Effects of Innovation Education and Corporate Needs -Analysis Using Bayesian Network

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Abstract

This paper offers a clarification of the skills required for innovation talent by comparing the effect of innovation in education at Tokushima University and the talent requirement of companies. The researchers performed the questionnaire investigation with the use of the 19 items of The Innovator’s DNA Skill Assessment. Both the basic statistical analysis and Bayesian Network analysis were conducted based on the resulting data. The sensitivity analysis was performed after building the Bayesian Network Model. The evidences are set to “skeptical thinking”, “taking risks”, and “creativity” in the item of mind. The calculation of the odds ratio reveals that enhancing the Observation skill and Skill to Plan and Design is effective in improving skeptical thinking and creativity.

Keywords: innovation education, design thinking, academic-industrial collaboration, Bayesian network

1. Introduction

The ideal business setting is to sell products that are produced based on consumers’ needs. However, in many cases, products are produced based on the resources available to companies. Businesses may find this challenging as user’s preferences tend to change over time, making it difficult to make a product that fits well in the market. Another reason for this is that market is matured by the mass production and one to one marketing is required to conquer that (Takeyasu, K., et al., 2013). Our university barely presents a systematic instruction to search for users’ needs, and this is despite the transition from seeds orientation to needs orientation of most businesses.

The extracurricular activities “Innovation challenge club” under Academic Industrial Collaboration (AIC) for undergraduate has launched since April 2018 in Tokushima University. It aims to solve the job and talent mismatch issues faced by companies located in Tokyo and Osaka. As far as this theme concerned, it is a unique approach made by Tokushima University and cannot be found in other universities. They intended to make final presentation on October 2018. Table 1 shows the themes of the collaborating companies. The companies’ participating staffs belong to business departments and research development departments. Further, design thinking was tested on the graduate students of technical management advanced course at university during April to July 2018. Application of this design thinking method to the existing problem under the collaboration with university and companies may be the first one as we cannot find any former researches.

In this paper, the author offers an examination of the skills needed for innovation talent by comparing the innovation education taught at Tokushima University and the skills most companies require.
Table 1. Themes of the companies

| Company name                        | Theme                                                                 |
|-------------------------------------|-----------------------------------------------------------------------|
| JTEKT Corporation                   | Commodity for consumers and business model utilizing bearing          |
| (JTEKT Corporation is a big manufacturer which produces bearings.) |                                                                        |
| Panasonic Cycle Technology Co., Ltd. | Electro motion bicycle which changes Tokushima district’s traffic   |
|                                     | infrastructure                                                        |
| YANMAR Co., Ltd                     | Autonomous robot shade from bird                                      |
|                                     | YANMAR Co. owns three exercise practice fields for football team. Ducks|
|                                     | take rest in winter there and eat the lawn roots and defecate. Therefore|
|                                     | robots which drive off ducks are developed.                           |
| YKK CORPORATION                     | Development of application of self-propelling fastener                |
|                                     | Fastener with small motor run automatically by the remote control of  |
|                                     | smart phone.                                                          |

2. Solve the Companies’ Issue by the Design Thinking

In design thinking, sympathizing with the consumers, such as knowing their inconveniences, is the first step to develop new products or services. The user's feedback on their experience about the prototype of the product is critical during the development stage. A better product is created by repeating the improvement based upon the user's feedback. In this instance, a simple version is presented for the product prototype. This strategy is favorable as it allows for efficient and timely product development according to customer specifications.

![Process of design thinking](http://beyondthenexus.com/designthinking_empathy_innovation/)

3. Outline of the Questionnaire Investigation

The researchers performed the questionnaire investigation with the use of the 19 items of The Innovator’s DNA Skill Assessment. The resulting data served as a basis in conducting both basic statistical analysis and Bayesian Network analysis.

Innovator’s DNA Skill Assessment is a diagnostic tool developed by Clayton Professor of Harvard Business School. It is comprised of 19 items that are classified in 4 divisions, namely Skill, Mind, Skill to execute, Skill of inducing others the innovation as shown in Table 2.
Table 2. The Innovator’s DNA Skill Assessment 19 items (The Innovator’s DNA https://innovatorsdna.com/)

| Skill                      | Skill to associate                        |
|----------------------------|-------------------------------------------|
|                            | Skill to inquire                          |
|                            | Observation skill                         |
|                            | Skill to make experiment                  |
|                            | Networking skill                          |
| Mind                       | Skeptical thinking                        |
|                            | Taking risks                              |
|                            | Creativity                                |
| Skill to execute           | Skill to analyze                          |
|                            | Skill to plan and design                  |
|                            | Introducing skill                         |
| Skill of inducing others the innovation | Skill to induce the others to associate |
|                            | Skill to induce the question of the other members |
|                            | Skill to induce other members to observe  |
|                            | Skill to induce other members to make experiment |
|                            | Skill to induce other members to have networking skill |
|                            | Skill to induce other members to challenge the current status |
|                            | Skill to induce other members to take risk |

The outline of the questionnaire investigation is as follows
1) Scope of investigation: Students who took innovation education, Collaborated companies
2) Date: July 17~September 19 2018
3) Method: Self writing to the questionnaire sheet
4) Collection: Number of distribution 50, Number of collection 41 (Collection rate 82%), Valid answer 41

4. Basic Statistical Results

Now, we show the main summary results by single variable.

4.1 Sex
Male 34, Female 4
These are exhibited in Figure 2. 83% are the male.

![Figure 2. Sex](image)

4.2 Affiliation
Undergraduate 21, Graduated students 15
Company members 5 (JTEKT Corporation 1, Panasonic Cycle Technology Co., Ltd. 1, YANMAR Co., Ltd 2, YKK CORPORATION 1) (Figure 3).
4.3 Innovation Index

Students have selected the rank of item which is classified into 5 (stage 1~stage 5) where their skill have advanced. As for the company employee, they have selected the rank of item which is classified into 5 (stage 1~stage 5) which is required as the innovation talent.

4.3.1 Undergraduate

From Figure 4, we observe that most of the item in the most advanced skill is Networking skill (Skill) and then Skill to associate (Skill), Skeptical thinking (Mind) and Skill to inquire (Skill) follow.

4.3.2 Graduated Students

From Figure 5, we observe that most of the item in the most advanced skill is Networking skill (Skill) and then Creativity (Mind), Skill to plan and design (Skill to execute), Observation skill (Skill) follow.
4.3.3 Company Employee

From Figure 6, we observe that most of the three items in the most advanced skill is Skeptical thinking (Mind), Skill to inquire (Skill) and Skill to plan and design (Skill to execute).

5. Bayesian Network Analysis

In recent years, Bayesian Network is highlighted because it has the following good characteristics (Neapolitan, R.E., 2004).

- Structural Equation Modeling requires normal distribution to the data in the analysis. Therefore it has a limitation in making analysis. But Bayesian Network does not require specific distribution type to the data. It can handle any distribution type.
- It can handle the data which include partial data.
- Expert’s know-how can be reflected in building Bayesian Network model.
- Sensitivity analysis can be easily executed by settling evidence. We can estimate and predict the prospective purchaser by that analysis.
It is a probability model having network structure. Related items are connected with directional link. Therefore understanding becomes easy by its visual chart.

In this research, it is suitable to utilize Bayesian Network to analyze this questionnaire investigation. The construction of the Bayesian Network model requires checking the causal relationship among groups of items. It is because the Bayesian Network is constructed by the link of items and there should be causal relationship when making links. We used BAYONET software found at http://www.msi.co.jp/BAYONET/ for this purpose. The existence of plural nodes in the same group results in the difficult of determining a causal relationship. The BAYONET system is useful in this case as it utilizes the AIC standard to set the sequence automatically.

The implication of the research outcome in relation to innovation education relates with the importance of building the model and utilizing the AIC standard.

Based on this, a model is built as is shown in Figure 7.

6. Sensitivity Analysis

Sensitivity analysis is executed based on the evidence gathered for each item. We select the “Mind” where the companies require. This resonates with the requirements of most companies, wherein the mind category comprised of "Skeptical thinking", “Taking risks” and “Creativity”. The change of innovation index is captured by comparing the Prior probability and Posterior probability. Appendix 3 shows the calculation results of Posterior probability after setting evidence to each item. Odds ratio is calculated in order to make change rate clear (Table 3).

Table 3. Prior probability, Posterior probability and odds ratio

| Skill                | Prior probability | Mind | Skeptical thinking Odds ratio | Taking risks Odds ratio | Creativity Odds ratio |
|----------------------|-------------------|------|-------------------------------|-------------------------|-----------------------|
| Skill to associate   | 0.496             |      | 1.002                         | 1.001                   | 1.002                 |
| Skill to inquire     | 0.370             |      | 1.002                         | 1.002                   | 1.002                 |
| Observation skill    | 0.514             |      | 1.002                         | 1.002                   | 1.003                 |
| Skill to make experiment | 0.318           |      | 1.000                         | 1.002                   | 1.002                 |
| Networking skill     | 0.518             |      | 1.002                         | 1.000                   | 1.002                 |
| Skill to analyze     | 0.496             |      | 1.001                         | 1.002                   | 1.002                 |
| Skill to plan and design | 0.348           |      | 1.003                         | 1.002                   | 1.003                 |
| Introducing skill    | 0.265             |      | 0.999                         | 0.999                   | 1.000                 |
| Skill to execute and promote | 0.451   |      | 1.002                         | 1.002                   | 1.002                 |

The result of this analysis reveals that enhancing the [Skill to plan and design] (Skill to execute) is effective for improving Skeptical thinking ability with respect to odds ratio equal to 1.003 in Table 3. Furthermore, it also shows that enhancing the Observation skill (Skill) and Skill to plan and design (Skill to execute) is effective for improving creativity.
7. Conclusion
Tokushima University has since integrated innovation education in its system. A questionnaire investigation is executed to examine the skills required for the innovation talent by comparing the effect of innovation education at Tokushima University with the company requirements.

Based upon these data, basic statistical analysis and Bayesian Network analysis are conducted. Bayesian Network model is built and the sensitivity analysis is performed.

The result of this study reveals that enhancing the Observation skill and Skill to plan and design is effective for strengthening Skeptical thinking and Creativity.

These results would properly be implicated in the companies’ business administration.

Based upon these analyses, innovation education in our university should be revised so as to meet the companies’ requirement of talent as was made clear.

Although it has a limitation that it is restricted in the number of questionnaire investigation, further consecutive research will make it more adequate and bear better results.

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https://innovatorsdna.com/
## Appendix A

Questionnaire Investigation

Self-Evaluation Check Sheet (Undergraduate, Graduated students) 2018

**Faculty ( ) Department ( ) Grade ( )**

Name ( )

Select rank of item which fit most to you and set five ○ at which your skill has advanced.

| Your skill has advanced (Set 5 ○) | Items                                                                 |
|----------------------------------|----------------------------------------------------------------------|
|                                  | Skill to associate                                                    | 1 2 3 4 5 |
|                                  | Skill to combine plural elements or ideas                             |
|                                  | Skill to inquire                                                     | 1 2 3 4 5 |
|                                  | Skill to grasp users’ insight and/or essence not to do it by the hypothesis verification |
|                                  | Observation skill                                                   | 1 2 3 4 5 |
|                                  | Skill to observe the fact thoroughly                                 |
|                                  | Skill to make experiment                                            | 1 2 3 4 5 |
|                                  | Experiment skill to evaluate users as well as thinking                |
|                                  | Networking skill                                                    | 1 2 3 4 5 |
|                                  | Skill to utilize the others wisdom                                   |
|                                  | Skeptical thinking                                                  | 1 2 3 4 5 |
|                                  | Skill to demonstrate about current condition                         |
|                                  | Taking risks                                                        | 1 2 3 4 5 |
|                                  | Skill to take risk resolutely                                       |
|                                  | Creativity                                                          | 1 2 3 4 5 |
|                                  | Confidence to bear creative idea                                     |
|                                  | Skill to analyze                                                    | 1 2 3 4 5 |
|                                  | Skill to analyze, combine, and check from other points               |
|                                  | Skill to plan and design                                            | 1 2 3 4 5 |
|                                  | Skill to plan, design and promote for the further step               |
|                                  | Introducing skill                                                   | 1 2 3 4 5 |
|                                  | Skill to introduce innovation tool to the team member                |
|                                  | Skill to execute                                                    | 1 2 3 4 5 |
|                                  | Skill to execute with discipline in order to perform systematically   |
|                                  | Skill to induce the others to associate                              | 1 2 3 4 5 |
|                                  | Skill to induce the other members to have the power of combining the plural elements and ideas |
|                                  | Skill to induce the question of the other members                    | 1 2 3 4 5 |
|                                  | Skill to induce other members to grasp users’ insight and/or essence not to do it by the hypothesis verification |
|                                  | Skill to induce other members to observe                             | 1 2 3 4 5 |
|                                  | Skill to induce other members to observe the fact thoroughly          |
|                                  | Skill to induce other members to make experiment                     | 1 2 3 4 5 |
|                                  | Skill to induce other members to have experiment skill to evaluate users as well as thinking |
|                                  | Skill to induce other members to have networking skill               | 1 2 3 4 5 |
|                                  | Skill to induce other members to utilize the others wisdom            |
|                                  | Skill to induce other members to challenge the current status        | 1 2 3 4 5 |
|                                  | Skill to induce other members to remonstrate about current condition |
|                                  | Skill to induce other members to take risk                          | 1 2 3 4 5 |
|                                  | Skill to induce other members to take risk resolutely                |
Guideline for the evaluation of 1~5
1. There is no experience
2. Have little bit experience but cannot have confidence
3. Have confidence to some extent
4. Maybe superior compared with others
5. Have enough experience

Appendix B
Questionnaire Investigation
Innovation talent (Company employee) 2018
Company name ( ) Name ( )
Select rank of item which is required as the innovation talent and set five ○ in which innovation talent is re-required.

| Your skill has advanced (Set 5 ○) | Items                                                                 |
|----------------------------------|----------------------------------------------------------------------|
|                                  | Skill to associate                                                   |
|                                  | Skill to combine plural elements or ideas                            |
|                                  | Skill to inquire                                                     |
|                                  | Skill to grasp users’ insight and/or essence not to do it by the hypothesis verification |
|                                  | Observation skill                                                   |
|                                  | Skill to observe the fact thoroughly                                |
|                                  | Skill to make experiment                                            |
|                                  | Experiment skill to evaluate users as well as thinking               |
|                                  | Networking skill                                                    |
|                                  | Skill to utilize the others wisdom                                  |
|                                  | Skeptical thinking                                                  |
|                                  | Skill to remonstrate about current condition                        |
|                                  | Taking risks                                                        |
|                                  | Skill to take risk resolutely                                       |
|                                  | Creativity                                                          |
|                                  | Confidence to bear creative idea                                    |
|                                  | Skill to analyze                                                    |
|                                  | Skill to analyze, combine, and check from other points              |
|                                  | Skill to plan and design                                            |
|                                  | Skill to plan, design and promote for the further step              |
|                                  | Introducing skill                                                   |
|                                  | Skill to introduce innovation tool to the team member               |
|                                  | Skill to execute                                                    |
|                                  | Skill to execute with discipline in order to perform systematically  |
| Skill to induce the others the associate | 1 | 2 | 3 | 4 | 5 |
| Skill to induce the other members to have the power of combining the plural elements and ideas |
| Skill to induce the question of the other members | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to grasp users’ insight and/or essence not to do it by the hypothesis verification |
| Skill to induce other members to observe | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to observe the fact thoroughly |
| Skill to induce other members to make experiment | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to have experiment skill to evaluate users as well as thinking |
| Skill to induce other members to have networking skill | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to utilize the others wisdom |
| Skill to induce other members to challenge the current status | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to remonstrate about current condition |
| Skill to induce other members to take risk | 1 | 2 | 3 | 4 | 5 |
| Skill to induce other members to take risk resolutely |

**Guideline for the evaluation of 1 ~ 5**
1. There is no need
2. Have little bit need
3. Better to have it
4. Required to some extent
5. Essential

**Appendix C**

Prior probability, Posterior probability and odds ratio

| Affiliation | Prior probability | Company Posterior probability | Company Odds ratio | Undergraduate Posterior probability | Undergraduate Odds ratio |
|-------------|------------------|------------------------------|-------------------|-----------------------------------|-------------------------|
| Company     | 0.136            | 1                            | -                 | 0                                 | 0.000                   |
| Undergraduate | 0.500         | 0                            | 0                 | 1                                 | -                      |
| Graduated students | 0.364 | 0                            | 0                 | 0                                 | 0.000                   |

| Skill        | Prior probability | Company Posterior probability | Company Odds ratio | Undergraduate Posterior probability | Undergraduate Odds ratio |
|--------------|------------------|------------------------------|-------------------|-----------------------------------|-------------------------|
| Skill to associate | 0.496         | 0.625                        | 1.692             | 0.458                             | 0.859                   |
| Skill to inquire | 0.370          | 0.750                        | 5.109             | 0.333                             | 0.852                   |
| Observation skill | 0.514        | 0.750                        | 2.838             | 0.500                             | 0.946                   |
| Skill to make experiment | 0.318 | 0.375                        | 1.289             | 0.250                             | 0.716                   |
| Networking skill | 0.518          | 0.625                        | 1.553             | 0.542                             | 1.101                   |

| Mind        | Prior probability | Company Posterior probability | Company Odds ratio | Undergraduate Posterior probability | Undergraduate Odds ratio |
|------------|------------------|------------------------------|-------------------|-----------------------------------|-------------------------|
| Skeptical thinking | 0.501         | 0.506                        | 1.021             | 0.501                             | 0.999                   |
| Taking risks | 0.334           | 0.338                        | 1.021             | 0.333                             | 0.999                   |
| Creativity | 0.334            | 0.338                        | 1.018             | 0.334                             | 0.999                   |

| Skill to execute and promote | Prior probability | Company Posterior probability | Company Odds ratio | Undergraduate Posterior probability | Undergraduate Odds ratio |
|-----------------------------|------------------|------------------------------|-------------------|-----------------------------------|-------------------------|
| Skill to analyze | 0.496            | 0.625                        | 1.696             | 0.417                             | 0.727                   |
| Skill to plan and design | 0.348            | 0.750                        | 5.624             | 0.208                             | 0.493                   |
| Introducing skill | 0.265            | 0.125                        | 0.396             | 0.375                             | 1.663                   |
| Skill to execute | 0.451            | 0.750                        | 3.646             | 0.375                             | 0.729                   |
| Affiliation          | Graduated students Odds ratio | Skill to associate Odds ratio | Skill to inquire Odds ratio |
|---------------------|-------------------------------|-------------------------------|-----------------------------|
| Graduated students  | 0.000                         | 0.172                         | 1.313                       |
| Posterior probability | 0                             | 0.462                         | 0.858                       |
|                     | 1                             | 0.366                         | 1.012                       |
|                     | 0.500                         | 1.015                         | -                           |
| 0.278               | 0.655                         | 0.385                         | 1.064                       |
| 0.444               | 0.757                         | 0.523                         | 1.035                       |
| 0.389               | 1.368                         | 0.322                         | 1.022                       |
| 0.444               | 0.745                         | 0.520                         | 1.011                       |
| 0.501               | 1.000                         | 0.501                         | 1.003                       |
| 0.334               | 1.000                         | 0.334                         | 1.001                       |
| 0.334               | 1.000                         | 0.334                         | 1.001                       |
| 0.556               | 1.272                         | 0.503                         | 1.032                       |
| 0.389               | 1.193                         | 0.368                         | 1.089                       |
| 0.167               | 0.554                         | 0.256                         | 0.952                       |
| 0.444               | 0.972                         | 0.465                         | 1.056                       |

| Skill                | Observation skill Odds ratio | Observation skill Odds ratio | Skill to make experiment Odds ratio | Networking skill Odds ratio |
|----------------------|-------------------------------|-------------------------------|-------------------------------------|-----------------------------|
| 0.199                | 1.574                         | 0.161                         | 1.216                               | 0.165                       |
| 0.486                | 0.947                         | 0.394                         | 0.649                               | 0.523                       |
| 0.314                | 0.803                         | 0.445                         | 1.405                               | 0.312                       |
| 0.505                | 1.034                         | 0.504                         | 1.031                               | 0.499                       |
| 0.399                | 1.130                         | 0.376                         | 1.025                               | 0.385                       |
| 1                    | -                             | 0.516                         | 1.007                               | 0.524                       |
| 0.319                | 1.005                         | 1                             | -                                   | 0.314                       |
| 0.528                | 1.041                         | 0.512                         | 0.977                               | 1                           |
| 0.501                | 1.003                         | 0.501                         | 1.000                               | 0.501                       |
| 0.334                | 1.001                         | 0.334                         | 1.002                               | 0.333                       |
| 0.334                | 1.003                         | 0.334                         | 1.002                               | 0.334                       |
| 0.502                | 1.025                         | 0.512                         | 1.068                               | 0.494                       |
| 0.373                | 1.115                         | 0.376                         | 1.130                               | 0.354                       |
| 0.260                | 0.972                         | 0.242                         | 0.885                               | 0.269                       |
| 0.471                | 1.084                         | 0.466                         | 1.062                               | 0.458                       |

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| Mind | Skeptical thinking Posterior probability | Skeptical thinking Odds ratio | Taking risks Posterior probability | Taking risks Odds ratio | Creativity Posterior probability | Creativity Odds ratio |
|------|----------------------------------------|------------------------------|-----------------------------------|------------------------|---------------------------------|----------------------|
|      | 0.137                                  | 1.003                        | 0.137                             | 1.003                  | 0.137                           | 1.004                |
|      | 0.500                                  | 0.999                        | 0.500                             | 0.998                  | 0.500                           | 0.998                |
|      | 0.364                                  | 1.000                        | 0.364                             | 1.000                  | 0.364                           | 1.000                |
|      | 0.497                                  | 1.002                        | 0.497                             | 1.001                  | 0.497                           | 1.002                |
|      | 0.370                                  | 1.002                        | 0.370                             | 1.002                  | 0.370                           | 1.002                |
|      | 0.514                                  | 1.002                        | 0.514                             | 1.002                  | 0.515                           | 1.003                |
|      | 0.318                                  | 1.000                        | 0.318                             | 1.000                  | 0.318                           | 1.002                |
|      | 0.518                                  | 1.002                        | 0.518                             | 1.000                  | 0.518                           | 1.002                |
|      | 1                                      | -                            | 0.501                             | 1.000                  | 0.501                           | 1.000                |
|      | 0.334                                  | 1.000                        | 1                                 | -                      | 0.334                           | 1.000                |
|      | 0.334                                  | 1.000                        | 0.334                             | 1.000                  | 1                               | -                    |
|      | 0.496                                  | 1.001                        | 0.496                             | 1.002                  | 0.496                           | 1.002                |
|      | 0.348                                  | 1.003                        | 0.348                             | 1.002                  | 0.348                           | 1.003                |
|      | 0.265                                  | 0.999                        | 0.265                             | 0.999                  | 0.265                           | 1.000                |
|      | 0.452                                  | 1.002                        | 0.452                             | 1.002                  | 0.452                           | 1.002                |

| Skill to analyze and promote | Skill to analyze Posterior probability | Skill to analyze Odds ratio | Skill to plan and design Posterior probability | Skill to plan and design Odds ratio | Introducing skill Posterior probability | Introducing skill Odds ratio | Skill to execute Posterior probability | Skill to execute Odds ratio |
|-------------------------------|----------------------------------------|------------------------------|-----------------------------------------------|-----------------------------------|----------------------------------------|-----------------------------|-----------------------------------|-----------------------------|
|                               | 0.172                                  | 1.315                        | 0.294                                         | 2.638                             | 0.064                                  | 0.435                       | 0.227                             | 1.855                       |
|                               | 0.420                                  | 0.725                        | 0.299                                         | 0.427                             | 0.707                                  | 2.415                       | 0.415                             | 0.711                       |
|                               | 0.408                                  | 1.204                        | 0.407                                         | 1.199                             | 0.229                                  | 0.519                       | 0.358                             | 0.976                       |
|                               | 0.504                                  | 1.032                        | 0.524                                         | 1.119                             | 0.479                                  | 0.932                       | 0.511                             | 1.061                       |
|                               | 0.382                                  | 1.054                        | 0.433                                         | 1.302                             | 0.347                                  | 0.907                       | 0.408                             | 1.173                       |
|                               | 0.520                                  | 1.026                        | 0.551                                         | 1.160                             | 0.503                                  | 0.950                       | 0.537                             | 1.096                       |
|                               | 0.328                                  | 1.050                        | 0.343                                         | 1.123                             | 0.290                                  | 0.877                       | 0.328                             | 1.049                       |
|                               | 0.516                                  | 0.995                        | 0.527                                         | 1.037                             | 0.525                                  | 1.029                       | 0.526                             | 1.033                       |
|                               | 0.501                                  | 1.001                        | 0.502                                         | 1.005                             | 0.501                                  | 0.999                       | 0.501                             | 1.003                       |
|                               | 0.334                                  | 1.002                        | 0.334                                         | 1.004                             | 0.333                                  | 0.999                       | 0.334                             | 1.002                       |
|                               | 0.334                                  | 1.001                        | 0.335                                         | 1.003                             | 0.334                                  | 1.000                       | 0.334                             | 1.002                       |
|                               | 1                                      | -                            | 0.534                                         | 1.168                             | 0.462                                  | 0.873                       | 0.514                             | 1.075                       |
|                               | 0.375                                  | 1.125                        | 1                                             | -                                 | 0.284                                  | 0.745                       | 0.396                             | 1.228                       |
|                               | 0.247                                  | 0.909                        | 0.217                                         | 0.767                             | 1                                      | -                           | 0.244                             | 0.893                       |
|                               | 0.468                                  | 1.068                        | 0.513                                         | 1.283                             | 0.415                                  | 0.862                       | 1                                 | -                           |

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