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# A Study of the Effect on Business Growth by Utilization and Contribution of Open Source Software in Japanese IT Companies

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**Abstract.** To analyze how OSS effects business growth both through simple use and by deeper engagement as a stakeholder in OSS community, we did questionnaire research to Japanese IT companies in 2012 and 2013. We analyze the progress of utilization and contribution of OSS, and the impact on business growth indicators by them.

## 1 Introduction

It has become commonplace for business enterprises to use OSS in their business activities. As a result, utilization of OSS only for cost reduction has become no longer a factor of obtaining the competitive advantages for them. The logic we understand as framing this such engagement is that the competitive edge that comes from technical advantages delivered by using OSS, and - using the same logic - it is therefore indispensable for them to contribute or participate in the development process of OSS. To verify this hypothesis, we questioned utilization and contribution of OSS, and business indicators to Japanese IT companies in 2012 and 2013.

## 2 Correlation between Utilization and Contribution of OSS

**Table 1.** Correlations between utilization and contribution of OSS

| contribution<br>utilization | Linux | Apache | Databases | Ruby   | O.L.   | RoR    |
|-----------------------------|-------|--------|-----------|--------|--------|--------|
| Linux                       | .136  | -.002  | .004      | .128   | .083   | .110   |
| Apache                      | .151  | .135   | .054      | .149   | .125   | .111   |
| Databases                   | .050  | -.016  | .052      | .132   | .098   | .105   |
| Ruby                        | .031  | -.013  | .007      | .324** | .114   | .351** |
| Other Languages             | .144  | .161*  | .189*     | .099   | .272** | .140   |
| Ruby on Rails               | .087  | .086   | .065      | .331** | .159   | .420** |

| contribution<br>utilization | Linux | Apache | Databases | Ruby   | O.L.  | RoR    |
|-----------------------------|-------|--------|-----------|--------|-------|--------|
| Linux                       | .062  | .009   | -.013     | .080   | .032  | .037   |
| Apache                      | .072  | .048   | .012      | .095   | .013  | .033   |
| Databases                   | .136  | .086   | .106      | .083   | .082  | .043   |
| Ruby                        | .098  | .057   | .044      | .461** | .164  | .320** |
| Other Languages             | .139  | .114   | .144      | .208*  | .217* | .257** |
| Ruby on Rails               | .180* | .141   | .129      | .400** | .239* | .343** |

Survey Results in 2012 (n=191)

Survey Results in 2013 (n=146)

Spearman's rank correlation coefficient \*\* 1% level of significance, \* 5% level of significance

First, the correlations between utilization and contribution of companies in many OSS technology types are not shown in both years. As for these OSS technologies, Japanese IT companies are still “free riders.” On another front, the correlation between Ruby and Ruby on Rails in this context is shown. And those of Other Languages between Apache and Databases technologies are also shown.

### 3 Effect on Business growth by OSS utilization and contribution

**Table 2.** Correlations between business growth and utilization of OSS

|                 | Growth Rate of Sales<br>(present period) | Prospect of Sales<br>Growth Rate<br>(subsequent period) | Growth of Employee<br>Number<br>(present period) | Prospect of Employee<br>Number's Growth Rate<br>(subsequent period) |                 | Growth Rate of Sales<br>(present period) | Prospect of Sales<br>Growth Rate<br>(subsequent period) | Growth of Employee<br>Number<br>(present period) | Prospect of Employee<br>Number's Growth Rate<br>(subsequent period) |
|-----------------|--|---|--|---|-----------------|--|---|--|---|
| Linux           | .191**                                   | -.245**   | .207**   | .133  | Linux           | .302**                                   | .194*   | .159   | .091  |
| Apache          | .167*                                    | .220**  | .079   | .066  | Apache          | .189*                                    | .113  | .129   | .071  |
| Databases       | .131                                     | .222**  | .026   | .067  | Databases       | .306**                                   | .219*   | .201*  | .134  |
| Ruby            | .135                                     | .214**  | .063   | .113  | Ruby            | .207**                                   | .148  | .149   | .106  |
| Other Languages | .098                                     | .176*   | .052   | .092  | Other Languages | .237**                                   | .125  | .164   | .053  |
| Ruby on Rails   | .055                                     | .178*   | .061   | .068  | Ruby on Rails   | .171*                                    | .098  | .132   | .044  |

Survey Results in 2012 (n=191)

Survey Results in 2013 (n=146)

Spearman's rank correlation coefficient \*\* 1% level of significance, \* 5% level of significance

From the survey result in 2012, the subsequent period prospect of sales growth rate is impacted by utilization of OSS. At the same time, the survey result in 2013 shows that the present period of sales growth rate is impacted. It turns out that the sales growth rate prediction by utilization of OSS expected from the reference fiscal year appears in the following fiscal year.

**Table 3.** Correlations between business growth and contribution of OSS

|                 | Growth Rate of Sales<br>(present period) | Prospect of Sales<br>Growth Rate<br>(subsequent period) | Growth of Employee<br>Number<br>(present period) | Prospect of Employee<br>Number's Growth Rate<br>(subsequent period) |                 | Growth Rate of Sales<br>(present period) | Prospect of Sales<br>Growth Rate<br>(subsequent period) | Growth of Employee<br>Number<br>(present period) | Prospect of Employee<br>Number's Growth Rate<br>(subsequent period) |
|-----------------|--|---|--|---|-----------------|--|---|--|---|
| Linux           | -.091                                    | .007  | -.032  | -.089   | Linux           | .001                                     | -.003   | .108   | .219*   |
| Apache          | -.031                                    | .021  | -.092  | -.127   | Apache          | .023                                     | .018  | .054   | .215*   |
| Databases       | -.036                                    | .092  | -.083  | .020  | Databases       | -.029                                    | -.018   | .071   | .182*   |
| Ruby            | .052                                     | .047  | .072   | .058  | Ruby            | .000                                     | -.053   | .054   | .115  |
| Other Languages | .019                                     | .057  | -.029  | .002  | Other Languages | .051                                     | -.025   | .127   | .206*   |
| Ruby on Rails   | .034                                     | .075  | .018   | .049  | Ruby on Rails   | .004                                     | -.039   | .046   | .135  |

Survey Results in 2012 (n=191)

Survey Results in 2013 (n=146)

Spearman's rank correlation coefficient \*\* 1% level of significance, \* 5% level of significance

The contribution of OSS communities has an insignificant effect on sales growth. But the survey result in 2013 shows that the prospect of employee number's growth rate (subsequent period) is impacted by contribution of OSS. Japanese IT companies tend to expect direct sales growth by OSS practical use, and they might also expect contribution to the development process of OSS leads to the increase of employee, personnel training, and personnel adoption.

### References

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