Chapter Three

Research Methodology
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Printing is one of those inventions that have revolutionized our world and is the most important fundamental practices in our society. Printing is widely used in our society to pass on information and to decorate objects. Printing is a process for reproducing text and images, typically with ink on paper using a printing press. Different techniques and printing equipments are employed for each printing practices. The emergence of the retail revolution and growing education across the country is acting as a fuel to the growth of the printing industry.

The purpose of this study was to build upon the training literature by providing a detailed examination of training needs assessment in commercial printing industry and evaluation practices, and comparing those practices with perceived levels of training program success and organizational effectiveness.

In addition, the variables of respondent characteristics (including specific skill gaps, determinants of training needs, influence of technological changes, effect of working environment, influence of training on existing skills, skills that will enhance the effectiveness for performance of the employees, qualities of trainer, specific training and their frequency of training provided and training evaluation etc.) and respondents characteristics (including age group, experience, qualifications, type of company and no. of employees) were examined to determine if a relationship exists between these variables and needs assessment, evaluation practices, perceptions of training program success, and organizational effectiveness.

3.1 Need of skill enhancement

Output of printing industry has changed hastily after the computerization of this industry. It has created lot of interest in the modernization of current operations and process of this industry. Modernization of printing industry leads to need of enhancement of the skill in existing employee. Skill gaps refer to the situation where a firm has employees but they are not skilled enough to meet the organization’s objectives. In other words we can say that the skill gaps are deficiencies between the skills of the current workforce and those required to meet business objectives.
3.2 Problem area of the study

Competencies and skills are empirically very important issues in today’s environment such as Education, business organization, and practitioner groups in human resource management. Variety of developments in civilization enlarges the role that human capital plays in competitiveness and economic growth. In addition to providing opportunities for workers, these developments may also imply risks. Employees with outmoded skills may run a high risk of becoming unemployed. Training workers is often referred to as a mechanism that can lower this risk by expanding or refreshing skills. The difference between the skills needed on the job and those possessed by the applicants, called skill - gap, is of real concern to human resource managers and business owners looking to hire competent employees. While employers would prefer to hire people who are trained and ready to go to work, they are usually willing to provide the specialized, job-specific training which is necessary for those lacking such skills. The skills are defined as an ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills). Over the last decade and a half, the falling of barriers to international trade and investment have led to a more integrated and interdependent framework of international business. Employers today, as a result, operate in an environment that demands new and constantly developing skills to retain global competitiveness. As our economy booms, and as our industry grows, researcher hears the pressing complaint about an imminent shortage of skilled employees.

3.3 Research Questions

After an in-depth review of literature, we have generated research questions for the assessment of training needs in commercial printing industry.

RQ1: What are the implications of new technology for the skill and training needs of commercial printing industry?

RQ2: How working environment of the printing firm affects the training needs of the employees?
RQ3: Is there an influence of training on the performance of the employees in commercial printing industry?

RQ4: What are the specific skill gaps of the employees i.e. Manager and Pre-Press, Press & Finishing operators working in the commercial printing industries?

RQ5: What are the potential determinants of training needs in commercial printing industries?

RQ6: What are the qualities required for the Trainer to train the employees working in the commercial printing industries?

RQ7: Which are the specific areas of the training and their frequency of training provided by the organizations to the employees working in the commercial printing industries?

RQ8: What are the criteria’s required for the Evaluation of Training in the commercial printing industries?

3.4 Scope of the Research

3.4 a) Conceptual Scope –

We need people who are highly specialized, yet multi-talented. We need employees whose broad range of skills and expertise extend beyond the conventional bounds of their process areas. We need people who are able to solve problems, make decisions, interact with customers, collaborate with colleagues and operate computers.

The scope of study will show the acquisition of knowledge, skill and motivation of employees to improve their performance on the job as per the goals and objectives of the organization.

3.4 b) Geographical Scope –

The present study’s geographical scope is limited to Pune District.
3.5 Significance of the study

For Indian Commercial Printing Industry-

- This study will help in identification of various skill set and knowledge of technology required to run the latest of printing machinery in commercial printing industry. It would also help to understand the present training needs with respect to competence level of the employees.
- It would help to identify the perceptions towards the influence of technological changes on training needs of employee in commercial printing industry. This would also help to identify the problems in the commercial printing industry compared to other industries capacity utilization.
- This study will identify the effect of working environment on training needs of employee in commercial printing industry.
- This will help to develop job descriptions that capture the requirements of commercial printing presses; current and future employees need.
- This research will contribute to collaborate with industrial partners to get innovation in transfer of knowledge to practical applications.

For Academics-

- This study is expected to contribute in adding vital findings about assessment of training needs in commercial printing industry and their relative effect on training as such and also on its various parameters to the existing literature and body of knowledge.
- This research will further guide or help to carry out collaborative research in faculty of management and printing technology.

3.6 Purposes of the Study

- Develop job descriptions that capture the requirements of current and future employees need in commercial printing industry.
- Assess and identify specific skills gaps / deficiencies of employees in Pre-Press, Press and Binding section in commercial printing industry.
Assess the new roles for Managers in commercial printing industry.
Enable the employee to become highly trained and more productive.
Identify the qualities required for the Trainer to train the employees in commercial printing industry.
Assess the specific training areas and frequency of training required to train the employees.
Enable to prepare the plan for Evaluation of training.
Assess the preferable method of training as per the specific skill gaps.
Assess the preferable duration of training as per the specific skill gaps.

3.7 Research Objectives
Based on the Pilot Survey and Literature review the following objectives were formulated:

1) To assess the influence of technological changes on training needs in commercial printing industry.
2) To study the effect of working environment on training needs in commercial printing industry.
3) To assess the influence of training on existing skills of employee in commercial printing industry.
4) To assess the importance of training needs and enhancement of skills at different level of employees in commercial printing industry.
5) To study the impact of training needs realization on training in Commercial Printing Industry.
6) To study the qualities required for Trainer as perceived by employees in commercial printing industry.
7) To study the frequency of Training provided to the employees in commercial printing industry.
8) To study the Evaluation of Training received by employees in commercial printing industry.
3.8 Hypotheses of the study

With respect to the objectives of the study, following hypotheses were set for the same:

**Ho:** There is no association between technological changes and training needs in commercial printing industry.

**H1:** There is an association between technological changes and training needs in commercial printing industry.

**Ho:** There is no relation between working environment and training needs of employee in commercial printing industry.

**H2:** There is relation between working environment and training needs of employee in commercial printing industry.

**Ho:** There is no relation between training and enhancement of existing skills of employee in commercial printing industry.

**H3:** There is relation between training and enhancement of existing skills of employee in commercial printing industry.

**Ho:** There is no association between training needs and enhancement of skills Manager in commercial printing industry.

**H4A:** There is an association between training needs and enhancement of skills Manager in commercial printing industry.

**Ho:** There is no association between training needs and enhancement of skills Pre-Press operator in commercial printing industry.

**H4B:** There is an association between training needs and enhancement of skills Pre-Press operator in commercial printing industry.

**Ho:** There is no association between training needs and enhancement of skills Press operator in commercial printing industry.

**H4C:** There is an association between training needs and enhancement of skills Press operator in commercial printing industry.

**Ho:** There is no association between training needs and enhancement of skills Finishing and Binding operator in commercial printing industry.
**H4D:** There is an association between training needs and enhancement of skills Finishing and Binding operator in commercial printing industry.

**H0:** Quality, Productivity, Quality inspection, Printing wastages, new machine, Promotion and Transfers do not influence the Training Needs in Commercial Printing Industry.

**H5:** At least one of the Independent variables has significant influence on Training Needs in Commercial Printing Industry.

**H0:** There is no difference in the importance respondents attached to the various qualities required for Trainer. (Mean Rank Across all qualities are equal)

**H6:** There is significant difference in the importance respondents attached to the various qualities required for Trainer. (At least one of the Mean Rank differ from rest)

**H0:** Frequency of training provided across various skills are equal. (Mean Rank across frequency of training provided for various skills are equal)

**H7:** Frequency of training provided across various skills are different. (At least one of the Mean Rank differ from rest)

**H0:** Weightage across various evaluation parameters of training received by employees are equal. (Mean Rank Across all Evaluation parameter of training are equal)

**H8:** Weightage across various evaluation parameters of training received by employees are different. (At least one of the Mean Rank differ from rest)

### 3.9 Research Design

Research design is the outline, plan, or strategy used to answer a research question. Research design is a plan of what to gather, from whom, how and when to collect the data, and how to analyze the obtained; for valid results, the design must be appropriate to answer the question or hypothesis being studied. The research design includes type, purpose, period, scope, and environment. The major elements of
research design are data collection design, sampling design, instrument development and data collection and preparation.

3.9 a) Research Type
The type of research design used for the present study is the descriptive research design, with the purpose of finding out who, what, where, when, or how much. Descriptive research comprises surveys and facts findings enquiries of different types. The main objective of descriptive research is describing the state of affairs as it prevails at the time of study.

3.10 Commercial Printing Industries consideration
The printing industry can be broken into three fundamental segments - prepress, press and post-press.

1) These segments cover all the aspects of printing and constitute various processes of workflows and technologies.
   • The prepress segment is the segment in which the content is created, designed, structured, laid out, made ready, and transferred to print. Pre-media, in which the prepress process is done before the media to be used (e.g. print, electronic) is specified, is now becoming an increasingly dominant part of the pre-press segment, which manages and controls the workflow processes.
   • The press segment is the printing stage in which the created content is either digitally transferred (Computer-to-Plate) or physically transferred (Conventional filming process) from the prepress, and is printed on the press-printing machine. Here, many aspects of reproduction and quality control come into play — color consistency, color reproduction, ink densities, trapping etc.
   • The post-press segment is the finishing stage in which the printed matter is cut for dimensions, die-cut for specific shapes, folded, gathered, piled, bound, and made into a finished print product.
2) Commercial printing is a trade involving the preparation of printed materials, such as brochures, books, magazines, announcements, posters, stationery, and similar documents. To get these types of items ready, commercial printers, also known as job printers, complete a wide range of services, such as graphic design, plate-making, layout, trim and fold, and press production & binding. Other types of printers offer similar services and results, but commercial printers are set apart by the fact that they usually are not specialized and can print tangible copies of most document types. They can produce a variety of materials based on what different clients need because they have a much more comprehensive set of equipment, tools, and applications.

3) Commercial printing involves letterpress, gravure, and offset techniques. Other methods sometimes are used, but these are the most common. For this our research, we have considered the Offset printing process. It starts with an engraved plate. Ink placed on the plate is transferred to a rubber blanket, and from the blanket to whatever you're printing on. The "extra" transferring of the ink to the rubber helps save some wear and tear on the plate.

4) Here, Employees are considered as Pre-Press, Press (Offset and Digital Printing Presses) and Binding and finishing section of the Commercial Printing Presses.

3.11 Sampling Plan

3.11 a) Population
Regular employees working with Commercial Printing Industries located in Pune District.

3.11 b) Sampling Frame
Commercial Printing Industries registered in Pune District served as sampling frame for the study.

3.11 c) Sampling Size
Sample size for the study was calculated using the mean method for sample size calculation using the formula

**Sample size: Determination by Mean Method**

The Mean Method was used because variables in study were measured using a 7 point measurement scale

**Formula:** \( N = \frac{z^2 \times s^2}{e^2} \)

‘Z’ is the standard score associated with **Confidence level** (95% in the current case).

Hence, Standard Scores equals to 1.96 (borrowed from Normal Table)

‘S’ is the **Variability in the data set**, computed as a ratio of range / 6.

Range is equal to 7-1 = 6 (the deviation values on the X axis of the standard normal curve, which takes in all the data, set in the study).

Hence Variability = 6 / 6 = 1

‘E’ is the **Tolerable error** = 10% (in the current study)

**Sample size:**

\[ N = \frac{(1.96)^2 \times (1)^2}{(0.1)^2} = 384 \]

Hence, A **buffer sample of 400 was finalized for current study.**

**3.11 d) Sampling Technique**

A two stage non-probability type that is Judgmental Sampling method was used for the study. In the first stage, 120 companies were randomly selected from the sampling frame, among the few are large scale commercial printing industries and remaining are small & medium scale commercial printing industries eliminating deliberately those companies where employee strength was less than 10 employees. In the second stage approximately 400 respondents were randomly chosen from the selected companies ensuring a proportionate representation of the four categories of employees i.e. Manager, Pre-Press Operator, Press Operator and Binding & Finishing Operator.

A total of 400 respondents were collected, out of which each 100 samples for Manager, Pre-Press Operator, Press Operator and Binding & Finishing Operator.
3.12 Data Collection

3.12 a) Primary Data

For Training needs, information was collected from the employees of Commercial Printing Industries through structured Questionnaire. Data regarding Assessment of Training Needs for Manager, Pre-Press Operator, Press Operator and Binding & Finishing Operator was collected through a 72 item questionnaire especially designed for the purpose.

3.12 b) Secondary Data

The secondary data was collected and compiled through various journals like International Journal of Management, Training & Development Research journals and magazines like Print World, Graphic Arts etc., Websites of Printing Machine Manufacturers companies and Printing Services providers involved in commercial printing industry. After consultation with printing production Managers, Prepress, Press and Finishing & Binding operators and Owners of Printing presses; structured questionnaires were developed to assess the Training Needs of employees in commercial printing industry.

3.13 Scale Development

3.13 a) Scale to measure Training Needs

To develop a scale for measurement of Training Needs, the researcher studied the popular definitions of the concept given by various renowned researchers and relevant organizations. From these definitions, ten common parameters of training needs were identified. These were basically the elements that collectively give shape to the concept of Training Needs. Then for each parameter a 5 to 8 item statements were developed. Utmost care was taken to ensure that the scale item of each parameter adequately captures the essence of the same. A 7-point Likert rating scale was used for each item. For the purpose of data analysis, summated rating method was used for each parameter and the multiple item scale was converted into a single item scale.
The Eleven parameters of Assessment of Training Needs and their respective indicators are as follows.

3.14 Design of Questionnaire
The researcher has used four different questionnaires for the collection of primary data from different level of respondents such as Manager, Pre-Press, Press and Finishing & Binding operators as follows.

3.14 a) Research Instrument Development
A four-page questionnaire was used as the research instrument. For assessing, the measures (statements or items) of assessment of training needs in commercial printing industry used the 7-point likert scale, as 7-point likert scale was used in many earlier studies for measurement of assessment of training needs.

3.14 b) Questionnaire for Commercial Printing Industry
This was the structured questionnaire with close ended questions to avoid the variations in the responses of the respondents. All questions were given sufficient options to record the responses of respondents. This style of questionnaire was adopted to standardize the responses.

All the questions asked in this questionnaire were formulated based on intensive and extensive literature review, expert’s opinions and pilot survey. Initial twelve questions were designed based on the objectives and hypothesis of the research study. There were categorical questions at the last of the questionnaire to understand the profile of the respondents.

The logic and rational behind formulation of respective questions are as follows.

**Question No. 1** was designed to know about the perceptions towards the influence of technological changes on training needs of employees in Commercial Printing industry. In this question eight statements were asked to the respondents about their agreement on the quality standards, use of internet, system integration, database
management system, digital printing technologies and advances in science and technology in the Commercial Printing Industry.

**Question No. 2** was designed to find out the degree of agreement of the respondents on the ‘Working Environment’ and Training Needs. In this question eight statements were asked to the respondents on transparent & open communication, recognition of hard work, role of leader, feedback procedures, quality of work output, technology & production processes and peer guidance at workplace in the Commercial Printing Industry.

**Question No. 3** was designed to know about the perceptions towards the influence of training on existing skills of employee in Commercial Printing industry after attending the training programs conducted by the organizations. In this question eight statements were asked to the respondents about their agreement on work roles, team work, production, quality, learn and share knowledge, technical skills and healthy work environment in the Commercial Printing Industry.

**Question No. 4A** was designed to find out the agreement on training in any of these areas will help to develop skills that will enhance the effectiveness of the respondents in the performance of the work. In this question eight statements were asked to the Managers about their agreement on technological developments, customer relationship management, computer skills, leadership skills, sales skills, communications skills, interviewing skills and project management skills in the Commercial Printing Industry.

**Question No. 4B** was designed to find out the agreement on training in any of these areas will help to develop skills that will enhance the effectiveness of the respondents in the performance of the work. In this question eight statements were asked to the Pre-Press Operators about their agreement on Pre-flight operations, manage assets, color management, information technology, image capturing, and image manipulate, file construction and file imposing skills in the Commercial Printing Industry.
Question No. 4C was designed to find out the agreement on training in any of these areas will help to develop skills that will enhance the effectiveness of the respondents in the performance of the work. In this question eight statements were asked to the Press Operators about their agreement on Healthy & safe working environment, material handling, ink-water balance, plate & blanket change over, drying system, quality inspection, trouble shooting and maintenance skills in the Commercial Printing Industry.

Question No. 4D was designed to find out the agreement on training in any of these areas will help to develop skills that will enhance the effectiveness of the respondents in the performance of the work. In this question eight statements were asked to the Finishing and binding Operators about their agreement on adjustment of cutters, setting of folders, lamination production quality, binding and there trouble shooting in the Commercial Printing Industry.

Question No. 5 was designed to find out the ‘Training needs realization’ and degree of agreement of the respondents on the situations given to find out the ‘Determinants of Training Needs of Employees’ in Commercial Printing Industry. In this question seven statements were asked to the respondents for Quality, Productivity, Quality inspection, Printing wastages, Promotion and Transfers in the Commercial Printing Industry.

Question No. 6 was designed to find out the preferable ‘Qualities required for Trainer’ to train the employees in Commercial Printing Industry. In this question five statements were asked to the respondents for training delivery, method of presentation, level of interaction with the participant, technical competence and use of visual aids in the Commercial Printing Industry.

Question No. 7 was designed to find out the preferable ‘specific training needs’ and ‘frequency’ of training provided to train the employees in Commercial Printing Industry. In this question eight statements were asked to the respondents for specific
job skills, motor skills, interpersonal skills, education, self and organization development, business and work ethics, attitude changes and decision making & problem solving abilities in the Commercial Printing Industry.

**Question No. 8** was designed to find out the ‘Evaluation of training’ parameters to train the employees in Commercial Printing Industry. In this question six statements were asked to the respondents for objectives of the training are clearly defined, objectives of the training are coherent, trainer met the training objective, material available on the learning platform, length of session, knowledge of trainer in the Commercial Printing Industry.

**Question No. 9** was designed to know the opinion on the ‘Training Needs based on the present competencies’. In this question six statements were asked to the respondents about the requirement of basic, core and operating skills of the employees working in the Commercial Printing Industry.

**Question No. 10** was designed to find out the preferable ‘Training methods’ used in the Commercial Printing Industry. In this question seven statements were asked to the respondents to choose the most preferable method training such as apprenticeship, job rotation, mentoring, job instructional technique, lectures and conferences, vestibule training and simulation technique in the Commercial Printing Industry.

**Question No. 11** were designed to find out the preferable ‘Duration of Training’ to accomplish specific training objectives in the Commercial Printing Industry. In this question five statements were asked to the respondents to choose the most preferable duration for training such as 1-3 days, 4 days to 2 weeks, 3 weeks to 6 weeks, 7 weeks to 12 weeks and above 13 weeks in the Commercial Printing Industry.

**3.15 Time period of the study**

Data related to assessment of training needs for employees in commercial printing (which included both primary and secondary data) was collected between October 2014 to March 2015, and the final data related to assessment of training needs for
employees in commercial (Primary data) was collected between April 2015 to December 2015.

3.16 Limitations

- The study focuses on one sector of Commercial Printing Industry. The other sectors of printing industries are not considered for the study.
- The geographical scope of the research is limited to Pune district only.
- The geographical scope of this research is Pune district only and thus, conclusions drawn from this will differ from other city or places.
- The study does not include administrative staff and temporary workers in its purview.