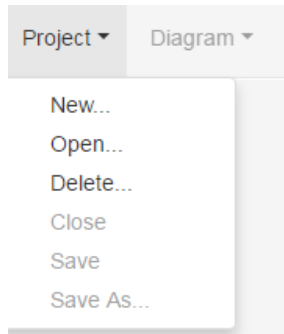
christophe.jeannette@gmail.com

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Sign in

Starting with Optimal PLS ? [Create your account.](#)

Step 2: In the drop down menus create a new project

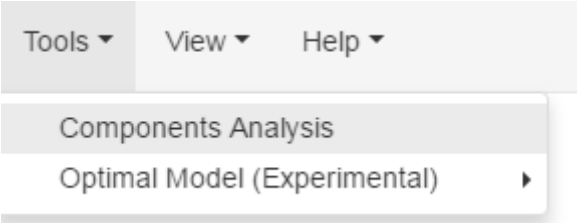


Enter the data file to process

A screenshot of a "New Project" dialog box. It has a title bar with "New Project" and a close button (X). The dialog contains a "PROJECT NAME" field with the text "Haier". Below it is a "RAW DATA FILE" section with a text input field containing "Example.csv" and a "Select" button. A small text note below reads: "Text file containing tab separated data values for all project's indicators, one period per row." At the bottom right, there is a "Create Project" button.

We provided a file to you. (example.csv) If you want to try your own data, you have to export it from excel with the option “CSV, tab delimited”

Step 3: in the “Tools” tab, you start with a principal component analysis, which will allow you to reduce the number of variables in the initial table.



The number of axes corresponding to latent variables depends on their explanatory power. *In the case where you already have a model to test you can build it and go directly to Step 4, Principal Component Analysis is not necessary.*

Number of Axes

Number of Axis	Explanatory Power
2	84.372 %
3	93.839 %
4	97.195 %
5	99.336 %

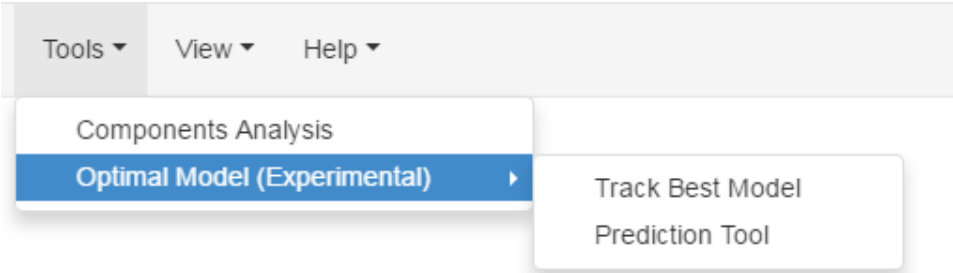
Choose a number of axes you want for your model, we recommend 4 or 5.

Indicators Affinity Scores

Click on scores to link indicators to axes ([automatic selection](#))

Click on “automatic selection” then “generate model”

Step 4: Choose “Track best model”



The model you obtain at the end of the computations is the one that explain statistically the most your data.

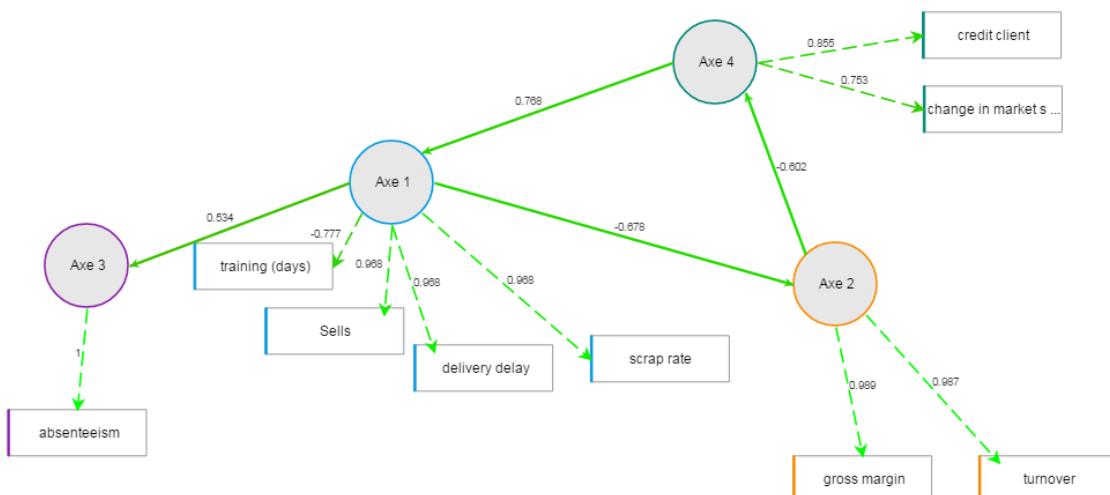
You then either have two possibilities in "tools" look for the optimal model, or in "statistics" build a classic PLS model. If you choose the classic PLS model the result is instantaneous. However, if you choose the optimal model, the algorithm will generate all the possible combinations and you will produce the best model.

Note 1: In all the cases of figures, you can go in "Statistics" to calculate the classic tests of the obtained model. You have also the opportunity to simulate the model for the period n+1

Note 2: You can save your results on the server for 10 days or import them to your computer immediately.

Note 3: The duration of the calculation is a function of the period / individual's number for the principal component analysis and the number of axes for the optimal graph. In the latter case, the problem is of a combinatorial nature. At each step save your results.

For all theoretical and technical details, consult the articles in bibliography.



Axis	Composite Reliability	Average Variance Extracted	R ²	Cronbach's Alpha
Axe 1	0.886	0.854	0.591	0.504
Axe 2	0.988	0.976	0.460	0.976
Axe 3	1.000	1.000	0.285	NaN
Axe 4	0.786	0.649	0.362	0.464

Variability Prediction : Optimal PLS



Click on a cell of the N + 1 column to set the future value of an indicator then hit 'Calculate'.

Indicator	N - 3	N - 2	N - 1	N	N + 1
▼ axis: Axe 1					
Sells	5.00	6.00	4.00	2.00	2.00
delivery delay	11.00	13.00	9.00	5.00	5.00
scrap rate	5.67	6.33	5.00	3.67	3.67
training (days)	3.00	2.00	1.00	3.00	3.00
▼ axis: Axe 2					
gross margin	3.00	2.00	2.00	3.00	4.00
turnover	1.33	0.89	0.44	1.33	1.33
▼ axis: Axe 3					
absenteeism	2.00	2.00	1.00	1.00	1.00
▼ axis: Axe 4					
credit client	36.00	38.00	32.00	30.00	30.00
change in market share	7.00	5.00	4.00	4.00	4.00

Development of an illustrative example

We have statistical information on companies that produce and market small electronic equipment. This information is monthly and for a period of 24 months

File downloadable here:

<https://drive.google.com/open?id=0BwfyndmwUMa0UjZJSzVQcWN1N2s>

Sale	Gross margin	Customer credit (days)	Delivery time (days)	Waste	Percentage change market	absent eeism	Training (days)	Staff turnover
5000000	3	30	11	5.66666667	2	1	3	1.33333333
6000000	2	40	13	6.33333333	3	2	2	0.88888889
3000000	4	32	7	4.33333333	2	1	6	2.66666667
4000000	4	35	9	5	1	1	7	3.11111111
4000000	5	34	9	5	1	1	8	3.55555556
1000000	4	20	3	3	2	1	9	2.76923077
3000000	3	33	7	4.33333333	5	2	5	2.22222222
4000000	2.5	34	9	5	6	1	3	1.33333333
5000000	3	36	11	5.66666667	7	2	3	1.33333333
6000000	2	38	13	6.33333333	5	2	2	0.88888889
4000000	2	32	9	5	4	1	1	0.44444444
2000000	3	30	5	3.66666667	4	1	3	1.33333333
6000000	3.6	36	13.2	7	2.4	1.2	3	1.6
6500000	2	44	14	7	3.25	2	2	0.96296296
4000000	5	43	9.5	5.75	2.75	1.5	8	3.55555556
4500000	4.5	40	10	5.625	1.125	1.125	8	3.5
2000000	2.5	17	4.5	2.5	0.5	0.5	4	1.77777778
4000000	6	60	12	9	8	4	36	11.0769231
5000000	5	55	12	7.25	8.5	3.5	8	3.7037037
6000000	4	51	13.5	7.5	9	1.5	4.5	2
7000000	4.2	51	15.4	8	9.5	2.8	4.2	1.86666667
6000000	2	38	13	6.5	5	2	2	0.88888889
3000000	1.5	24	6.75	3.75	3	0.75	0.75	0.33333333
3000000	4.5	45	7.5	5.5	6	1.5	4	2

Table 1 : basic data

This information describes the day-to-day management of the organization, and is assumed to be reliable. It should be noted that we have here all the classic management indicators; financial elements, process descriptions, market indicators, and elements of innovation and investment. In step 1 the data are automatically standardised.

Our problem is to produce a dashboard for this organization. We initially have no idea a priori about the number of axes and the hierarchy of connections.

We proceed in 5 steps:

- 1- Research of the number of axes by Principal Component Analysis,
- 2- For each axis, indicators are selected based on their correlation with the axis,
- 3- Heuristic search for the best graph,
- 4- Production of graph quality tests,
- 5- Simulation analysis to prepare the investment policy.

If we have an initial model, steps 1 and 2 are useless and the PLS graph can be produced directly.

- 6- Step 1 : Research of the number of axes by Principal Component Analysis,

Number of Axis	Explanatory Power
2	85.03%
3	92.79%

Table 2 : explanatory power of factor axes

We notice here that 3 axes are enough to summarize the information in the table has more than 92%.

- Step 2 : Correlation between axes an indicator (value chosen by the controlling manager are selected in red)

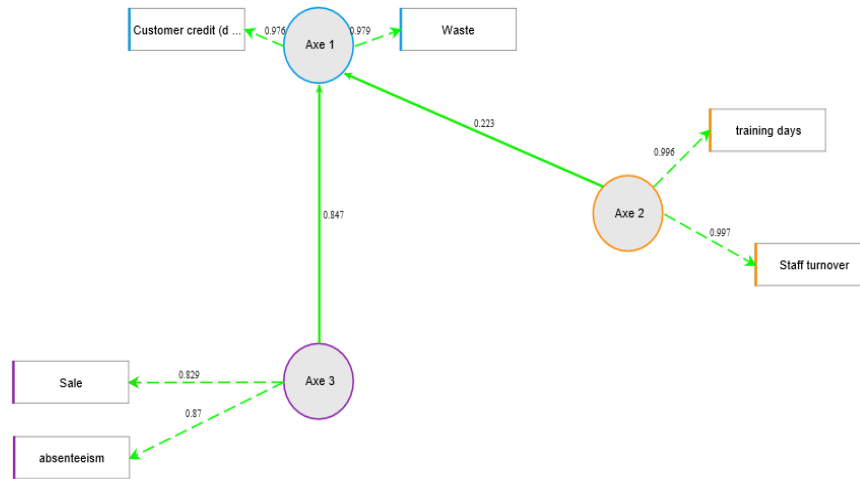
Indicator	Axis 1	Axis 2	Axis 3
Sale	27.68%	44.97%	33.28%
Gross margin	23.11%	42.03%	20.17%
Customer credit (days)	42.60%	2.36%	4.06%
Delivery time (days)	33.81%	36.89%	29.87%
Waste	42.23%	15.47%	17.26%
Percentage change market	31.77%	10.85%	77.32%
absenteeism	39.77%	3.66%	30.30%
Staff turnover	26.50%	47.89%	16.52%
training days	25.80%	46.70%	10.48%

Table 3 : Correlation axes indicators

The highest coefficients for each axis are preferred but not mandatory.

At this stage it can be said that axis 1 represents internal processes, axis 2 training, axis 3 the market.

7- Step 3: Heuristic search for the best graph,



If we now look at the graph determined by the PLS-Optimal, we can see that two blocks (training and market) control the processes in this case, customer lead times and waste. It can be concluded that a search for market share and turnover at all costs affects the quality of the organisation: waste is increasing as well as customer delivery times.

- Step 4 : Production of graph quality tests

	Average Variance Extracted	R2	Cronbach's Alpha
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	Composite Reliability	Average Variance Extracted	R2	Cronbach's Alpha
Axe 1	0.977	0.955	0.868	0.953
Axe 2	0.996	0.993	-	0.993
Axe 3	0.838	0.722	-	0.616

Globally the graph is statistically significant with a lower significance for axis 3 (the Cronbach alpha value is low).

- Step 5 : Simulation analysis to prepare the investment policy

Axis : Axe 1					
Customer credit (days)	51.00	38.00	24.00	45.00	50.04
Waste	8.00	6.50	3.75	5.50	6.12

Axis : Axe 2					
Staff turnover	1.87	0.89	0.33	2.00	2.00
training days	4.20	2.00	0.75	4.00	4.00

Axis : Axe 3					
Sale	7000000.00	6000000.00	3000000.00	3000000.00	3000000.00
Percentage change market	9.50	5.00	3.00	6.00	7.00

For this simulation, for example, we choose a 7% monthly variation, which brings the customer credit to 50 days with a 6.12% discount rate.