

Improving Graph Literacy

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Improving Graph Literacy



■ What are the Strengths of Graphs?

Visualize Numbers More Clearly !

Possible to Discover Something New !

Easy to Convey a Message !

Source: Matsugami (2018: 13)

Improving Graph Literacy



■ What are the Strengths of Graphs?

Visualize Numbers More Clearly !

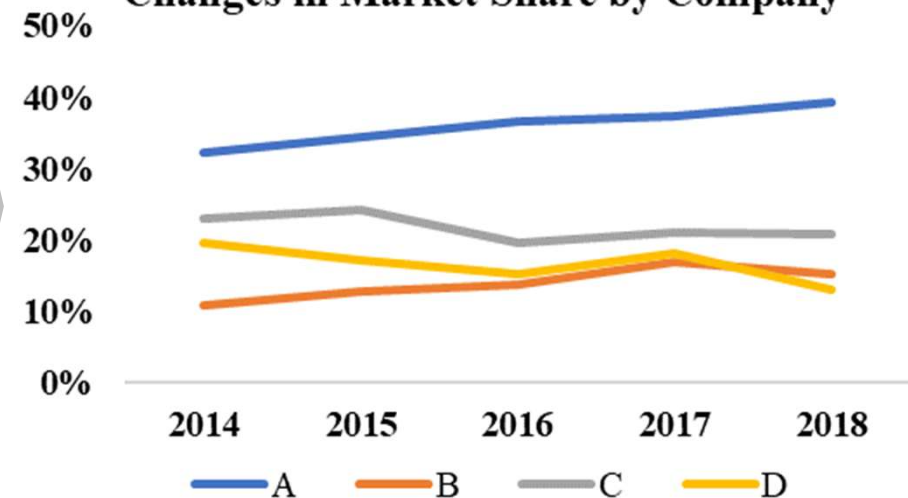
Table

Changes in Market Share by Company

	2014	2015	2016	2017	2018
A	32.20%	34.50%	36.70%	37.30%	39.30%
B	10.70%	12.80%	13.80%	16.90%	15.20%
C	23.00%	24.10%	19.60%	21.10%	20.80%
D	19.50%	17.20%	15.10%	18.10%	13.00%

Graph

Changes in Market Share by Company



Source: Matsugami (2018: 13)

Improving Graph Literacy



■ What are the Strengths of Graphs?

Possible to Discover Something New !

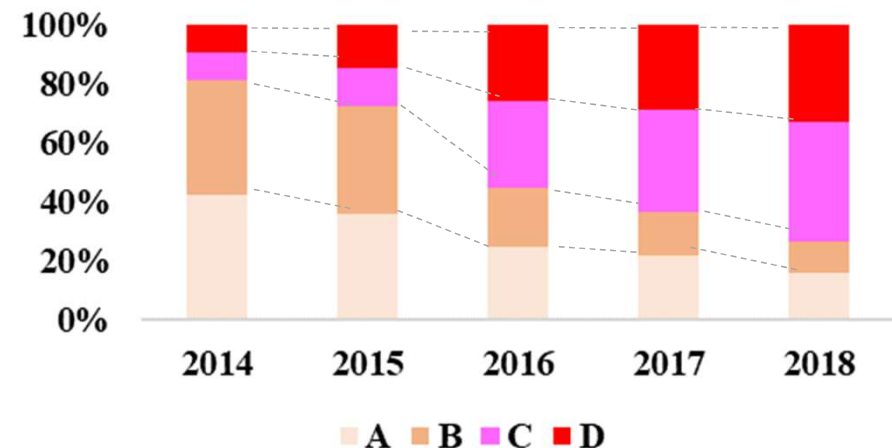
Table

Changes in Market Share by Company

	2014	2015	2016	2017	2018
A	42.20%	36.10%	25.00%	22.00%	15.90%
B	39.20%	36.00%	20.00%	14.50%	10.50%
C	9.40%	13.40%	29.40%	34.50%	40.60%
D	9.20%	14.50%	25.60%	29.00%	33.00%

Graph

Changes in Market Share by Company



Source: Matsugami (2018: 13)

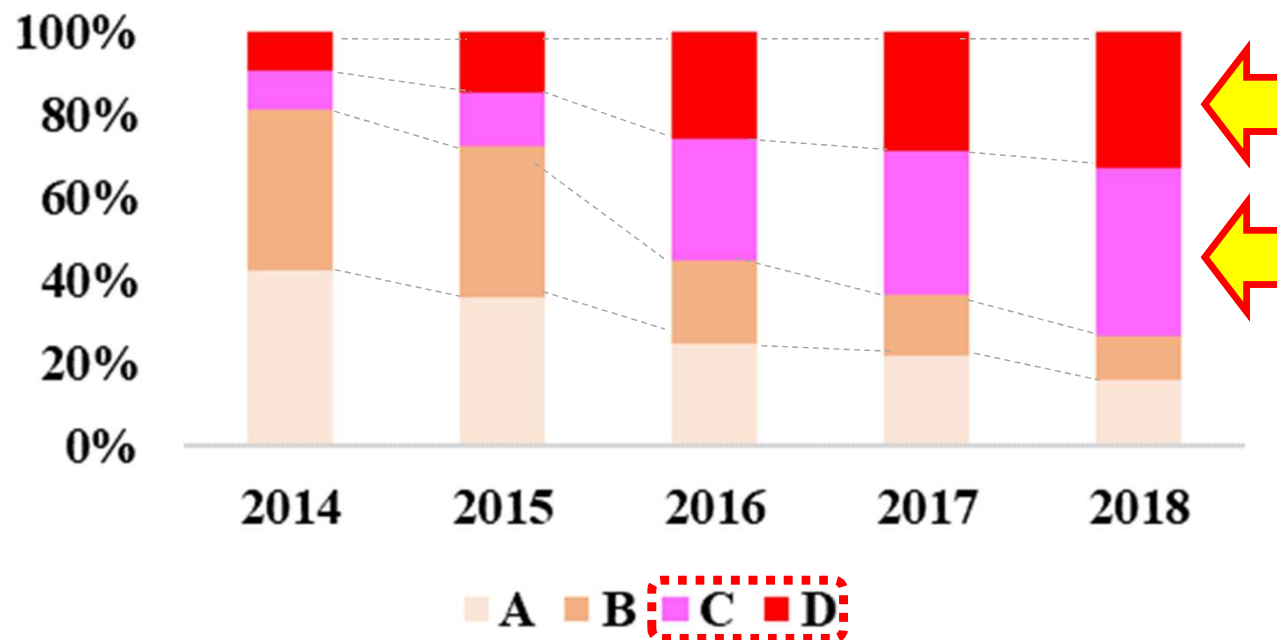
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■ What are the Strengths of Graphs?

Easy to Convey a Message !

Changes in Market Share by Company



Source: Matsugami (2018: 14)

Improving Graph Literacy



■ Why Do Many People Have Low Graph Literacy?

Poor understanding of the strengths of using graphs.

Limited knowledge of how to show the data in which graph.

There is excessive incorrect graph usage.

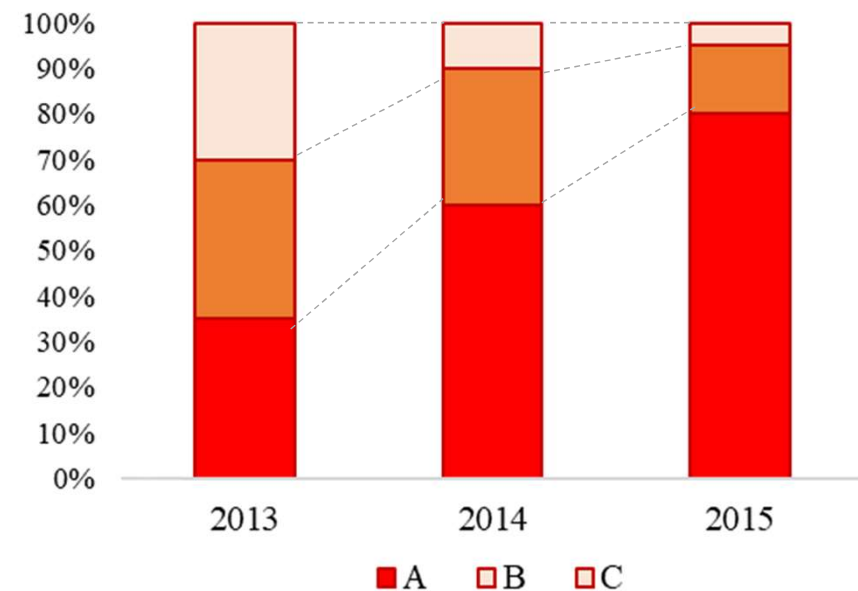
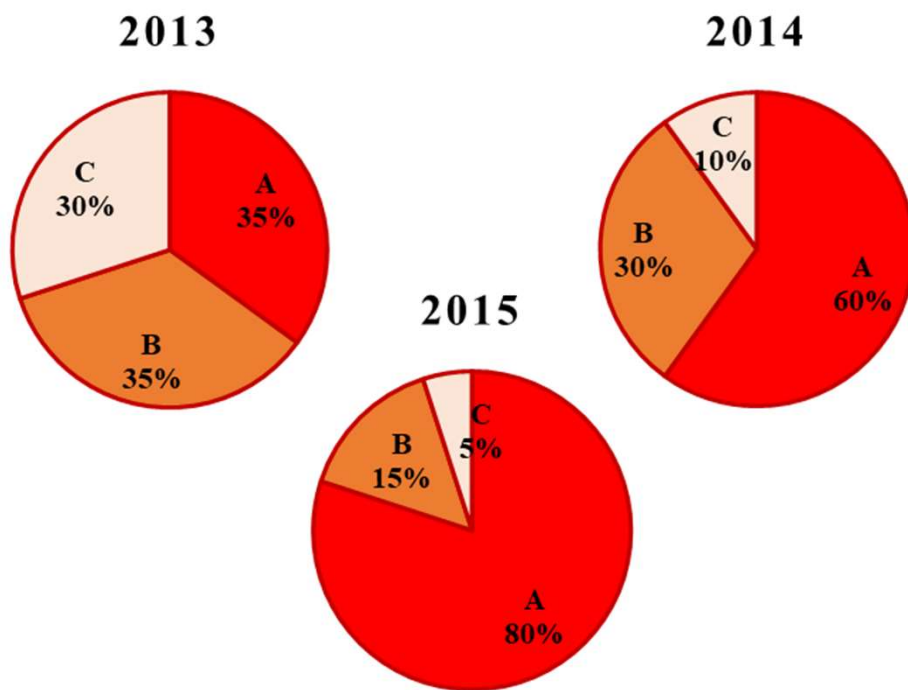
Source: Matsugami (2018: 14)

Improving Graph Literacy



■ Why Do Many People Have Low Graph Literacy?

There is excessive incorrect graph usage.



Pie charts unlikely fit comparative data.

Cumulative bar charts look way clearer.

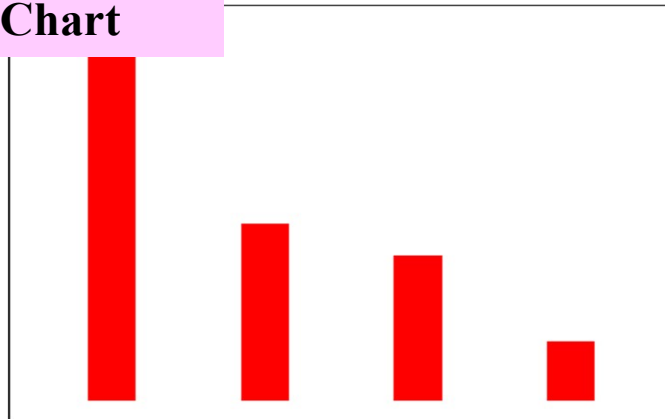
Source: Matsugami (2018: 14)

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■ Graphs that You Should Remember

Column Chart



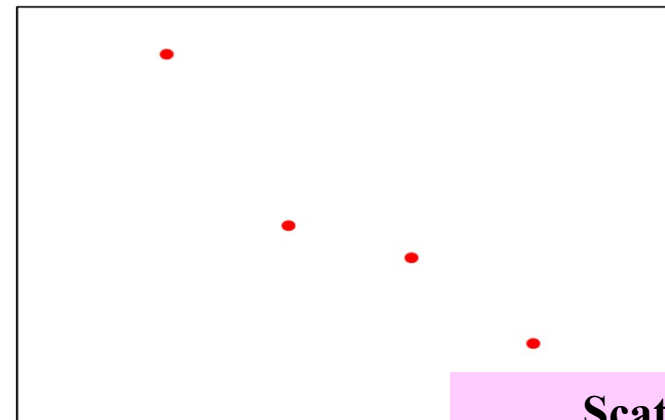
Horizontal Bar Graph



Line Graph



Scatter Plot



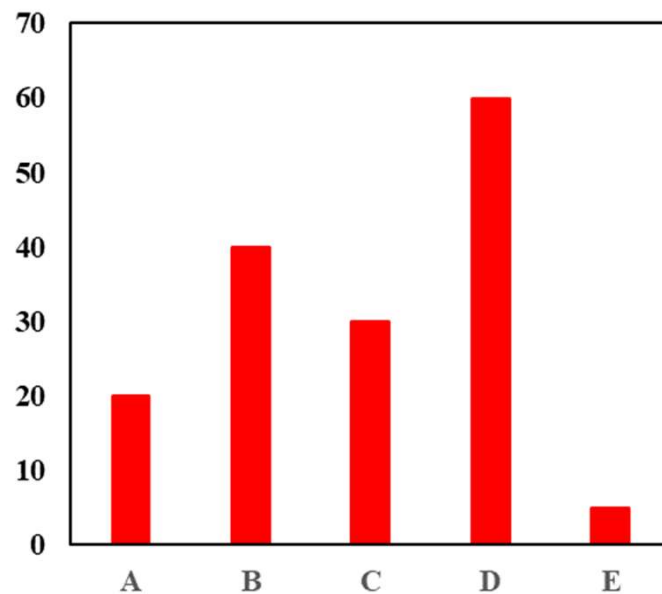
Source: Matsugami (2018: 86)

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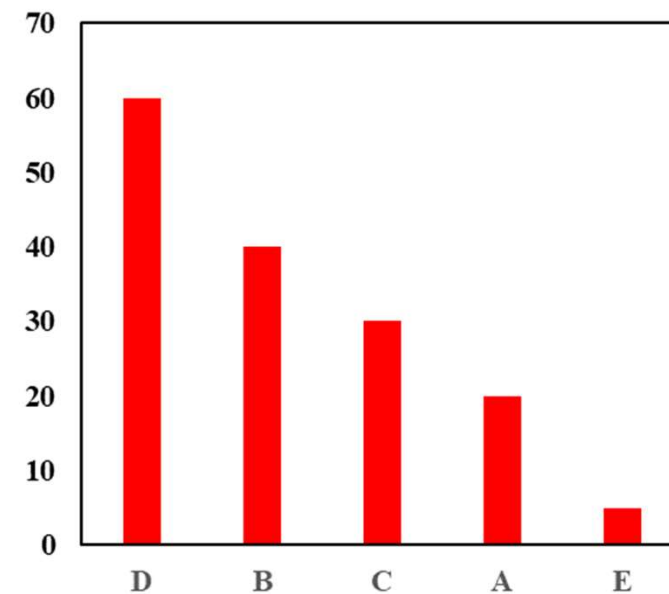


■ Arrange the Data : Descending Order

Out of Order



Descending Order



Large



Small

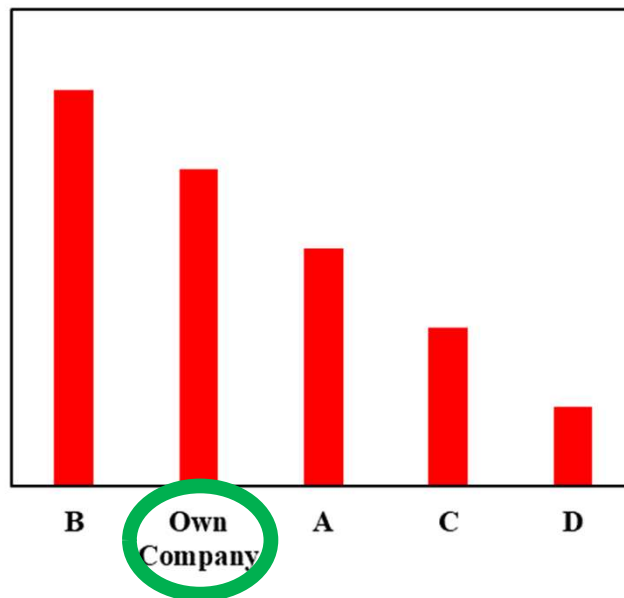
Source: Matsugami (2018: 86)

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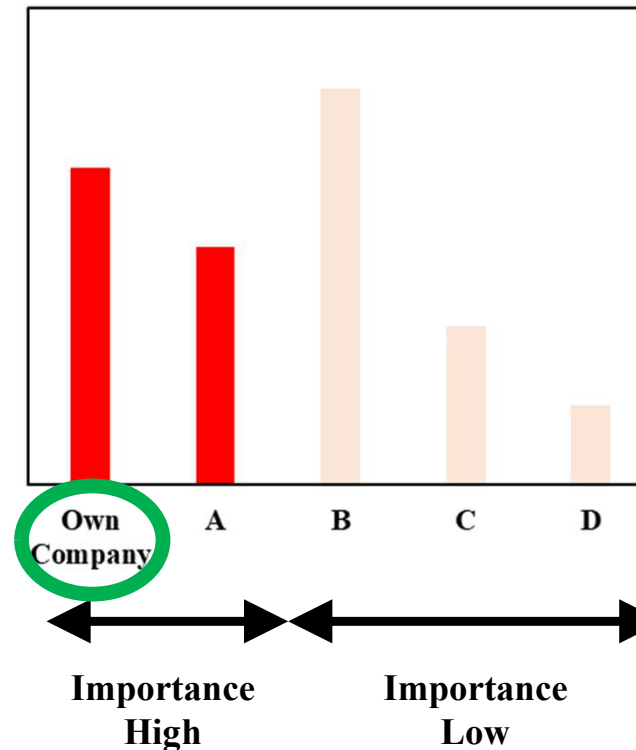


■ Arrange the Data : In Order of Importance

Not in Order of Importance



In Order of Importance



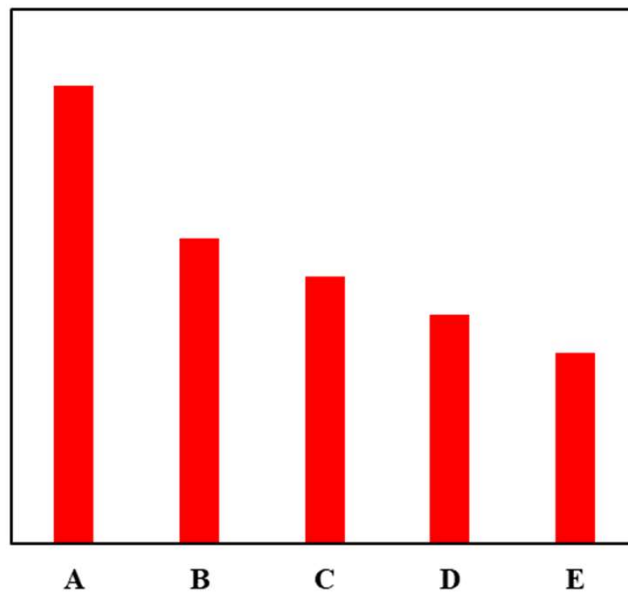
Source: Matsugami (2018: 86)

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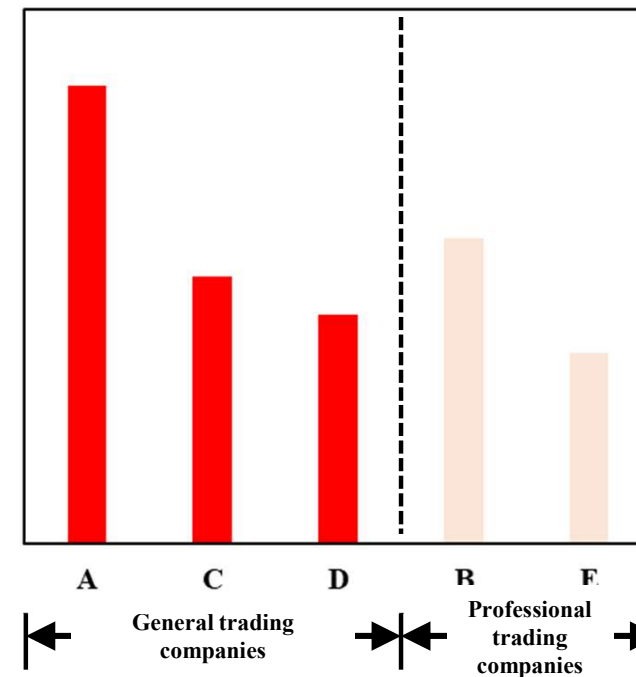


■ Arrange the Data : Type

Mixed Types



In Order by Types



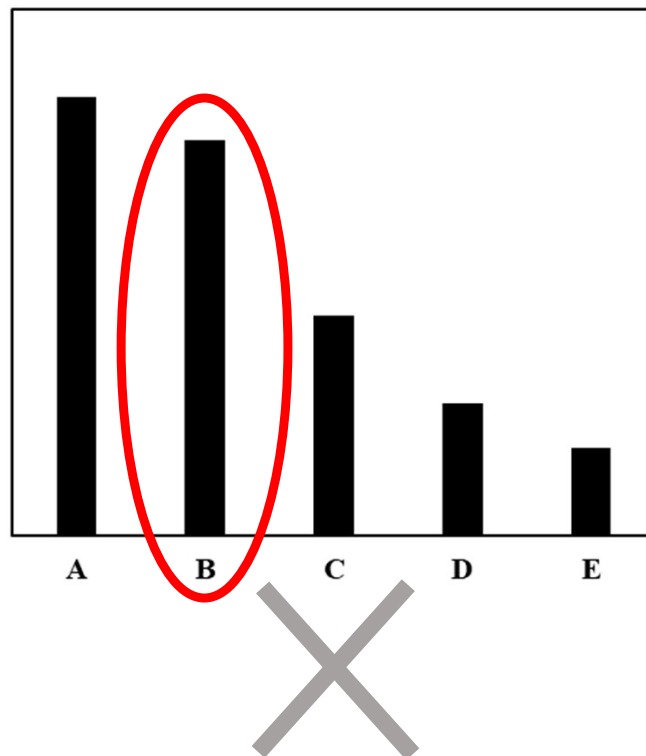
Source: Matsugami (2018: 86)

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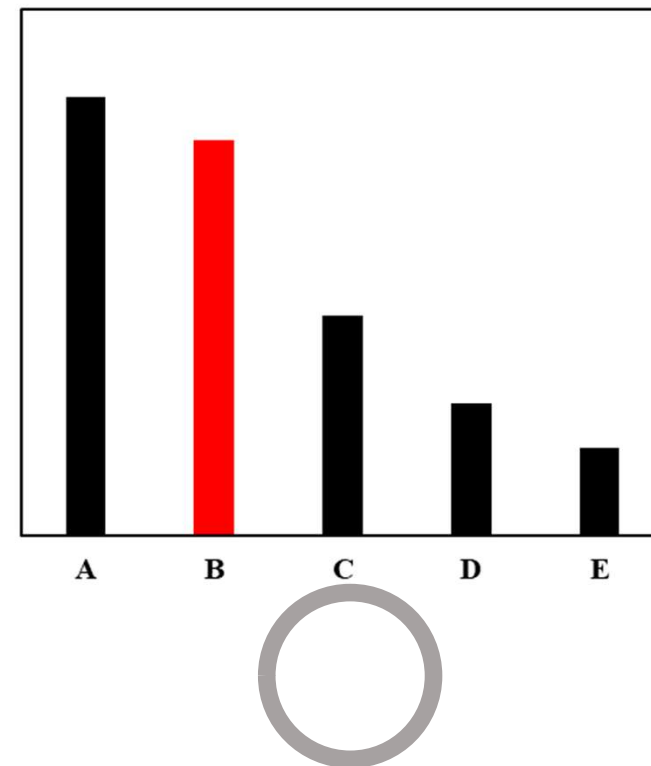


■ Data Emphasis

Typical Way to Emphasize



Emphasis with Color



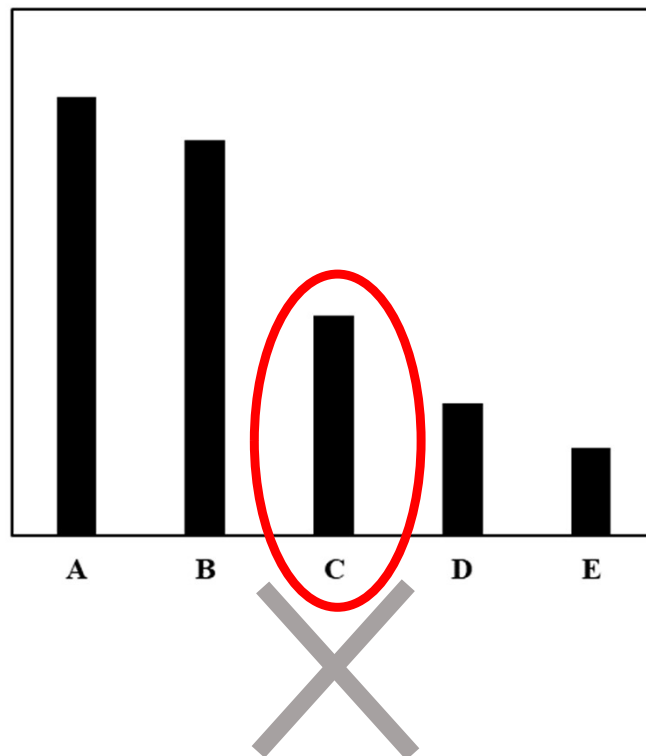
Source: Matsugami (2018: 100)

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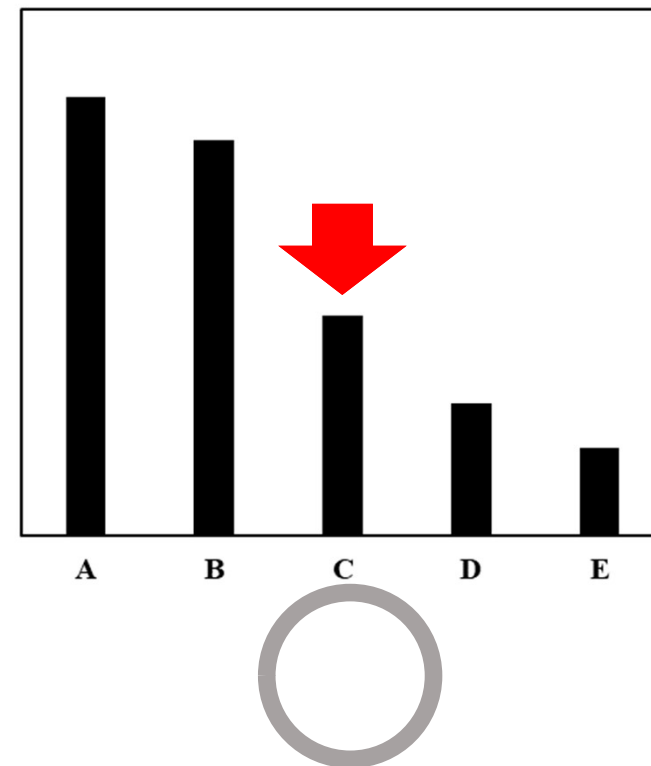


■ Data Emphasis

Typical Way to Emphasize



Emphasis with Arrow



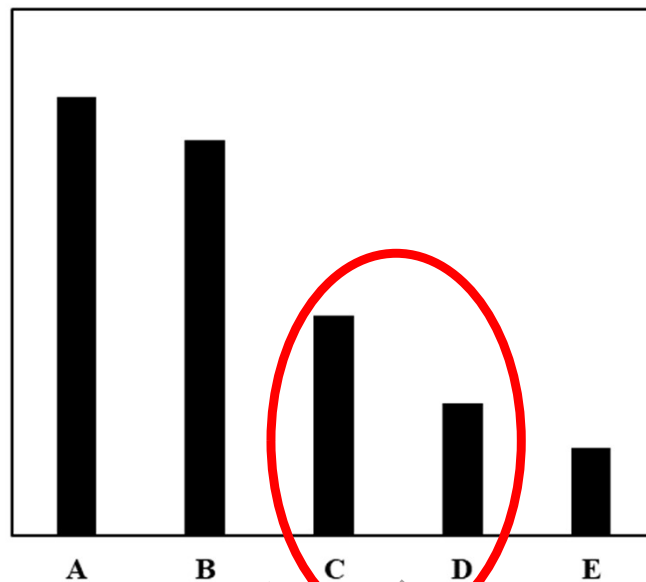
Source: Matsugami (2018: 101)

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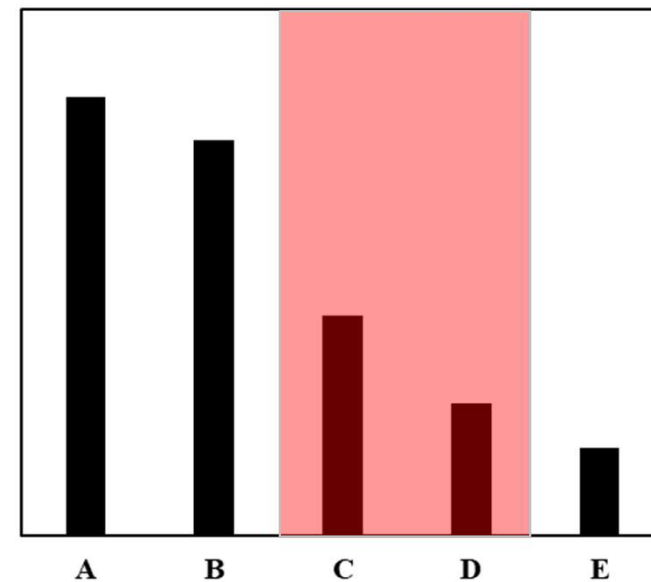


■ How to Draw Attention from the Audience?

Typical Emphasis



Emphasis in the Background



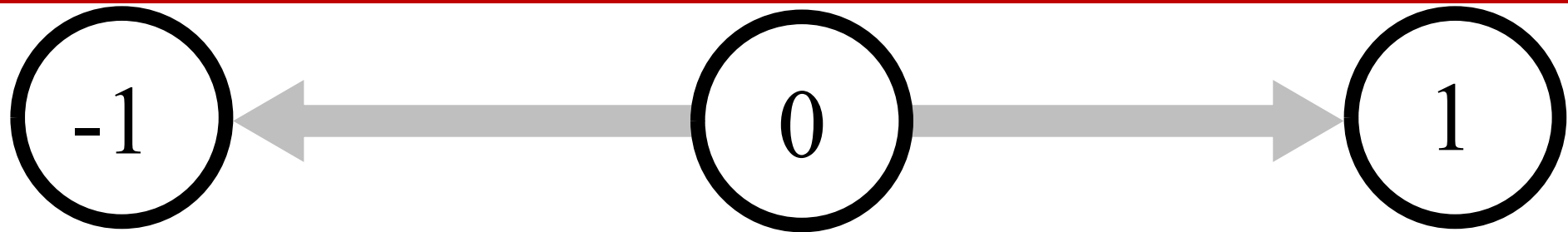
Source: Matsugami (2018: 101)

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■ Quantitative Analysis: Correlations

A statistical method to measure the association between two variables.



Correlation Coefficients	The degree of correlations
~ 0.3	No correlation
$0.3 \sim 0.5$	A weak correlation
$0.5 \sim 0.7$	A moderate correlation
$0.7 \sim 0.9$	A strong correlation
0.9 or greater	A very strong correlation

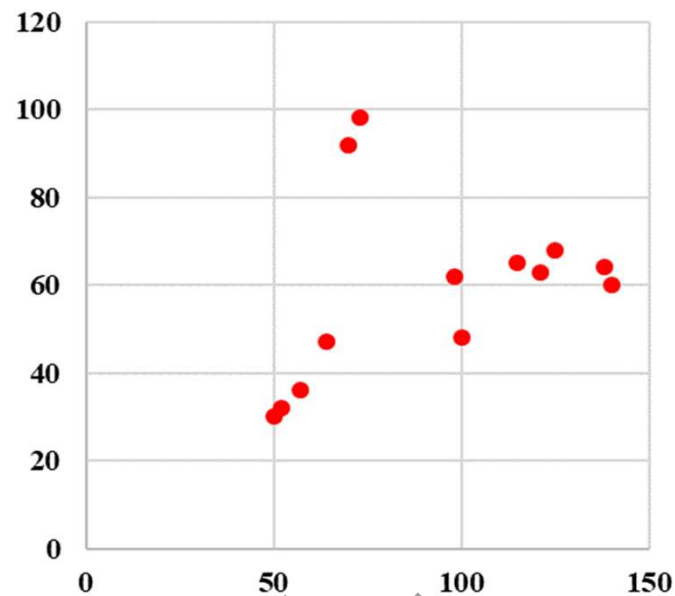
Source: Ueyama (2016: 149)

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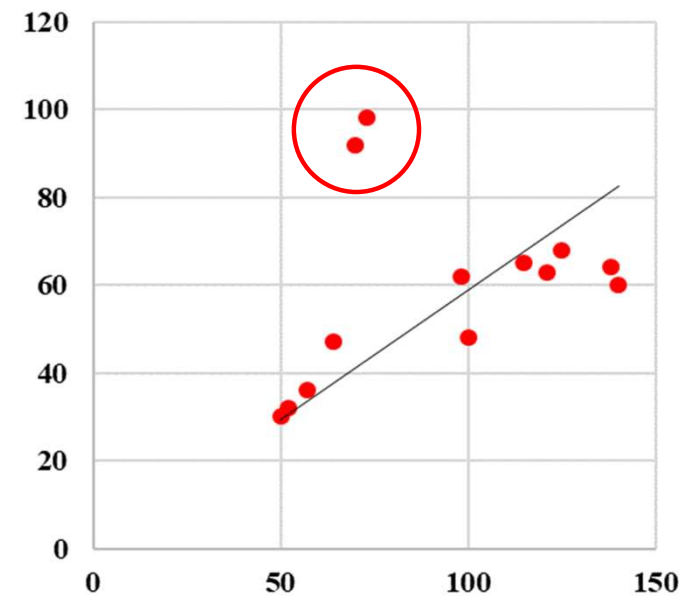


■ Correlation Analysis

Without Emphasis



Emphasis with an Ellipse



Source: Matsugami (2018: 102)



■ Quantitative Analysis: Correlations

Topics (Examples)

Family support & entrepreneurs' well-being or resilience

Labor productivity & working hours

Income & crime rates

Age & health

Price & customer satisfaction

Foreign ownership & return on investment

R&D intensity & patents

Professors' research outputs & university competitiveness

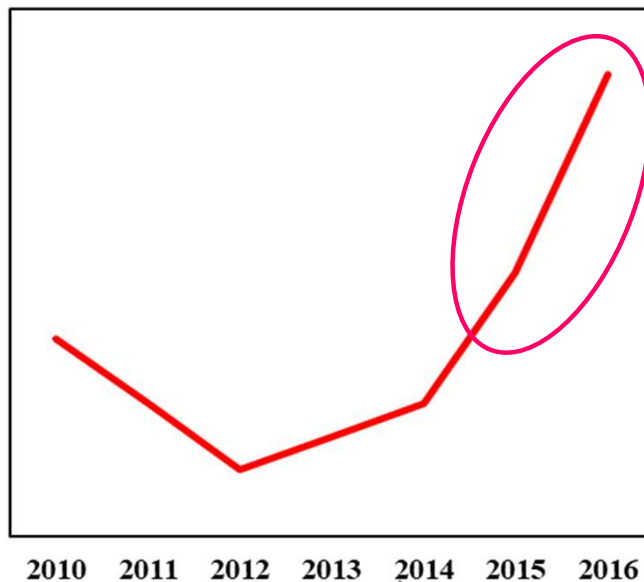
Institutional quality & FDI

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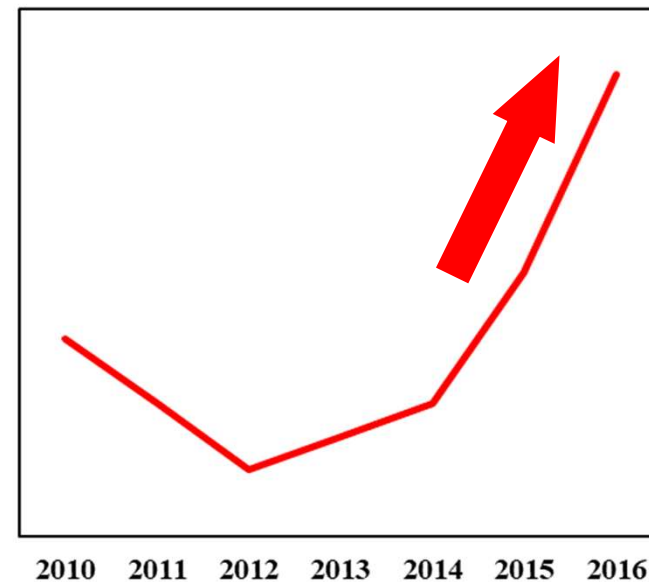


■ Data Emphasis: Emphasizing Growth Patterns

Without Emphasis



Emphasis with Arrow



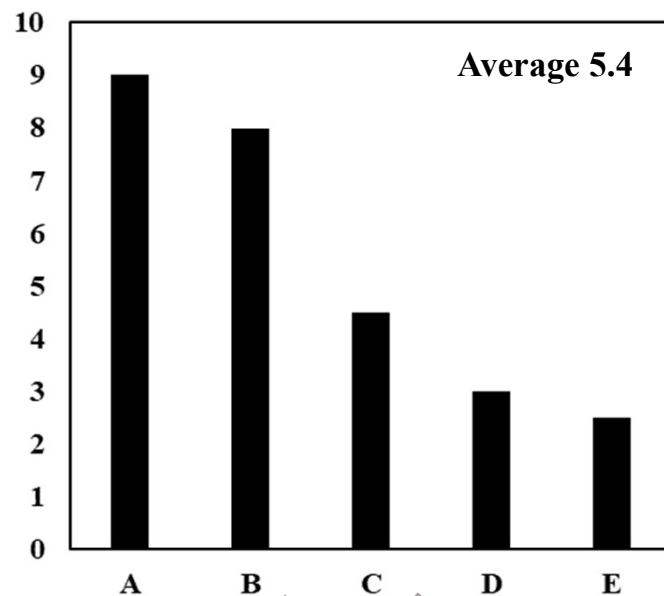
Source: Matsugami (2018: 102)

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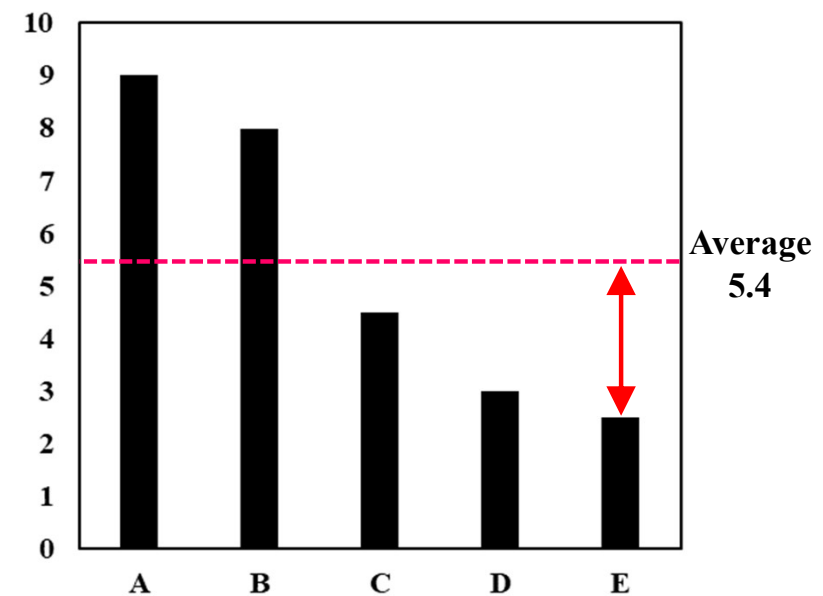


■ Data Emphasis: Emphasizing Differences

Without Emphasis



Emphasis with Auxiliary Line



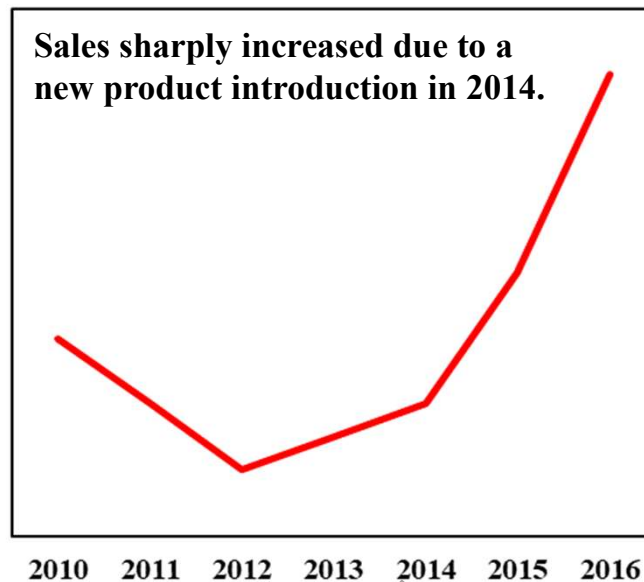
Source: Matsugami (2018: 103)

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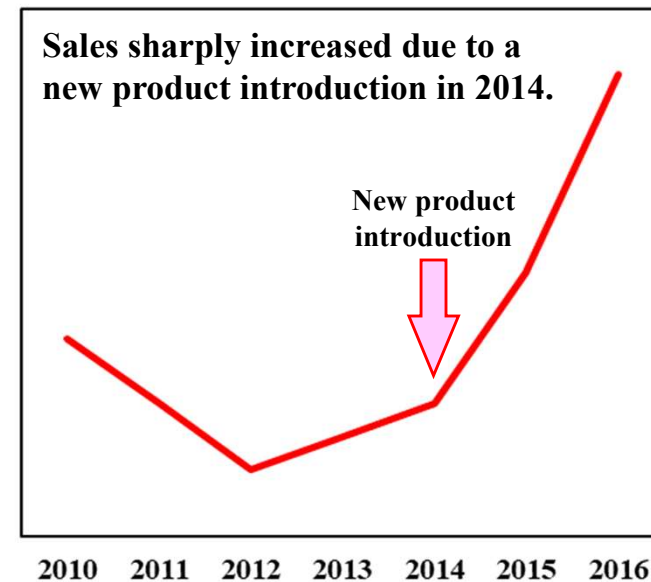


■ Data Emphasis: Adding Explanation

No Explanation



With Explanation



Source: Matsugami (2018: 103)



'4' Major Matrix Analyses



■ '4' Major Matrix Analyses

What are the Strengths of Matrix Analyses?

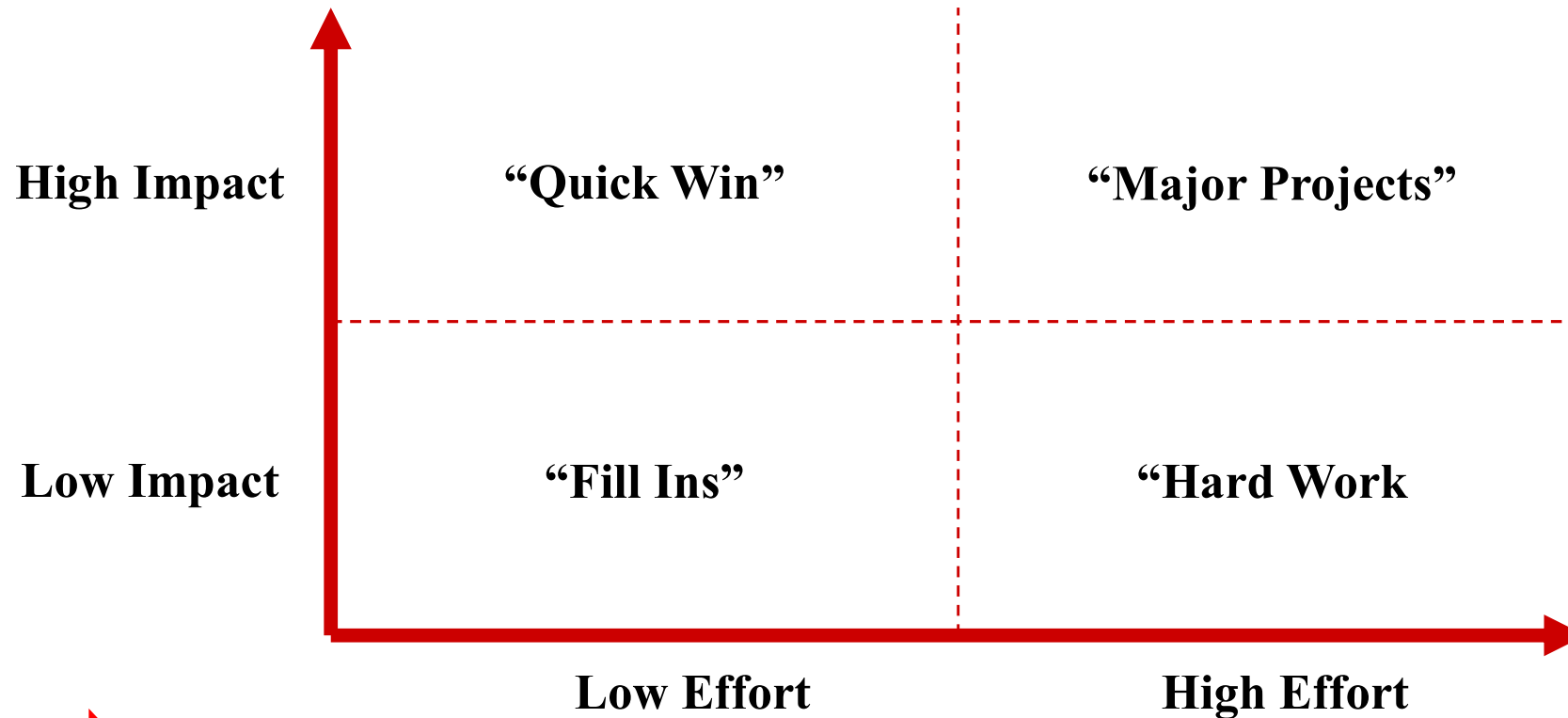
- 【1】 Make information look organized & easier to see.
- 【2】 Gain new ideas via a mix of multiple perspectives.
- 【3】 Expand the perspective that tends to be narrow.
- 【4】 Help classify data.

Source: Ueyama (2016: 160)

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1 Pay-Off Matrix



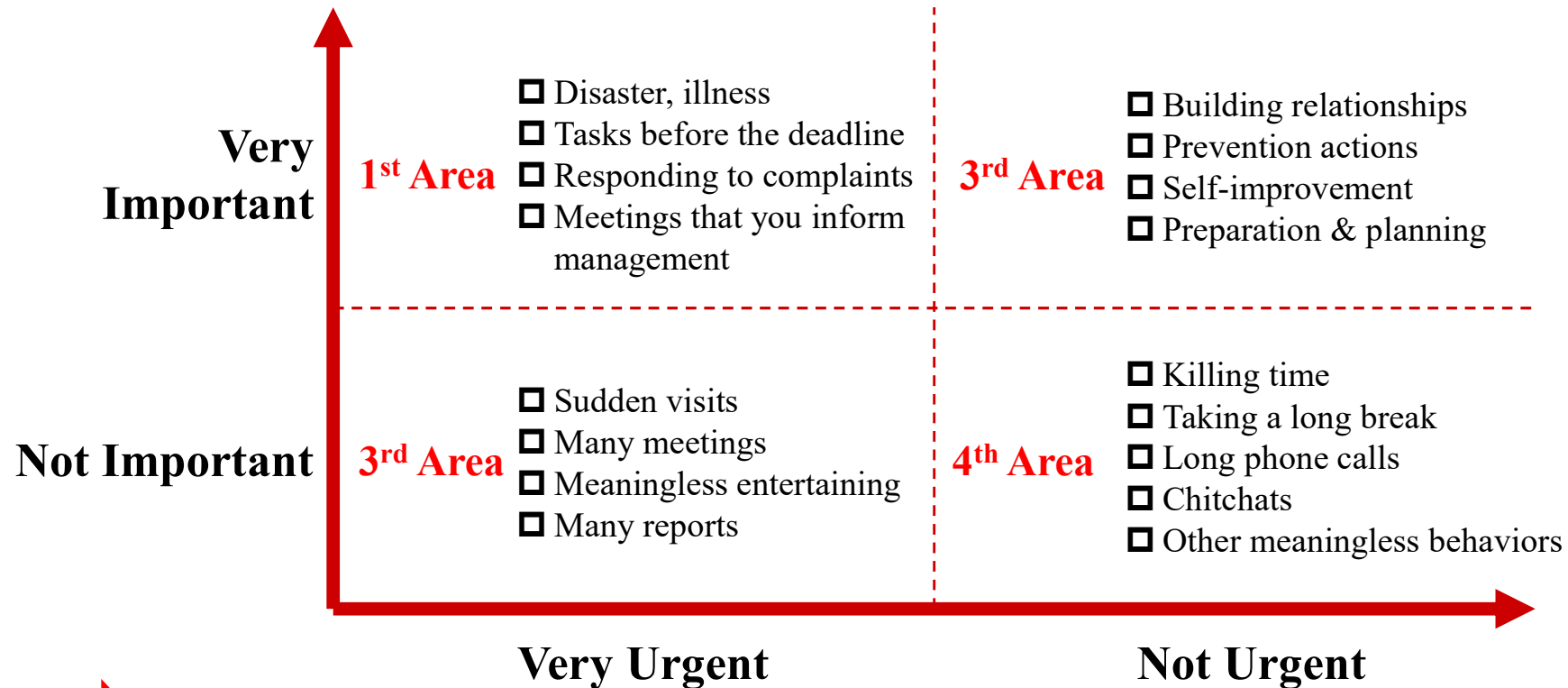
This matrix is helpful in creating one’s priorities regarding ideas !

Source: Ueyama (2016: 81)

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2 Importance & Urgency Matrix



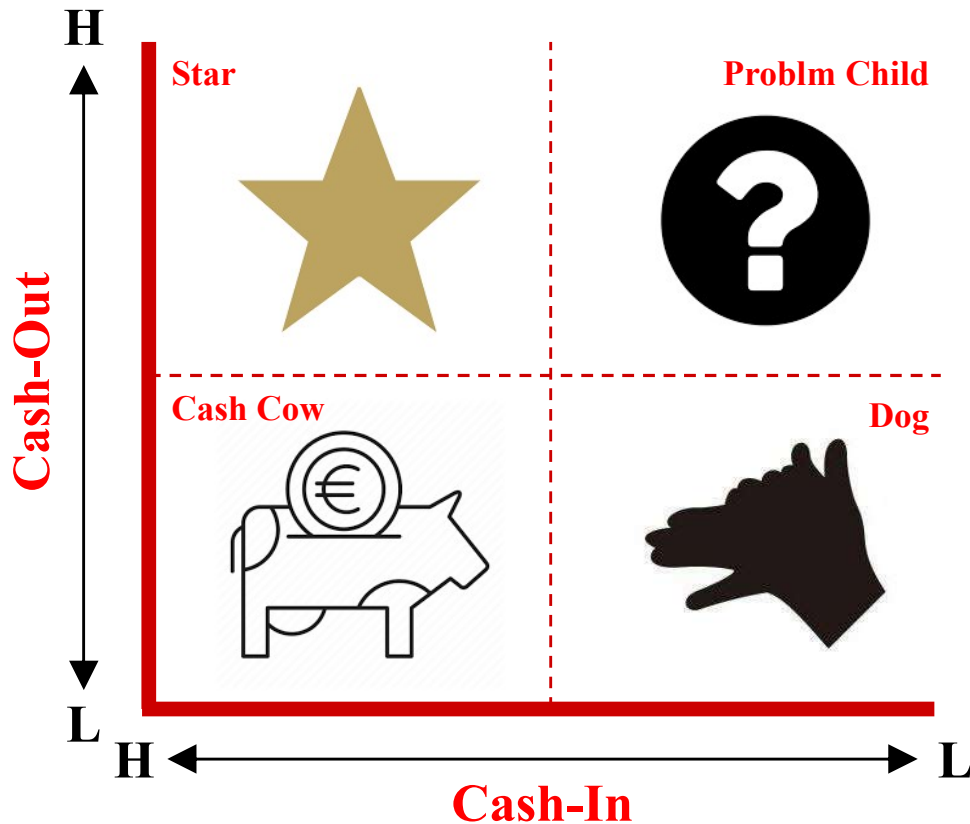
It is effective in clarifying what is urgent & important !

Source: Ueyama (2016: 161)

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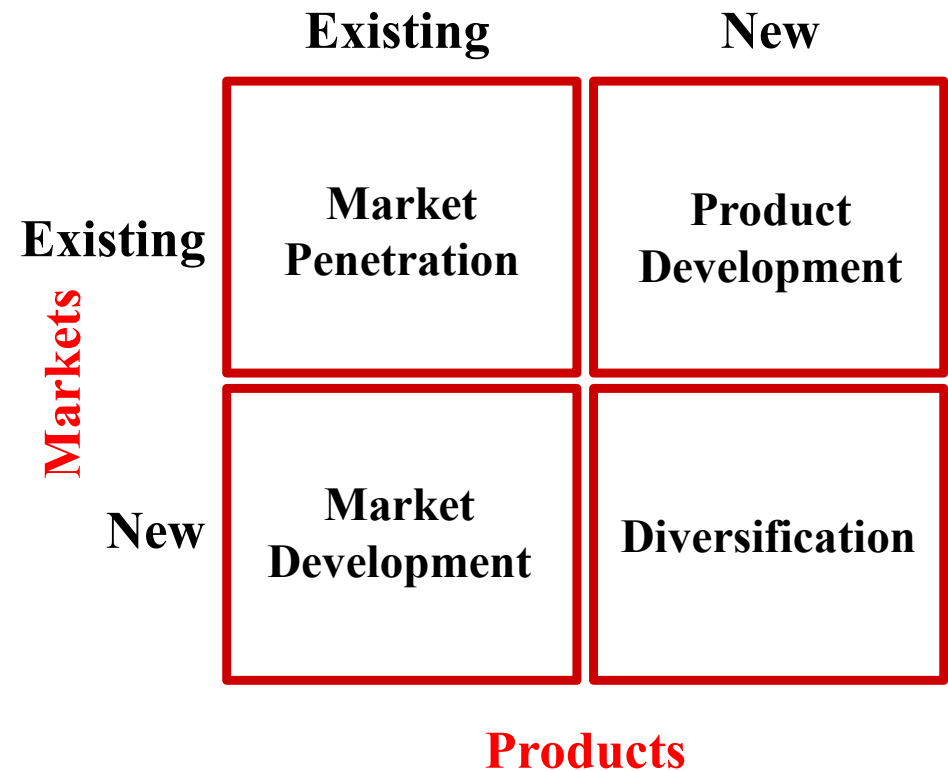
3 PPM



Establishing strategic directions

Source: Ueyama(2016: 161)

4 Ansoff's Product-Market Matrix



Clarifying the way of corporate growth

Improving Graph Literacy



【Exercises】 Let's make a graph !

Exercise 1



■ Was China Hit by the Global Financial Crisis?

Let's make a graph !

Please make a figure indicating that the negative impact of Global Financial Crisis of 2008-2009 on the Chinese economy was limited as compared to its counterparts & that China successfully maintained its high economic growth.

Unit: %	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
China	11.40	12.72	14.23	9.65	9.40	10.64	9.55	7.86	7.77	7.30	6.91	6.74	6.76	6.57
Japan	1.66	1.42	1.65	-1.09	-5.42	4.19	-0.12	1.50	2.00	0.37	1.22	0.61	1.93	0.79
Germany	0.72	3.81	2.98	0.96	-5.70	4.18	3.92	0.42	0.43	2.23	1.74	2.23	2.47	1.53
US	3.51	2.85	1.88	-0.14	-2.54	2.56	1.55	2.25	1.84	2.45	2.88	1.57	2.22	2.93
UK	3.18	2.79	2.43	-0.28	-4.25	1.95	1.54	1.48	2.14	2.61	2.36	1.92	1.89	1.39

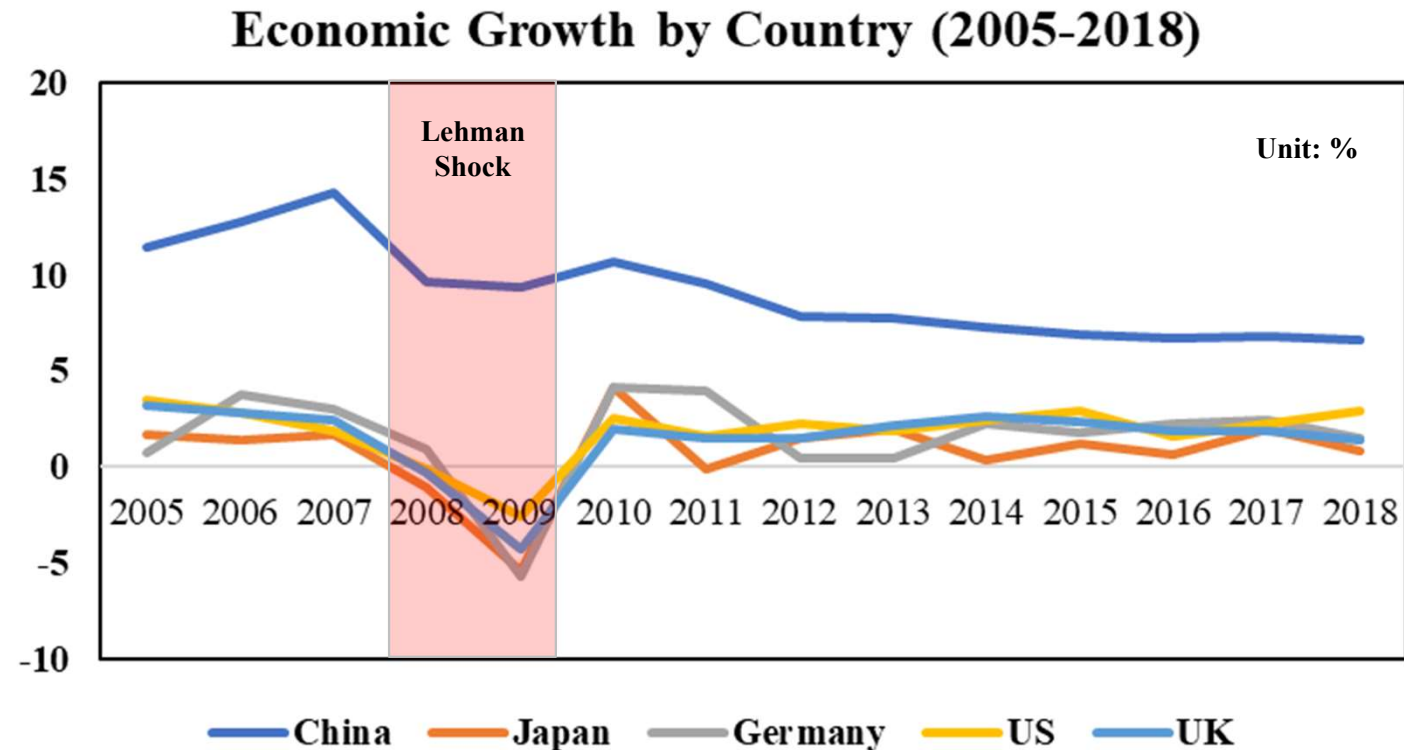
Source: World Bank

Exercise 1



■ Was China Hit by the Global Financial Crisis?

Let's make a graph !



Source: World Bank

Exercise 2



■ Employee Composition Ratio by Industry

Let's make a graph !

Make a graph describing that the secondary industry has been declining since the year 2000 based on the data provided below.

Unit: 10,000	1970	1980	1990	2000	2010
1st Industry	1015	610	439	317	238
2nd Industry	1790	1874	2055	1857	1412
3rd Industry	2451	3091	3642	4049	3965
Total	5256	5575	6136	6223	5615

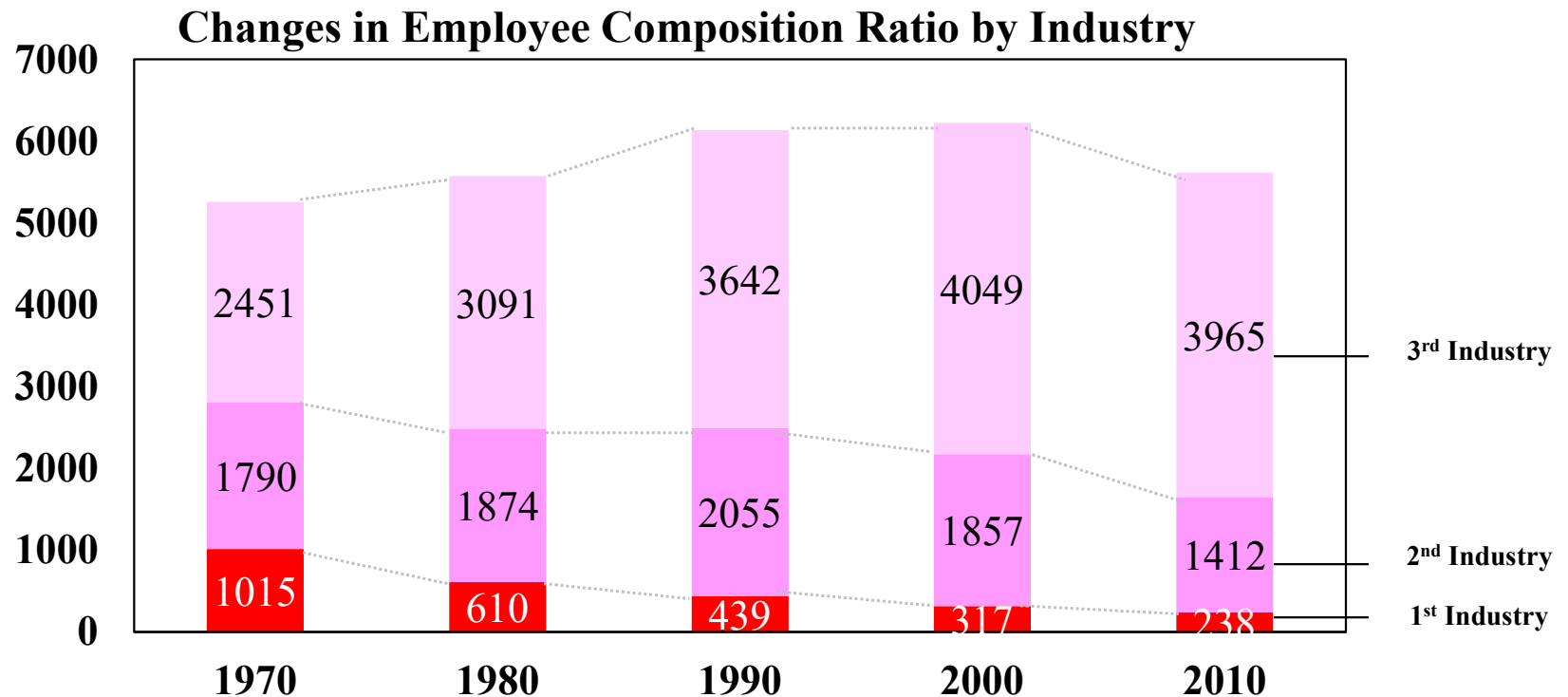
Source: Matsugami (2018:111)

Exercise 2



Employee Composition Ratio by Industry

Let's make a graph !



Source: Ministry of Internal Affairs & Communications in Japan

Exercise 3



■ Changes in the Number of Foreign Visitors in Japan

Let's make a graph !

Make a figure indicating that the number of foreign visitors in Japan has grown since the year 2012.

Unit: 10,000	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of Foreign Visitors in Japan	733	835	835	679	861	622	836	1036	1341	1974	2404	2869	3119

Source: <https://www.jnto.go.jp/jpn/statistics>.

Exercise 3



■ Changes in the Number of Foreign Visitors in Japan

Let's make a graph !



Source: <https://www.jnto.go.jp/jpn/statistics>.

Exercise 4



■ The Number of Online Access to Product A & the Number of Orders?

Let's make a graph !

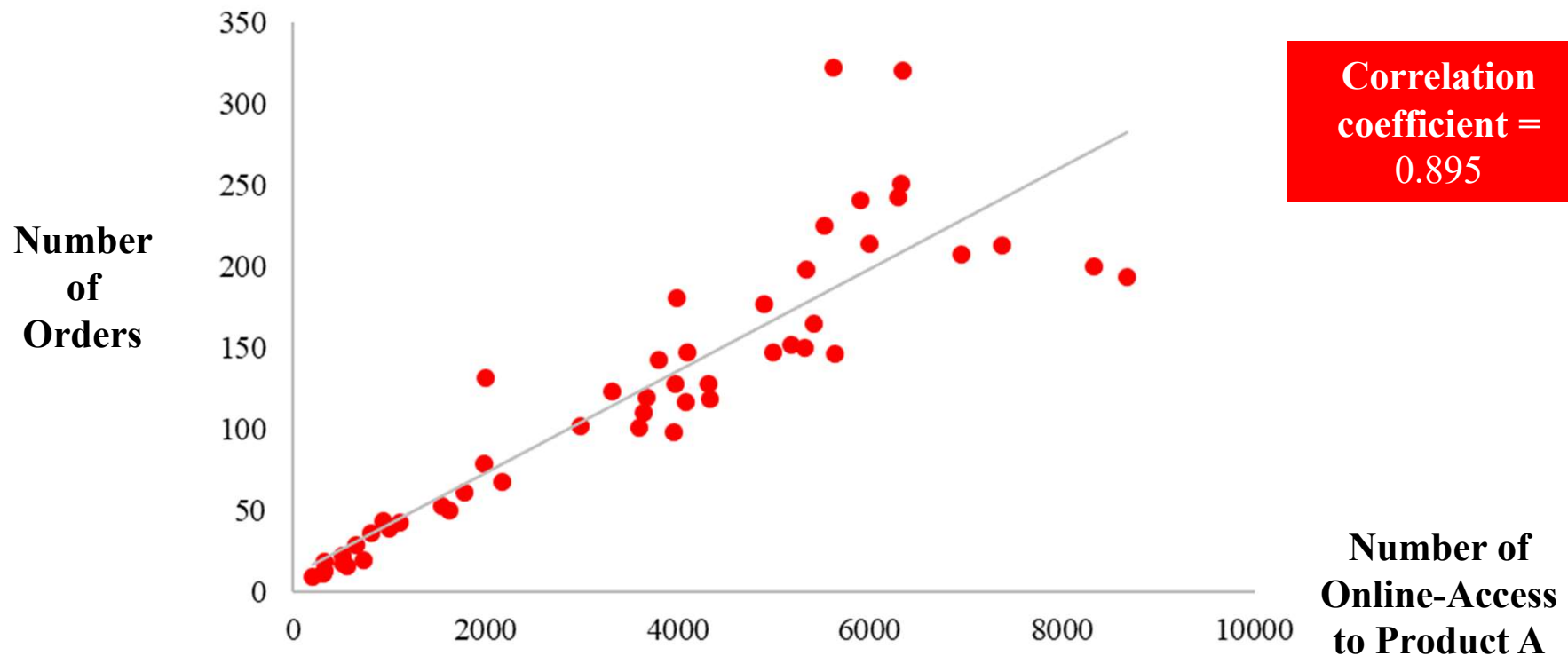
Calculate a correlation coefficient & make a figure explaining the relationship between the number of online access to Product A & the number of orders using MS Excel.

Exercise 4



■ The Number of Online-Access to Product A & the Number of Orders?

Let's make a graph !



The End of Today's Lecture



ご清聴有難う御座いました。

Thank you so much!

Vielen Dank für Ihre Aufmerksamkeit!

Grazie mille !

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