Chapter III

RESEARCH DESIGN

Being a library professional, the researcher has taken this study by accepting the fact that there is a need to study the trends of various prominent facets which are highly required. The first thing is designing a detailed methodology to carry out research which eventually leads the researcher in a systematic manner. The research design compacts with the detailed outline of the research design, methodology, data collection source, method of data collection, various bibliometric indicators, and statistical tools.

3.1 Methodology

For the purpose of the study, the Web of Science an International database was searched for all records of papers published by scientists / academicians from the part of the R & D activity that has resulted in publication in peer-reviewed journals. Data was collected from Web of Science till 2012. The comprehensive search string, was used to elicit records relevant to Soft Skills were used for this study.

It can be seen that 47,316 bibliographic records of contribution in Soft Skills over the period of 14 years (i.e) 1999 to 2012.

3.2 Data Collection

The method of data collection is as follows:

\[ ts = \text{life skills or ts = Grammar skills or ts = Time Management skills or ts = Positive Attitude skills or ts = Verbal communication skills or ts = optimism skills or ts = Communication skills or ts = Social skills or ts = self directed or ts = Team skills or ts = Common Sense or ts = Self Confidence skills or ts = Problem solving skills or ts = Honesty or ts = Crisis management skills or ts = Sympathy or ts = mathematics skills or ts = ability to understand or ts = Curtsey skills or ts = Leadership skills or ts } \]
Creativity or ts = innovation skills or ts = Cooperation skills or ts = Work Ethic or ts = self awareness or ts = personal values or ts = Learning skills or ts = Public speaking or ts = sense of humour or ts = analytical skills or ts = Interpersonal skills or ts = Courtesy or ts = Writing skills or ts = Computer skills or ts = Ability to Accept or ts = Reliability skills or ts = Training skills or ts = Teaching skills or ts = Report writing or ts = Presentation skills or ts = IT skills or ts = Self discipline or ts = Critical thinking skills or ts = Project Management skills or ts = flexibility skills or ts = Trustworthiness skills or ts = Planning skills or ts = responsible behaviour skills or ts = Listening skills or ts = goal setting skills or ts = Decision making skills or ts = Public relation skills or ts = Negotiation skills or ts = Behavior skills or ts = Self Management skills or ts = Self awareness skills or ts = Facilitating skills or ts = Ability to think skills or ts = Interpersonal relationship skills or ts = Organizing skills or ts = Motivational skills or ts = reporting skills or ts = Ability to Measure skills or ts = empathy skills or ts = Adaptability skills or ts = Integrity skills or ts = Consulting skills or ts = Emotional Intelligence skills or ts = life skills or ts = Grammar skills or ts = Time Management skills or ts = Positive Attitude skills or ts = Verbal communication skills or ts = optimism skills or ts = Communication skills or ts = Social skills or ts = self directed or ts = Team skills or ts = Common Sense or ts = Self Confidence skills or ts = Problem solving skills or ts = Honesty or ts = Crisis management skills or ts = Sympathy or ts = mathematics skills or ts = ability to understand or ts = Curtsey skills or ts = Leadership skills or ts = Creativity or ts = innovation skills or ts = Cooperation skills or ts = Work Ethic or ts = self awareness or ts = personal values or ts = Learning skills or ts = Public speaking or ts = sense of humour or ts = analytical skills or ts = Interpersonal skills or ts = Courtesy or ts = Writing skills or ts = Computer skills or ts = Ability to Accept or ts = Reliability skills
or ts = Training skills or ts = Teaching skills or ts = Report writing or ts = Presentation skills or ts = IT skills or ts = Self discipline or ts = Critical thinking skills or ts = Project Management skills or ts = flexibility skills or ts = Trustworthiness skills or ts = Planning skills or ts = responsible behaviour skills or ts = Listening skills or ts = goal setting skills or ts = Decision making skills or ts = Public relation skills or ts = Negotiation skills or ts = Behavior skills or ts = Self Management skills or ts = Self awareness skills or ts = Facilitating skills or ts = Ability to think skills or ts = Interpersonal relationship skills or ts = Organizing skills or ts = Motivational skills or ts = reporting skills or ts = Ability to Measure skills or ts = empathy skills or ts = Adaptability skills or ts = Integrity skills or ts = Consulting skills or ts = Emotional Intelligence skills

Refined by: [excluding] Research Areas=( Meteorology Atmospheric Sciences or Orthopedics or Cardiovascular System Cardiology or Optics or Neurosciences Neurology or Geriatrics Gerontology or Infectious Diseases or Agriculture or Polymer Science Or Engineering Or Endocrinology Metabolism or Chemistry or Toxicology or Public Environmental Occupational Health or Social Work or Anthropology or Respiratory System or Health Care Sciences Services or Biomedical Social Sciences or Gastroenterology Hepatology or Biochemistry Molecular Biology or Zoology or Arts Humanities Other Topics or General Internal Medicine or Marine Freshwater Biology or Physics or Obstetrics Gynecology or Anesthesiology or Rehabilitation or Computer Science or Radiology Nuclear Medicine Medical Imaging or Religion or Environmental Sciences Ecology or Life Sciences Biomedicine Other Topics or Water Resources or Nursing or Literature or History Philosophy Of Science or Substance Abuse or Medical Informatics or Science Technology Other Topics or Physiology or Instruments Instrumentation or Materials Science or Geology or
Electrochemistry or Surgery or Audiology Speech Language Pathology or Food Science Technology or Pharmacology Pharmacy or Biophysics or Astronomy Astrophysics or Pediatrics or Family Studies or Evolutionary Biology or Sport Sciences or Public Administration or Virology or Oncology or Dentistry Oral Surgery Medicine or Criminology Penology or Urology Nephrology or Mechanics or Cell Biology or Plant Sciences or Telecommunications or Immunology or Veterinary Sciences or Dermatology or Nutrition Dietetics or Genetics Heredity or Emergency Medicine or Ophthalmology or Otorhinolaryngology or Developmental Biology or History or Music or Government Law or Geography or Mathematical Computational Biology or Biotechnology Applied Microbiology or Hematology Or Rheumatology or Research Experimental Medicine ) And [Excluding] Research Areas=(Area Studies or Theater or Pathology or Anatomy Morphology or Metallurgy Metallurgical Engineering or Energy Fuels or Demography or Tropical Medicine or Parasitology or Automation Control Systems or Oceanography or Medical Ethics or Cultural Studies or Crystallography or Remote Sensing or Classics or Medical Laboratory Technology or Microscopy or Architecture or Mining Mineral Processing or Mathematics or Legal Medicine or Reproductive Biology or Microbiology or Ethnic Studies or Allergy or Nuclear Science Technology or Mineralogy or Geochemistry Geophysics or Asian Studies or Mycology or Art or Urban Studies or Dance or Operations Research Management Science or Spectroscopy or Acoustics or Forestry or Archaeology or Construction Building Technology or Social Issues or Transportation or Paleontology or Behavioral Sciences or Robotics or Physical Geography or Mathematical Methods In Social Sciences or r Film Radio Television or Transplantation or Integrative Complementary Medicine or Fisheries or
3.3 Bibliometric Indicators

3.3.1 Relative Growth Rate

In order to identify the relative growth rate, the researcher has adopted a model developed by Mahapatra. The relative growth rate is the increase in number of publications / pages per unit of time. The mean relative growth rate \( R (1-2) \) over a specified period of interval can be calculated from the following equation

\[
R (1-2) = \frac{W_2 - W_1}{T_2 - T_1}
\]

Where \( R (1-2) \) = mean relative growth rate over the specified period of interval

\( W_1 = \log W_1 \) (Natural log of initial number of publications/papers);

\( W_2 = \log W_2 \) (Natural log of initial number of publications/pages);

\( T_2 - T_1 \) = The unit difference between the initial time and final time.

The relative growth rate for both publications and pages can be calculated separately. Therefore,

\( R (a) \) = Relative growth rate per unit of publications per unit of time (year);

\( R (p) \) = Relative growth rate per unit of pages per unit of time (year)

3.3.2 Time Series Analysis

The purpose of using this technique is to predict the number of publications for the near future i.e. 2015 and 2020. The year has been considered as the independent value and number of publications is considered as the depended variable.

3.3.3 Degree of Collaboration

In order to identify the degree of collaboration, the researcher has adopted K.Subramanyam’s formula
The formula is

\[ C = \frac{Nm}{Nm + Ns} \]

Where

where \( C \) = degree/extent of collaboration

\( Ns \) = number of single authored papers

\( Nm \) = number of multi authored papers.

### 3.3.4 Authored Productivity

Authored productivity examines the prevailing trend in carrying out the research process in terms of the extent to which the research performance is concentrated by a single author.

### 3.3.5. Authorship Pattern

It intends to analyze the percentage of single and multiple authors contributed research output.

### 3.3.6. Price’s 80-20 Rule

It is observed in library and information field that:

- Most of the documents are hardly circulated/used/cited and very few books are frequently circulated/used/cited.
- Most of the authors publish very few articles and very few authors publish more frequently.

This phenomenon is explained fairly by a 80-20 rule. That is 80% of the documents contribute to 20% of the total circulations/citations received. 20% of such documents are called “core documents/core collection”. Similarly it can be interpreted that 20 per cent of the total authors contribute to 80 per cent of the total publications on a given subject during a given period.
Price's celebrated lectures on “Little Science and Big Science” reviewed some earlier works by Francis Galton, J.M.Cattell and A.J.Lotka and presented a notable “feeling that most of the great scientists are still with us, and that the greater part of scientific work has been produced within living memory, within the span of the present generation of scientists”.

But once the mathematical nature of the model he considered is understood, the awe, if any, disappears. He considers an exponential time trend as the appropriate model to fit for data on number of scientists. He calls this principle of exponential growth as the “fundamental law of any analysis of science”.

Let \( y_t \) = number of scientists during a period \( t \). (\( t \) may be just 1 year or a span of say, 30 or 45 years).

\[
y_t = e^{a' + b't}
\]

\[
\log y_t = a' + b't
\]

Let \( a' = \log a \) and \( b' = \log b \).

Then \( \log y_t = \log a + t \log b \)

Or \( y_t = a \cdot b^t \)

In (2) if \( b > 1 \) the exponential curve is rising over time (+ve growth) and if \( b < 1 \), curve is falling down (-ve growth). (2) may also be written as \( y_t = y_0 \cdot b^t \) (Since \( t = 0 \), \( y_0 = a \) is number of scientists in the beginning).

or \( y_t = y_{t-1} \cdot b \)

Since \( b > 1 \), obviously the number of scientists during any period \( t \) is greater than those existing during any particular period in the past.

In this present study, the value of \( b \) is greater than 1 in all the years except 1012 and hence the present study accepts Price’s fundamental law of science.
3.3.7 Activity Index

Activity index is long used as relative indicator in bibliometrics. The Activity Index (AI) characterizes the relative research effort a country devotes to a given subject field. Its definition is:

\[ AI = \frac{\text{Country's Share in World's Publication output in the given field}}{\text{Country's Share in World's Publication output in all science fields}} \]

\( A \) = Country’s Share in Worlds Publication output in a given field

\( B \) = The country’s share in World’s Publication output in all science fields

\( A = \) Publication count in a specific field by a country \((X)\)/ Publication count in a specific field in the world \((Y)\)

\( A = X/Y \)

\( B = \) Publication count of a country in all fields \((P)\)/Total World Publications\((Q)\)

\( B = P/Q \)

\( AI = A/B \)

Where:

1. \( AI = 1 \) indicates that the country's research effort in the given field precisely corresponds to the world average,

2. \( AI > 1 \) indicates that the country's research effort in the given field is higher than the world average; and

3. \( AI < 1 \) indicates that the country's research effort in the given field is below the world average

In the present study, it can be found that the AI is greater than 1 for countries like England, Netherland and USA.. This is a healthy atmosphere with respect to Soft Skills research in these countries. Other countries like ITALY, DENMARK, JAPAN, India, China etc., do not possess high regard for Soft Skills research.
3.3.8 Analysis and Interpretation

After having collection of data, a computer file for the data was created on a spreadsheet program using Microsoft Excel. Another computer file was created for preparing tables using Visual Basic 6.0. Then the details of the tables been analysed and interpreted among various bibliometric indicators. The statistical analysis have been done with the followings statistical tools:

1. Correlation analysis; and

2. Chi – Square test

Graphic representations are presented wherever necessary.
REFERENCES:

