Chapter 7
APPENDICES
Dear Respondents,

The present research study entitled “A comparative analysis of approaches for reducing attrition in IT companies in Pune” is being carried out under the doctoral programme of Symbiosis International University, Pune.

It would be very much appreciated if you could please spare your valuable time, share your THOUGHTS and FEEDBACK as frankly as possible and complete the questionnaire. Your response to the questionnaire will be kept confidential. The data shared by you will be used for academic purposes only. I assure you to share the outcome of the study as soon as it is over.

Note: Please put a [✓] mark wherever applicable

1. Name of the organization

2. Year of establishment

3. Nature of Industry
   (a) IT Enabled Services  (b) Product Development  (c) Any other – please specify

4. Constitution
   (a) Private limited
   (b) Public limited
   (c) Any other:

5. Annual Revenues (Rs in crores)
   (a) Rs. Less than 50 crores
   (b) Rs. 51 crores to 1,000 crores
   (c) Rs. More than 1,000 crores

6. Can any major policy decisions taken in your organization be classified into any one of the categories?
   (1) Traditional  (2) Professional  (3) Committee  (4) Any other
7. Total number of employees in your organization:
   (a) Top Management
   (b) Middle Management
   (c) Lower Management
   (d) Total

8. How do you fill-up positions in your organization?
   (a) International sources ( )
   (b) Employee referrals ( )
   (c) Campus recruitment ( )
   (d) Advertisements ( )
   (e) Existing data bank ( )

9. Regarding the culture of the organization, how do your employees respond?
   (1) Spontaneously express their feelings and thoughts and share without defensiveness
       Yes/No
   (2) Face and not shying away from problems and take up challenges
       Yes/No
   (3) Maintain confidentiality of information shared by the other persons and not misuse it?
       Yes/No
   (4) Have a sense of assurance to honor mutual obligations and commitments?
       Yes/No
   (5) Have congruence between what one feels, says and does?
       Yes/No
   (6) Actions and mistakes are owned, share their feelings unreservedly?
       Yes/No
   (7) Take initiative in planning and preventive measures before taking any action?
       Yes/No
   (8) Are given freedom to plan and act in one's own sphere?
       Yes/No
   (9) Are respected and encouraged to take independent decisions in their area of operation?
       Yes/No
10. What was the attrition rate in your organization?

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Middle Management</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lower level employees</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Organization as a whole</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

11. Do you appreciate that the retention of talent is an emerging key strategy to counter challenges and to ensure competitive advantages?  
   Yes/No

12. Do you feel the high rate of turnover is avoidable?  
   Yes/No

13. Do you feel certain percentage of turnover is desirable?  
   Yes/No

14. Whether Exit-Interview system has been in practice in your organization?  
   Yes/No

15. If yes, normally, when does an exit interview take place?  
   (a) A few days earlier
   (b) On the same day of leaving

16. What are the reasons for employees leaving the organization as revealed in the exit interview by them?


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17. What measures/approaches were suggested by the employees in their exit interviews which should be implemented in your organization to retain the best talents?


18. For initiating corrective measures on employee attrition, which is most applicable for your organization?

- (a) Voluntary (Employee leave the organization on their own)  
- (b) In Voluntary (Employee is asked to leave organization)  
- (c) Both

19. Do you undertake further analysis of existing high attrition rate in regard to these?

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Factors</th>
<th>(Please tick [✓])</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top performers</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>High impact jobs</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hard to fill up jobs</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Core technical employees/Architect’s of the company</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Attrition from one business unit or team</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Attrition at junior level employees or less than 3 years experience</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Employees from premier educations institutes like IIT’s, IIM’s, Eng colleges etc</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Middle and Top management</td>
<td></td>
</tr>
</tbody>
</table>
20. **Reasons for employees leaving the organization as revealed by HR department**  
(4=Always true, 3= Mostly true, 2= Sometimes true, 1=Rarely true, 0= Not at all true)

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lack of career growth in all directions</td>
</tr>
<tr>
<td>2</td>
<td>Absence of challenging assignment on the job</td>
</tr>
<tr>
<td>3</td>
<td>Lack of competitive compensation</td>
</tr>
<tr>
<td>4</td>
<td>Lack of benefits/Rewards/Stock options</td>
</tr>
<tr>
<td>5</td>
<td>Work life balance – integration between personal and professional life</td>
</tr>
<tr>
<td>6</td>
<td>High stress in the job</td>
</tr>
<tr>
<td>7</td>
<td>Lack of training and development skills including learning opportunities</td>
</tr>
<tr>
<td>8</td>
<td>Poor inter-personal relationship with boss, colleagues, peers</td>
</tr>
<tr>
<td>9</td>
<td>Poor work culture</td>
</tr>
<tr>
<td>10</td>
<td>Poor leadership</td>
</tr>
<tr>
<td>11</td>
<td>No clear vision /mission of the company</td>
</tr>
<tr>
<td>12</td>
<td>Lack of long term road map</td>
</tr>
<tr>
<td>13</td>
<td>Core competency of employees is not used properly- clarity in job does not exist</td>
</tr>
<tr>
<td>14</td>
<td>Poor or lack of communication from the employer</td>
</tr>
<tr>
<td>15</td>
<td>Personal reasons like marriage, health and relocation</td>
</tr>
<tr>
<td>16</td>
<td>Lack of mentoring programmes in organization</td>
</tr>
<tr>
<td>17</td>
<td>Job variety challenges – monotonous assignments</td>
</tr>
<tr>
<td>18</td>
<td>Stability of the job, organization stability</td>
</tr>
<tr>
<td>19</td>
<td>Freedom to work- autonomy- lack of respect to each other</td>
</tr>
<tr>
<td>20</td>
<td>Any other – please specify</td>
</tr>
</tbody>
</table>
21. From your observations, which one of the following costs are eminent due to high employee attrition? (1 as the highest and 6 as the lowest in terms priority)

(1) Exit costs  
(2) Productivity costs  
(3) Training costs  
(4) Recruiting costs  
(5) Orientation costs  
(6) Other Costs  
(Please specify)

22. Do you agree that there will be impact of high rate of attrition on the organization?

+ve / -ve impact

23. What according to you are the Effects of high attrition in your organization?  
(Please tick [√] and also rank on priority or importance wise)

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Effects</th>
<th>[√]</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss of productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Loss of business opportunities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>High financial costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Work flow interruptions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Loss of brand Image of the organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Poor service to the customer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Poor work environment/culture/employee morale, motivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gain for competitors – employee leave to join competitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Scalability of the organization due to prospective employees may not like to join the company</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>Any other – please specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
24. What measures/strategies have been initiated to reduce attrition rate and retain the best talents in your organization

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Measures/Strategies</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Competitive compensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Clear definition of career growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Scientific and systematic recruitment, induction programmes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Shadow Hunting – Keep resources ready-to-hire-over staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hire from smaller cities – Train them on soft skills, language, etiquettes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Higher education assistance</td>
<td></td>
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<tr>
<td>7</td>
<td>Challenging work – which tests knowledge, skills and experience</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Building work-force capabilities through ample learning opportunities</td>
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<td></td>
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<tr>
<td>9</td>
<td>Ensuring work life balance</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>Good balance between long and short term objectives of the organization</td>
<td></td>
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<tr>
<td>11</td>
<td>Training programmes for career progression and new learning opportunities</td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td>Employee satisfaction surveys and exit interviews are analyzed and root caused</td>
<td></td>
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<tr>
<td>13</td>
<td>Clear and concise communication on short and long term objectives of the company</td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td>Culture of facilitating performance – timely feedback on how well I do my work</td>
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<tr>
<td>15</td>
<td>Enforcing corporate values and operating principles</td>
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<tr>
<td>16</td>
<td>Good deal of team work and collaboration</td>
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<tr>
<td>17</td>
<td>Company surveys to understand the culture and climate of the employees</td>
<td></td>
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<tr>
<td>18</td>
<td>Promoting innovation – patents etc</td>
<td></td>
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<tr>
<td>19</td>
<td>On-site opportunities (international exposure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Any other – please specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

25. Please spare your valuable suggestions as to what else could be done to attract, nurture and retain the best talents?
EXIT INTERVIEW CHECKLIST AND COMMENTS

Employee: ___________________________ Mgr: ___________________________
EE's Personal Email ___________________________ Contact Number: ____________

Exit Discussion: All Terminations

How did you feel about your manager/management team here?

What would you recommend we do to make NVIDIA a better place to work?

Exit Discussion continued: Voluntary Termination

Why are you leaving NVIDIA?

Could NVIDIA have done anything to prevent you from leaving?

Who will be your new employer?

What will be your new job title?

What incentives did you receive (salary increase, stock etc.)

How were you recruited?

I certify that all NVIDIA property has been returned.

Employee ___________________________ Date ___________________________

Human Resources ___________________________ Date ___________________________
### Voluntary Turnover by Business Area

<table>
<thead>
<tr>
<th>Location</th>
<th>%</th>
<th>% 25</th>
<th>% 50</th>
<th>% 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hyderabad</td>
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<tr>
<td>Pune</td>
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<tr>
<td>Mumbai</td>
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<tr>
<td>Visakhapatnam</td>
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</table>

Note: Annualized Turnover= YTD Turnover/12 (Average Headcount in Number of months elapsed)
Turnover Analysis II
Reasons for Termination (Voluntary)

Term reasons classified as others:
SPSS is a computer program used for statistical analysis. Between 2009 and 2010 the premier software for SPSS was called PASW (Predictive Analytics Software) Statistics. The company announced July 28, 2009 that it was being acquired by IBM for US$1.2 billion. As of January 2010, it became "SPSS: An IBM Company".

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Statistics program

SPSS (originally, Statistical Package for the Social Sciences) was released in its first version in 1968 after being developed by Norman H. Nie and C. Hadlai Hull. Norman Nie was then a political science postgraduate at Stanford University, and now Research Professor in the Department of Political Science at Stanford and Professor Emeritus of Political Science at the University of Chicago. SPSS is among the most widely used programs for statistical analysis in social science. It is used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and others. The original SPSS manual (Nie, Bent & Hull, 1970) has been described as one of "sociology's most influential books". In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary is stored in the datafile) are features of the base software.

Statistics included in the base software:

- Descriptive statistics: Cross tabulation, Frequencies, Descriptives, Explore, Descriptive Ratio Statistics
- Bivariate statistics: Means, t-test, ANOVA, Correlation (bivariate, partial, distances), Nonparametric tests
- Prediction for numerical outcomes: Linear regression
- Prediction for identifying groups: Factor analysis, cluster analysis (two-step, K-means, hierarchical), Discriminant

The many features of SPSS are accessible via pull-down menus or can be programmed with a proprietary 4GL command syntax language. Command syntax programming has the benefits of reproducibility; simplifying repetitive tasks; and handling complex data manipulations and analyses.
Additionally, some complex applications can only be programmed in syntax and are not accessible through the menu structure. The pull-down menu interface also generates command syntax, this can be displayed in the output though the default settings have to be changed to make the syntax visible to the user; or can be paste into a syntax file using the "paste" button present in each menu. Programs can be run interactively, or unattended using the supplied Production Job Facility. Additionally a "macro" language can be used to write command language subroutines and a Python programmability extension can access the information in the data dictionary and data and dynamically build command syntax programs. The Python programmability extension, introduced in SPSS 14, replaced the less functional SAX Basic "scripts" for most purposes, although SaxBasic remains available. In addition, the Python extension allows SPSS to run any of the statistics in the free software package R. From version 14 onwards SPSS can be driven externally by a Python or a VB.NET program using supplied "plug-ins".

SPSS places constraints on internal file structure, data types, data processing and matching files, which together considerably simplify programming. SPSS datasets have a 2-dimensional table structure where the rows typically represent cases (such as individuals or households) and the columns represent measurements (such as age, sex or household income). Only 2 data types are defined: numeric and text (or "string"). All data processing occurs sequentially case-by-case through the file. Files can be matched one-to-one and one-to-many, but not many-to-many.

The graphical user interface has two views which can be toggled by clicking on one of the two tabs in the bottom left of the SPSS window. The 'Data View' shows a spreadsheet view of the cases (rows) and variables (columns). Unlike spreadsheets, the data cells can only contain numbers or text and formulas cannot be stored in these cells. The 'Variable View' displays the metadata dictionary where each row represents a variable and shows the variable name, variable label, value label(s), print width, measurement type and a variety of other characteristics. Cells in both views can be manually edited, defining the file structure and allowing data entry without using command syntax. This may be sufficient for small datasets. Larger datasets such as statistical surveys are more often created in data entry software, or entered during computer-assisted personal interviewing, by scanning and using optical character recognition and optical mark recognition software, or by direct capture from online questionnaires. These datasets are then read into SPSS.

SPSS can read and write data from ASCII text files (including hierarchical files), other statistics packages, spreadsheets and databases. SPSS can read and write to external relational database tables via ODBC and SQL.

Statistical output is to a proprietary file format (*.spv file, supporting pivot tables) for which, in addition to the in-package viewer, a stand-alone reader can be downloaded. The proprietary output can be exported to text or Microsoft Word. Alternatively, output can be captured as data (using the OMS command), as text, tab-delimited text, PDF, XLS, HTML, XML, SPSS dataset or a variety of graphic image formats (JPEG, PNG, BMP and EMF).

Add-on modules provide additional capabilities. The available modules are:

- SPSS Programmability Extension (added in version 14). Allows Python programming control of SPSS.
- SPSS Data Validation (added in version 14). Allows programming of logical checks and reporting of suspicious values.
- SPSS Regression Models - Logistic regression, ordinal regression, multinomial logistic regression, and mixed models.
- SPSS Advanced Models - Multivariate GLM and repeated measures ANOVA (removed from base system in version 14).
• SPSS Classification Trees. Creates classification and decision trees for identifying groups and predicting behaviour.
• SPSS Tables. Allows user-defined control of output for reports.
• SPSS Exact Tests. Allows statistical testing on small samples.
• SPSS Categories
• SPSS Trends
• SPSS Conjoint
• SPSS Missing Value Analysis. Simple regression-based imputation.
• SPSS Map
• SPSS Complex Samples (added in Version 12). Adjusts for stratification and clustering and other sample selection biases.

SPSS Server is a version of SPSS with a client/server architecture. It has some features not available in the desktop version, such as scoring functions.

Versions

Early versions of SPSS were designed for batch processing on mainframes, including for example IBM and ICL versions, originally using punched cards for input. A processing run read a command file of SPSS commands and either a raw input file of fixed format data with a single record type, or a 'getfile' of data saved by a previous run. To save precious computer time an 'edit' run could be done to check command syntax without analysing the data. From version 10 (SPSS-X) in 1983, data files could contain multiple record types.

SPSS version 16.0 runs under Windows, Mac OS 10.5 and earlier, and Linux. The graphical user interface is written in Java. The Mac OS version is provided as a Universal binary, making it fully compatible with both PowerPC and Intel-based Mac hardware.

Prior to SPSS 16.0, different versions of SPSS were available for Windows, Mac OS X and Unix. The Windows version was updated more frequently, and had more features, than the versions for other operating systems.

SPSS version 13.0 for Mac OS X was not compatible with Intel-based Macintosh computers, due to the Rosetta emulation software causing errors in calculations. SPSS 15.0 for Windows needed a downloadable hotfix to be installed in order to be compatible with Windows Vista.

Release history

• SPSS 15.0.1 - November 2006
• SPSS 16.0.2 - April 2008
• SPSS Statistics 17.0.1 - December 2008
• PASW Statistics 17.0.3 - September 2009
• PASW Statistics 18.0 - August 2009
• PASW Statistics 18.0.1 - December 2009
• PASW Statistics 18.0.2 - April 2010

See also

• List of statistical packages

SPSS - Wikipedia, the free encyclopedia

- Comparison of statistical packages
- PSPP - an open source alternative to SPSS
- gretl - an open source alternative to SPSS that can import SPSS data files
- R Commander - an open source R-alternative to SPSS

Notes

2. "press release

References

- SPSS 15.0 Command Syntax Reference 2006, SPSS Inc., Chicago Ill.

External links

- SPSS Inc Homepage - support page includes a searchable database of solutions
- How-To Guides for Running Statistical Tests in SPSS - by Latex Statistics
- Raynald Levesque's SPSS Tools - library of worked solutions for SPSS programmers (FAQ, command syntax; macros; scripts; python)
- Archives of SPSSX-L Discussion - SPSS Listserv active since 1996. Discusses programming, statistics and analysis
- UCLA ATS Resources to help you learn SPSS - Resources for learning SPSS
- UCLA ATS Technical Reports - Report 1 compares Sata, SAS and SPSS against R (R is a language and environment for statistical computing and graphics)
- Using SPSS For Data Analysis - SPSS Tutorial from Harvard
- SPSS Developer Central - Support for developers of applications using SPSS, including materials and examples of the Python programmability feature


Categories: Java platform software | Statistical software | Statistical programming languages

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http://en.wikipedia.org/wiki/SPSS

2016
Spearman's rank correlation coefficient

Definition and calculation

The Spearman correlation coefficient is often thought of as being the Pearson correlation coefficient between the ranked variables. In practice, however, a simpler procedure is normally used to calculate ρ. The n raw scores $X_i, Y_i$ are converted to ranks $x_i, y_i$, and the differences $d_i = x_i - y_i$ between the ranks of each observation on the two variables are calculated.

If there are no tied ranks, then ρ is given by:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}.$$  

If tied ranks exist, Pearson's correlation coefficient
between ranks should be used for the calculation:

\[
\rho = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}
\]

One has to assign the same rank to each of the equal values. It is an average of their positions in the ascending order of the values.

An example of averaging ranks:

In the table below, notice how the rank of values that are the same is the mean of what their ranks would otherwise be.

<table>
<thead>
<tr>
<th>Variable (X_i)</th>
<th>Position in the descending order</th>
<th>Rank (X_i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>1.2</td>
<td>4</td>
<td>(\frac{4 + 3}{2} = 3.5)</td>
</tr>
<tr>
<td>1.2</td>
<td>3</td>
<td>(\frac{4 + 3}{2} = 3.5)</td>
</tr>
<tr>
<td>2.3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Interpretation

The sign of the Spearman correlation indicates the direction of association between \(X\) (the independent variable) and \(Y\) (the dependent variable). If \(Y\) tends to increase when \(X\) increases, the Spearman correlation coefficient is positive. If \(Y\) tends to decrease when \(X\) increases, the Spearman correlation coefficient is negative. A Spearman correlation of zero indicates that there is no tendency for \(Y\) to either increase or decrease when \(X\) increases. The Spearman correlation increases in magnitude as \(X\) and \(Y\) become closer to being perfect monotone functions of each other. When \(X\) and \(Y\) are perfectly monotonically related, the Spearman correlation coefficient becomes 1. A perfect monotone increasing relationship implies that for any two pairs of data values \(X_i, Y_i\) and \(X_j, Y_j\), that \(X_i > X_j\) and \(Y_i > Y_j\) always have the same sign. A perfect monotone decreasing relationship implies that these

http://en.wikipedia.org/wiki/Spearman's_rank_correlation_coefficient
differences always have opposite signs.

The Spearman correlation coefficient is often described as being "nonparametric." This can have two meanings. First, the fact that a perfect Spearman correlation results when \( X \) and \( Y \) are related by any monotonic function can be contrasted with the Pearson correlation, which only gives a perfect value when \( X \) and \( Y \) are related by a linear function. The other sense in which the Spearman correlation is nonparametric is that its exact sampling distribution can be obtained without requiring knowledge of the joint probability distribution of \( X \) and \( Y \).

**Example**

In this example, we will use the raw data in the table below to calculate the correlation between the IQ of a person with the number of hours spent in front of TV per week.

<table>
<thead>
<tr>
<th>IQ, ( X_i )</th>
<th>Hours of TV per week, ( Y_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>7</td>
</tr>
<tr>
<td>86</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>27</td>
</tr>
<tr>
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<td>50</td>
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<td>99</td>
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<td>103</td>
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<td>97</td>
<td>20</td>
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<tr>
<td>113</td>
<td>12</td>
</tr>
<tr>
<td>112</td>
<td>6</td>
</tr>
<tr>
<td>110</td>
<td>17</td>
</tr>
</tbody>
</table>

First, we must find the value of the term \( d_i^2 \). To do so we use the following steps, reflected in the table below.

1. Sort the data by the first column \( (X_i) \). Create a new column \( x_i \) and assign it the ranked values 1,2,3,...,\( n \).
2. Next, sort the data by the second column \( (Y_i) \). Create a fourth column \( y_i \) and similarly assign it the ranked values 1,2,3,...,\( n \).
3. Create a fifth column \( d_i \) to hold the differences between the two rank columns \( (x_i \) and \( y_i) \).
4. Create one final column \( d_i^2 \) to hold the value of column \( d_i \) squared.

<table>
<thead>
<tr>
<th>IQ, ( X_i )</th>
<th>Hours of TV per week, ( Y_i )</th>
<th>rank ( x_i )</th>
<th>rank ( y_i )</th>
<th>( d_i )</th>
<th>( d_i^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>97</td>
<td>20</td>
<td>2</td>
<td>6</td>
<td>-4</td>
<td>16</td>
</tr>
</tbody>
</table>

With $d_i^2$ found, we can add them to find $\sum d_i^2 = 194$. The value of n is 10. So these values can now be substituted back into the equation,

$$\rho = 1 - \frac{6 \times 194}{10(10^2 - 1)}$$

which evaluates to $\rho = -0.175757575...$

This low value shows that the correlation between IQ and hours spent watching TV is very low. In the case of ties in the original values, this formula should not be used. Instead, the Pearson correlation coefficient should be calculated on the ranks (where ties are given ranks, as described above).

**Determining significance**

One approach to testing whether an observed value of $\rho$ is significantly different from zero ($\rho$ will always maintain $1 \geq \rho \geq -1$) is to calculate the probability that it would be greater than or equal to the observed $r$, given the null hypothesis, by using a permutation test. An advantage of this approach is that it automatically takes into account the number of tied data values there are in the sample, and the way they are treated in computing the rank correlation.

Another approach parallels the use of the Fisher transformation in the case of the Pearson product-moment correlation coefficient. That is, confidence intervals and hypothesis tests relating to the population value $\rho$ can be carried out using the Fisher transformation:

$$F(r) = \frac{1}{2} \log \frac{1 + r}{1 - r} = \text{arctanh}(r).$$

If $F(r)$ is the Fisher transformation of $r$, the sample Spearman rank correlation coefficient, and $n$ is the sample size, then

$$z = \sqrt{\frac{n - 3}{1.06}} F(r)$$

is a $z$-score for $r$ which approximately follows a standard normal distribution under the null hypothesis of statistical independence ($\rho = 0$).
One can also test for significance using

\[ t = r \sqrt{\frac{n - 2}{1 - r^2}} \]

which is distributed approximately as Student's t distribution with n-2 degrees of freedom under the null hypothesis.\(^5\) A justification for this result relies on a permutation argument.\(^6\)

A generalization of the Spearman coefficient is useful in the situation where there are three or more conditions, a number of subjects are all observed in each of them, and it is predicted that the observations will have a particular order. For example, a number of subjects might each be given three trials at the same task, and it is predicted that performance will improve from trial to trial. A test of the significance of the trend between conditions in this situation was developed by E. B. Page\(^7\) and is usually referred to as Page's trend test for ordered alternatives.

**Correspondence analysis based on Spearman's rho**

Classic correspondence analysis is a statistical method which gives a score to every value of two nominal variables, in this way that Pearson's correlation coefficient between them is maximized.

There exists an equivalent of this method, called grade correspondence analysis, which maximizes Spearman's rho or Kendall's tau\(^8\).

**See also**

- Kendall tau rank correlation coefficient
- Rank correlation
- Chebyshev's sum inequality, rearrangement inequality (These two articles may shed light on the mathematical properties of Spearman's \(\rho\)).
- Pearson product-moment correlation coefficient, a similar correlation method that instead relies on the data being linearly correlated.

**References**

Spearman's rank correlation coefficient - Wikipedia, the free encyclopedia


- M.G. Kendall, "Rank correlation methods", Griffin (1962)

External links

- Performing a Spearman's Rank Order Correlation in SPSS - A How-To Guide by Laerd Statistics
- Table of critical values of $p$ for significance with small samples
- Spearman's rank online calculator
- Chapter 3 part 1 shows the formula to be used when there are ties
- Spearman's rank correlation: Simple notes for students with an example of usage by biologists and a spreadsheet for Microsoft Excel for calculating it (a part of materials for a Research Methods in Biology course)
- Tests of Association Calculator

Retrieved from "http://en.wikipedia.org/wiki/Spearman%27s_rank_correlation_coefficient"

Categories: Covariance and correlation | Statistical dependence | Statistical tests | Non-parametric statistics
Chi-square test

From Wikipedia, the free encyclopedia

"Chi-square test" is often shorthand for Pearson's chi-square test.

A chi-square test (also chi-squared or \( \chi^2 \) test) is any statistical hypothesis test in which the sampling distribution of the test statistic is a chi-square distribution when the null hypothesis is true, or any in which this is asymptotically true, meaning that the sampling distribution (if the null hypothesis is true) can be made to approximate a chi-square distribution as closely as desired by making the sample size large enough.

Some examples of chi-squared tests where the chi-square distribution is only approximately valid:

- Pearson's chi-square test, also known as the chi-square goodness-of-fit test or chi-square test for independence. When mentioned without any modifiers or without other precluding context, this test is usually understood (for an exact test used in place of \( \chi^2 \), see Fisher's exact test).
- Yates' chi-square test, also known as Yates' correction for continuity.
- Mantel-Haenszel chi-square test.
- Linear-by-linear association chi-square test.
- The portmanteau test in time-series analysis, testing for the presence of autocorrelation
- Likelihood-ratio tests in general statistical modelling, for testing whether there is evidence of the need to move from a simple model to a more complicated one (where the simple model is nested within the complicated one).

One case where the distribution of the test statistic is an exact chi-square distribution is the test that the variance of a normally-distributed population has a given value based on a sample variance. Such a test is uncommon in practice because values of variances to test against are seldom known exactly.

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- 2 See also
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Chi-square test for variance in a normal population

If a sample of size \( n \) is taken from a population having a normal distribution, then there is a well-known result (see distribution of the sample variance) which allows a test to be made of whether the variance of the population has a pre-determined value. For example, a manufacturing process might have been in stable condition for a long period, allowing a value for the variance to be determined essentially without error. Suppose that a variant of the process is being tested, giving rise to a small sample of product items whose variation is to be tested. The test statistic \( T \) in this instance could be set to be the sum of squares about the sample mean, divided by the nominal value for the variance (i.e. the value to be tested as holding). Then \( T \) has a chi-square distribution with \( n-1 \) degrees of freedom. For example if the sample
size is 21, the acceptance region for \( T \) for a significance level of 5% is the interval 9.59 to 34.17.

See also

- Chi-squared test nomogram
- G-test
- Likelihood-ratio tests are approximately chi-square tests
- McNemar's test, related to a chi-square test
- Pearson's chi-square test for a more detailed explanation
- T-Test
- Wald test can be evaluated against a chi-square distribution

External links

- Chi-Square Calculator from GraphPad
- Vassar College's 2x2 Chi-Square with Expected Values

References

- Weisstein, Eric W., "Chi-Squared Test" from MathWorld.

Retrieved from "http://en.wikipedia.org/wiki/Chi-square_test"

Categories: Statistical tests | Non-parametric statistics | Categorical data

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"Talent Flow Management"
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Dr. Ravindra K. Nalawade, Planning & Development Dept., University of Pune

Allana Institute of Management Sciences, Pune
"Talent Flow Management"

Our core corporate assets walk out every evening. It is our duty to make sure these assets return the next day morning, mentally and physically enthusiastic and energetic.

N. R. Narayan Murthe (1)

During the last few decades dramatic challenges have been imposed on organizations as well as on HR managers. Responding to the changing world scenario is both an opportunity and challenge. With human capital becoming more and more strategic resource, the focus is on building the organization on should foundation of human values and culture oriented management. Organizations have realized the major drive in talent knowledge economy is to attract, develop and retain best talents. Today’s managers need to focus not so much on competing more on product market or technological specialists but on winning the hearts and minds of talented and capable employees. The slogan is "manage the people, people will manage the business".
1. Retention - A prevailing scenario

   a. Employee turnover has assumed more significance from individual, organizational and social perspective. The problem of attrition represents a major cost in terms of selection, recruitment, induction and training as well as variety of other associated indirect costs.

   b. The topic of retention management has received wide publicity through renowned magazines, journals like Fortune, Forbes, Hewitt Asia Pacific and Business Week. The business has been constantly discussed and debated in academic circles, industrial wizards, scholars and HR specialists during workshop, seminars and conferences.

   c. The concept of 'Employer-of-choice' has intensifies and employees choose/select to work for the best companies. This trend demands the organizations to reshape and design new innovative process to acquire the best talents to gain competitive advantage.

   d. It is also interesting to observe that the issue of "retention management" in HR department has been elevated to the strategic level of the corporation from the level of strategic support system.

   e. Fortune magazine has pointed out that during the period of the downturn economy thirteen strategies are to be followed with the business. The three rules should not be forgotten.

1. When times get tough, many organizations ease up on recruiting
2. Figuring slow economy will drive more applicants their way and
3. They spend less on training as a way to raise profit quickly without doing immediate damage to the business.

This approach is just dumb. Major business organizations have taken a stand on importance of recruiting quickly people during downturn while continue to invest in their training and development.

1. Both internal and external drivers collectively providing tremendous challenge for organizations to manage employee retention.

Management of turnover is a strategic issue. The need to be managed fruitfully by utilizing technology and other variable tools. Commitment from top management and actively designing planning timely strategic and continuous monitoring both internal and external affecting retention.

2. Myths about turnover (2)

There are certain myths which often suit organization and those myths inhibit ef...
manage retention in positive way. They are:

1. Turnover costs are not too high.
2. Turnover is just a cost of doing business.
3. Turnover is good, at least it has many positive consequences.
4. Turnover is an industry problem.
5. Turnover is an HR problem.
6. The managers role is minimal.
7. Turnover is out of our control.
8. Throwing money at the problem will solve it.
9. Turnover is a tactical issue.

Robert Levin and Joseph Rosse comment on the prevailing myths that

1. The change in the nature of markets forces and environment mean that the employee turnover is but natural and management have little to do and need not worry too much.

2. Management agenda is to improve retention rate and some others disagree and assert that certain amount of turnover is necessary.

However, there is no right or wrong answers and what is feasible and reasonable rate of attrition is to be determined by each organization depending upon is own need, nature, philosophy, culture and economy prevailing situation.

3. The paradox of attrition:

While some organizations are hectically putting their best efforts to reduce the rate of attrition to the barest minimum, some management gurus are actually propagating for increasing attrition. Is it not a paradox when war for talent is fought vigorously by many organizations and at the same time advocating boosting turnover levels? Blindly attempting to avoid attrition issue is definitely damaging. It has been argued that functional turnover is good as it stimulates a competitive advantage. It is necessary to actively manage turnover to create a performance culture. Maneuver turnover for positive business and financial results.

4. Some turnover is good

According to Payal Chanania (3), “nil attrition level stand testimony to the jolting reality that an organization is laden with old skills, stale managers and a dull work force. Valuable retention efforts are actually being spent on preserving poor performers who do not meet efficiency expectations but also essentially reduce productivity, drive away customers and breed low morale. In other words lack of attrition indicates stagnant skills levels.

He further elaborates that in such situation no organization can build high performing work force to face global competition. It is necessary for inflow of fresh ideas, new blood, vantage perspective, external knowledge and reshape workforce with better distribution of age and reduced pay packages. Instead of exclusively
preventing departure and retaining all employees, the focus should shift to keeping a
selective/ group of talented employees only. Turnover benefits a firm if managed judiciously.
It means that the firm is actively evaluating employee's performance and making decisions.
The bottom line is to manage and encourage good turnover in the interest of the company.
Where companies go wrong is that they attempt to drive out older long term employees in an
attempt to infuse new talent and back salaries. They fail to realize that not only does this invite
age discrimination liabilities but also begets a huge loss of commitments, skills and
experience.

While concluding the author emphasizes that the key to avoiding organizational stagnation is to
institute a sound selection process that ensures top performers alone. With the scientifically
designed measures organizations can manage the need based level of retention and also
achieve a maximum return on their human capital investment.

5. Talent flow approach

According to Robert Levin and Joseph Rosse (4), "the employee turnover and retention has
frequently debated on three fundamental issues.

a. To what extent employee turnover should be considered most significant as
organizational problem.

b. Is it merely an avoidable cost and has more negative consequences? and

c. What is a model level of turnover which has potential benefit to the organization?

The author has proposed a "talent flow approach" for managing retention of best talents. "Whether
economy is up or down, you will still need to be concerned with (1) about flow of employees in to
and (2) through your organization about their performance while they are employed with you.
Economic forces will continuously change and it is necessary to develop an approach to attracting
and retaining talents. "The flow of people is like the flow of river. People flow through as they flow
through their life and career". The decision people make about (1) When to come (2) When to leave
it and (3) What to do when they are in it, create powerful forces that shape an organization. You
shape your organizations understanding the flow of talent and dynamics of forces. Respond to the
challenges effectively of retaining talents. A turnover problem is like the roaring falls of the river,
each is shaped by two fundamental characteristics.

a. Long term sustainable pattern that a flow of anything develops, water flowing over river bed or talent flowing through organization.

b. In case of river the fundamental force is gravity, whereas in case of talent flow, employee motivation to adopt. Water flowing with gravity always has turnover as it flows down hill. So also people moving
through their lives and career, has a turnover and retaining too many people for too long results in silts up and stagnation. Therefore the author suggests to master talent turnover by understating for fundamentals.

1. Talent flow is natural ongoing process and

2. Dynamics of talent flow driven by forces

6. Why talent flow approach

Talent flow is similar to flow of water in the river. The way flow of water is managed, management can also management flows. How much required, how much to be released and when to remove silts etc. Talent flow approach is replicable and adaptable process embodying both effective principles and concepts and practical solutions.

1. Turnover is inevitable and therefore something to be managed rather than simply minimized.

2. Both turnover and counter productive behavior typically increase when dissatisfaction with work increases and

3. Hiring process itself will always bring good performers and bad one in to organization.

The problem of attrition need to view from managing the performance satisfaction and retention. An integrated strategy is necessary treating retention management as a continuous process and not as one gunshot action.

The author provides an analogy which reads:

"Living with talent flow. Picture standing at the edge of massive river pounding over a roaring water fall. Water flowing gently for many miles, then whole nature seems to change – water plunges down the rocks – massive waves – droplets – spray rise above water force new apart force breath taking and humbling.

In this connection, author suggests to ask three basic questions as to understand talent flow.

1. What is the proposition of good performers to poor performers coming in to organization (a hiring issue).

2. How much good performance is changing to poor performance and vice versa (management issue) and

3. How much good performers are leaving the organization (retention issue).

The talent flow approach will guide to identify the areas that need focus of attention for constructive actions. High tech companies recognize the importance of innovation in maintaining and enhancing technological advantage. The same approach is required to keep best talents. To do so, they rely on latest scientific knowledge,
effective engineering skills, a comprehensive research and development and commitment of resources to innovate by talented human resources.

Measuring and Reporting:

Turnover cost as a iceberg with the tip of the iceberg being the visible turnover costs labeled "green money". A major part of iceberg being under water is called "blue money", which is invisible cost of turnover. This example is useful to understand and communicate the growth of hidden issues. Naturally, measuring and reporting the actual story of turnover becomes most essential for bringing appropriate attention to the issue for taking constructive action.

In this connection an interesting thought provoking and useful observation has been made by Dr. John Sullivan (5). He asserts that the way turnover picture is presented to management is mostly misleading as a result it can lead to some very bad decision making.

Normally, at least a few, managers use the popular phrases "turnover is high but everybody else's is also. It is a world phenomenon, what we can do? At least our attrition on rate is bit lower than others. We need not...".

The simple turnover rate as 25% hides the real truths. Providing additional information to management is absolutely necessary to initiate corrective measures. The author clarifies further that the need is to develop deeper insight to understand the implications of reporting in simple metric statement "our turnover is just 20%". It is harmful and also misleading since it omits most valuable details. The author has painted the picture of misleading statement by narrating an example as under:

1. "our turnover is 20% but our competitor is 4%". It means our turnover is five times more. How adding additional information is useful?
2. "of that 20%, 19% were top performers".
3. "of that 19%, all were in key, high impact jobs".
4. "of that 19%, 90% were in hard to fill jobs".
5. "even when replacement are found for this 19%, it takes 6 months to find them and 2 full year before they are up to the minimum productivity levels".
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divisions with turnover rates under 5%) are two times higher than the profit in high turnover divisions.

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Conclusions:

The author suggests that "do not wait until it is too late. Instead revisit your retention / turnover metrics today and to see how you can do more accurately present the "real picture" of what is happening. If you have time, please dust off those old retention solutions that you labeled as necessary during the downturn because they will soon be needed.

The researcher on the study of "retention management and its ripple impact on organizational performance and development will gain immensely from the above observations, in realizing the direction and dimension of the topic. It provides enough scope to know as to how to approach the problem of reducing attrition rate and retaining best talents." Nevertheless, the range of study has opened for further research study and analysis by understanding the subject in depth.

References:

GURU MANTRA

VALUING HUMAN CAPITAL

- Prof. S.P.R. Vittal

Corporates worldwide started recognizing the importance of human resources they possess and attributing a monetary value to them. In technology intensive companies the value of their human capital exceeds the values of assets-in-place.

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AN INTERVIEW WITH DR. G. PRAGEETHA RAJU

What are the qualities that an interviewer looks for in a prospective HR candidate?

For HR function, in these turbulent times of recession, the scene is not very rosy, in terms of the requirement of HR candidates.

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NOTES FROM THE INDUSTRY

AN INTERVIEW WITH MS. JAYANTHI RAJAGOPALAN

Ms. Rajagopal is the brain behind Detours, a unique Travel agency in Hyderabad. She is an XLRI, Jamshedpur alumnus and has worked with Titan, both in the HR and Marketing Dept., & Bill and Melinda Gates Foundation before starting "Detours". On her recent visit to IBS Hyderabad, the ConVerve team managed to get a few words from her, where she narrates her tryst with the Human Resource Management.

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INDUSTRY ARTICLE

This issue features the article, Knowledge-Flow Management by Mr. Bhooshan Agalgatti, Director-Software Engineering, NVIDIA Corporation, Pune.

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by Kirti Sharma, Kunal Davey, Nimish Rastogi and Sheetal Tejankar

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MERGERS AND ACQUISITIONS - AN HR PERSPECTIVE

by Angana Deb

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A FEW PAGES FROM SIP DIARY

by Smita Jain

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“Knowledge - Flow Management”

Introduction

Retention Management is both a challenge and an opportunity. Many authors, academicians and others have offered suggestions theoretical as well as practical solutions. Some of the suggestions make it abundantly clear that the myths about turnover/retention management which quite often surface in the organizations and inhibit sincere efforts to manage. The need is to revisit with positive approach. Nil attrition means organizational stagnation of skills. In other words, management has allowed accommodating enough silts-deadwood-poor performers. It is a drag on organizational performers and development. During the last few decades dramatic challenges have been imposed on organizations as well as on HR managers. Responding to the changing world scenario is both an opportunity and challenge. With human capital becoming more and more strategic resource, the focus is on building the organization on sound foundation of human values and culture oriented management. Organizations have realized the major drive in talent knowledge economy is to attract, develop and retain best talents. Today’s managers need to focus not so much on competing more on product market or technological specialists but on winning the hearts and minds of talented and capable employees. The slogan is “manage the people, people will manage the business”.

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6. Both internal and external drivers are collectively providing tremendous challenge for organizations to manage employee retention.

Management of turnover is a strategic issue and it needs to be managed carefully by utilizing technology and other variable tools. Commitment from top management and actively designing and planning timely strategic and continuously monitoring both internal and external factors affecting retention.

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The author suggests that "do not wait until it is too late". Instead revisit your retention/turnover metrics today and to see how you can do so more accurately present the "real picture" of what is happening. If you have time, please dust off those old retention solutions that you labeled as necessary during the downturn because they will soon be needed.

The researcher studying about "retention management and its ripple impact on organizational performance and development" will gain immensely from the above observations, in realizing the direction and dimension of the topic. It provides enough understanding on how to approach the problem of reducing attrition rate and retaining best talents. Nevertheless, the scope of study is open for further research study and analysis through an in-depth understanding of the subject.