CHAPTER - 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

This Chapter summarizes the individual research projects which make up the entire research programme, discusses and analyses the hypotheses generated and tested during the research programme, justifies the methods selected and analyses the contribution of the Thesis as a whole.

In the main body of this thesis, presented material logically rather than in strict order of occurrence. I have therefore presented the results on the basis of the finished product, rather than on the underlying development process. In this Chapter, however, I shall describe the work as a research project, describing sub-projects undertaken, the rationale for their temporal ordering and a justification of the methods employed in each case.

In this chapter the key themes of the study are concerned. All these themes are linked with the concept of modern measurement techniques of training practices, which is the core theme of this study. We observe here that organizations generally develop the employees for which technology, HR management tools/techniques and finally HR core excellence is required to be harnessed. Keeping these points in view, some of the hypothesis have been devised, revisited and analyzed, in the chapter. The various concepts and principles are given in the succeeding paragraphs. This is followed by a discussion on the methodology of the study.

3.2 CONCEPTUAL MODEL

This conceptual model explains the variables selected for the study and how they are interlinked are shown in a diagrammatic manner. This model indicates the training effectiveness and what are the areas of training is addressed and outcome of such training as perceived by the transport corporation employees at MTC, Chennai Metro. Since the ultimate goal of training is to improve organizational performance, it is crucial to measure the success of a training program in terms of training outcomes. Trainee’s reaction was proposed as one of the outcomes in Kirkpatrick [1976]. It implied trainee’s satisfaction with, or enjoyment of, the program, which can be represented by three main components: expectation, desire, and perception [Tannenbaum, et al., 1991]. Trainee’s reaction plays an important role in building interest and attention and enhancing motivation to transfer [Patrick, 1992]. For instance, unmet expectation about one’s training may lead to low training transfer [Hicks and
Klimoski, 1987; and Tannenbaum, et al., 1991]. Fulfillment of trainee’s expectation, therefore, is one of the main reactions often subject to investigation in training research, because satisfaction with one’s learning experience is regarded as a measure of performance, and because this factor received more attention from training practitioners.

Mathieu, et al. [1992] found, however, that trainee’s reaction functioned mainly as a moderator of the relationship between training motivation and learning. Moreover, it was found to be not directly related to learning and transfer to job performance, as in, for example, Alliger, et al. [1997], Noe and Schmitt [1986], and Warr and Bunce [1995]. Eventually, Holton [1996] dropped trainee’s reaction from the list of training outcomes in his training model, in which the reaction was treated merely as an intervening factor affecting learning and training transfer. Whereas management research on trainee’s reaction to training mainly concerns satisfaction with the training material, instruction, instructors, and environment.

FIGURE NO 3.1
CONCEPTUAL MODEL
Framework for Training Effectiveness
TRAINEE CHARACTERISTICS

A wealth of empirical research focused on trainee characteristics. Researchers primarily used retention as the criterion measure for trainee characteristic studies (Baldwin & Ford, 1988). Some of the earliest studies of this type asked trainees to recall training content soon after the completion of a training intervention (Wexley & Baldwin, 1986). Other researchers collected information relative to the application and maintenance of learned skills in the work environment (Huczynski & Lewis, 1980). Initially, the researchers asked the participants about their intent to transfer their trained skills to the work environment. After four months, the researchers asked the participants about their perceptions of how successful they believed they were in transferring skills from the training intervention to their work environment. Noe (1986) also analyzed trainee characteristics and determined that the trainee motivation is a primary factor when considering training transfer.

More recently, Tziner, Haccoun, and Kadish (1991) concluded that trainee characteristics, such as motivation, were influential in trained skills transferring into the work environment. Many other researchers have reached similar conclusions (Holton, 1996; Holton & Baldwin, 2000). Trainee characteristics such as personal locus of control (Noe, 1986), individual differences (Gist, Stevens, & Bavetta, 1991), individual motivation (Bates, Holton, Seyler, & Carvalho, 2000), and motivations influencing the transfer of learning to work performance (Machin & Fogarty, 1997; Yamnill & McLean, 2001) have also been explored in the organizational-training literature. Some of the criticisms of the literature focusing on trainee characteristics include the lack of theoretical frameworks using systematic approaches to study the training transfer phenomena and the use of self-report measures of transfer which are inadequate for relating trainee characteristics to the transfer process and for establishing which training interventions have the most robust impact on transfer (Baldwin & Ford, 1988). Ford and Weissbein (1997) noted the progress that had been made in this area by recognizing studies such as Facteau et al. (1995) which utilized theoretical frameworks from relevant career development literature and expectancy theory to produce a theory-based model of pre-training factors influencing training programs and learning.

Training Program Design
Training program design received an extensive amount of attention from training and development researchers in the 1950s and 1960s. These studies generally focused on increasing training transfer by improving the design of training content. Thorndike & Woodworth (1901) were two of the first researchers to advocate the use of identical elements--incorporating identical stimulus-response elements in the learning and transfer environments. Crafts (1935) and Underwood (1951) also recommended this approach to improving training content design. McGehee & Thayer (1961) suggested teaching general principles, the rules underlying training content, as a method of improving training design. Many other researchers examined this method as well (see, for example, Cominsky, 1982; Crannel, 1956; Forgus & Schwartz, 1957;). Some researchers examined the use of stimulus variability—the presentation of salient training stimuli in a variety of ways—to increase training transfer through improved training content (Baldwin, 1987; Duncan, 1958; Ellis, 1965).

Another empirically researched principle for improving training content included utilizing various conditions of practice (Briggs & Naylor, 1962; Naylor & Briggs, 1963; Wexley & Thornton, 1972). Specifically, this technique included using distributed sessions, effective feedback, and overlearning in the training environment. Baldwin and Ford (1988) identified two basic limitations in these types of studies: (1) the tasks used limited the researcher(s)’ ability to generalize beyond short-term, basic motor tasks and information recall training; and (2) the researchers in these studies used learning and short-term retention as criterion measures and they did not examine the direct effect of training-design factors on training outcomes and relate those outcomes to conditions of transfer.

While Ford and Weissbein (1997) acknowledged that progress has been made in these areas in their updated review of the relevant organizational-training literature, the use of overall measures of effectiveness in lieu of analyzing specific dimensions of transfer remained a serious problem that needs to be address in the literature. [They cite Baldwin (1992) as an example of a study that began using more complex tasks, diverse samples, and longer time intervals between training intervention and criterion assessment to more effectively demonstrate transfer.]

**Work Environment**
The work environment has been the subject of many empirical organizational-training studies. Some of the earliest studies used large-scale surveys to examine variables such as leadership climate (Fleishman, 1953), work climate (Baumgartel, Pathan, & Reynolds, 1984), and supervisory support (Huczynski & Lewis, 1980). More recent studies have provided evidence that management support, given prior to and post-training intervention, leads to greater transfer of training (Brinkerhoff & Montesino, 1995). Broad & Newstrom (1992) suggest supervisor support, and transfer partnerships among trainee, trainer, and manager are of central importance in enhancing transfer of learning. Richman-Hirch (2001) examined the effectiveness of two post-training interventions—goal setting and self-management training—and their potential in helping trainees avoid inhibitors to transfer in the work environment.

Baldwin and Ford (1988) identified two major criticisms of the organizational-training literature regarding work environment variables and their impact on training transfer. The first was the need to identify key work-environment variables and to operationalize these variables. While the authors supported the empirical evidence that work environment factors such as managerial support, transfer climate, and opportunity to use trained skills on the job are important variables influencing transfer, they also concluded that these factors were multidimensional in nature and needed to be operationalized in order to establish causality between work-environment factors and behavioral changes.

**FACTORS AFFECTING TRAINING EFFECTIVENESS**

Above reviews were about how to measure training effectiveness now we will discuss the literature which will explore the factors affecting training effectiveness. In the real world, there are many factors that influence the effectiveness of training and development in an organization. One similar factor i.e. the human resource policy of training and development has been identified by Haywood (1992). He mentioned that too many training programmes place emphasis on ease and the purpose behind the design of programs namely learning, skill development and behavioral change, has defeat the original purpose and goals of training are lost. Everything is affected by its surrounding weather directly or indirectly and similarly training effectiveness is also affected by many factors. Birdi (2005) found that poor managerial support or an unfavorable departmental climate could limit the impact of creativity training with regard to influencing idea implementation. Unfavorable environment
affects the training effectiveness. According to him training will be affected negatively if there is less support from department or there is unfavorable condition for training. Fischer & Ronald (2011) stated that open-mindedness is also a significant moderator of training effectiveness. It has been found that training become more successful if the participants and trainer work with open-mindedness. Driskell (2011) concluded in his study that type of training implemented, training content and trainee expertise also affect the training outcomes. Success of a training programme always depends on how the training was given, what was the content and who was the trainer. Haslinda & Mahyuddin (2009) found that lack of support from top management and peers, employees’ individual attitudes, job-related factors and also the deficiencies in training practice are the main factors which affect the effectiveness of training. If there will be less support from top management and peers, job is not going well or somehow there is problem in job and absence of training practice then there is less chance of effective training programme. Beigi & Shirmohammadi (2011) found that emotional training have significant impact on service quality. It means there is a relationship between behavior and learning, and service industry can be benefitted by emotional training because service industry is basically related to marketing and verbal communication. Saks & Haccoun (2007) discussed that psychological states of trainees especially motivation, self-efficacy, perceived control and the realities of the organizational context affects the training outcomes. Tai (2006) also concluded about general self-efficacy that it partially arbitrated the relationship between training framing and training motivation and consequently influenced training outcomes. On the other hand Black & Mendenhall (1990) explained that cross-cultural skill development, adjustment and performance are three primary dependent variables of cross culture training effectiveness.

Human resource is the very important and the People learn from their practical experience much better as compare to bookish knowledge. On the job training reduces cost and saves time (Flynn et al., 1995; Kaynak, 2003; Heras, 2006). It is better for the organizations to give their employees on the job training because it is employees development and the employee development encourage self-fulfilling skills and abilities of employee, decreased operational
costs, limits organizational liabilities and changing goals & objectives (Donald Nickels, M.A., 2009).

Kupritz (2002) recently identified workplace design as an organizational factor that may contribute to transfer. Workplace design includes building design, interior and exterior features, and surrounding landscapes. Sundstrom (1985) describes workplace design as the “layout and appearance of buildings, the arrangement and properties of rooms, characteristics of equipment and furniture, and the associated ambient conditions (sound, light, temperature, air)” p. 174. While Gans (1968) suggests that the design of workspaces can have a supportive or unsupportive effect on workplace behaviors, Becker (1981) proposes direct support of work tasks and facilitating organizational outcomes as two important ways workplace design contributes to organizational effectiveness.

Kupritz (2002) examined trainee perceptions of organizational factors impacting newly acquired supervisory skills. The study determined that office workers perceived workplace design to be an important organizational factor affecting their ability and opportunity to perform newly acquired supervisory skills. Physical enclosure, layout, furniture, flexibility, ergonomic design, and acoustical privacy were some of the design features identified by study participants as impacting transfer. Workplace design perceived to impede transfer and workplace design perceived to facilitate transfer ranked first and second, respectively, in cumulative frequencies for elicited responses regarding organizational factors impacting transfer.

The contemporary view of the physical environment as part of organizational context can be described as strategic (Becker, 1981; Stokols, 1986). Buildings and other physical structures of organizations are identified as critical assets for implementing organizational strategies and achieving corporate goals. Other researchers have investigated the cost benefit of supportive physical environments and determined that there are significant productivity gains and paybacks, as much as 5 percent of the average worker’s annual salary, which can be associated with supportive workplace design (Brill, Margulis, Konar, & BOSTI Associates, 1985; Brill, 1993). This estimate is supported by 30 years of environment and behavior (EB) research and theory that supports workplace design as an essential element of organizational context and its role in facilitating or impeding all levels of individual and organizational performance (Brookes & Kaplan, 1972; Brill, Margulis, Konar, & BOSTI Associates, 1984,

3.3 DEFINITION OF KEY CONCEPTS

**Human resource management** is the way organizations manage their staff and help them to develop (McCourt & Eldridge 2003, 2) in order to be able to execute organizations’ missions and goals successfully.

**Human resource development** is the integration of individual, career and organization development roles in order to achieve maximum productivity, quality, opportunity and fulfillment of organizations members as they work to accomplish the goals of the organization (Pace, Smith & Mills 1991, 6).

**Training** is a type of activity which is planned, systematic and it results in enhanced level of skill, knowledge and competency that are necessary to perform work effectively (Gordon 1992).

**Development** is a broad ongoing multi-faceted set of activities (training activities among them) aimed at bringing someone or an organization up to another threshold of performance, often to perform some job or a new role in the future (McNamara 2008).

**Employee performance** is defined as the outcome or contribution of employees to make them attain goals (Herbert, John & Lee 2000) while performance may be used to define what an organization has accomplished with respect to the process, results, relevance and success Uganda National Development Program (1995). Afshan et al. (2012) define performance as the achievement of specific tasks measured against predetermined or identified standards of accuracy, completeness, cost and speed. Employee performance can be manifested in improvement in production, easiness in using the new technology, highly motivated workers.

3.3.1 UNIT OF ANALYSIS:

**Training Needs Analysis**

Training is an expensive process not only in terms of the money spent on it but also the time and the other resources spent on the same. The most important question therefore is determining whether or not a need for training actually exists and whether the intervention will contribute to the achievement of organizational goal directly or indirectly? The answer to
the above mentioned question lies in ‘training needs analysis’ which is the first step in the entire process of training and development.

Training needs analysis is a systematic process of understanding training requirements. It is conducted at three stages - at the level of organization, individual and the job, each of which is called as the organizational, individual and job analysis. Once these analyses are over, the results are collated to arrive upon the objectives of the training program.

Another view of the training need is that, it is the discrepancy between ‘what is’ and ‘what should be’. Taking cues from this the world bank conducted a needs analysis and arrived upon the conclusion that many of its units in eastern regions of Europe required transformation from state owned business to self-sustaining organizations. A number of universities were then contacted to develop the necessary modules and conduct the training upon the same.

Although each step in the entire training process is unique in its own, needs analysis is special in that it lays the foundation for the kind of training required. The assessment gives insight into what kind of intervention is required, knowledge or skill or both. In certain cases where both of these are present and the performance is still missing then the problem may be motivational in nature. It thus highlights the need and the appropriate intervention which is essential to make the training effective. As mentioned earlier, the needs analysis / assessment is carried out at three levels - organizational, Individual and Job. We now take up each one of them in detail.

**Organizational Analysis**

The organizational analysis is aimed at short listing the focus areas for training within the organization and the factors that may affect the same. Organizational mission, vision, goals, people inventories, processes, performance data are all studied. The study gives cues about the kind of learning environment required for the training. Motorola and IBM for example, conduct surveys every year keeping in view the short term and long term goals of the organization.

**Job Analysis**

The job analysis of the needs assessment survey aims at understanding the ‘what’ of the training development stage. The kind of intervention needed is what is decided upon in the job analysis. It is an objective assessment of the job wherein both the worker oriented -
approach as well as the task-oriented approach is taken into consideration. The worker approach identifies key behaviors and ASK for a certain job and the task-oriented approach identifies the activities to be performed in a certain job. The former is useful in deciding the intervention and the latter in content development and program evaluation.

**Individual Analysis**

As evident from the name itself, the individual analysis is concerned with who in the organization needs the training and in which particular area. Here performance is taken out from the performance appraisal data and the same is compared with the expected level or standard of performance. The individual analysis is also conducted through questionnaires, 360 feedback, personal interviews etc. Likewise, many organization use competency ratings to rate their managers; these ratings may come from their subordinates, customers, peers, bosses etc. Apart from the above mentioned organization also make use of attitude surveys, critical Incidents and Assessment surveys to understand training needs which will be discussed in detail.

Many needs assessments are available for use in different employment contexts. Sources that can help you determine which needs analysis is appropriate for situation are described below.

**Organizational Analysis:** An analysis of the business needs or other reasons the training is desired. An analysis of the organization's strategies, goals, and objectives. What is the organization overall trying to accomplish? The important questions being answered by this analysis are who decided that training should be conducted, why a training program is seen as the recommended solution to a business problem, what the history of the organization has been with regard to employee training and other management interventions.

**Person Analysis:** Analysis dealing with potential participants and instructors involved in the process. The important questions being answered by this analysis are who will receive the training and their level of existing knowledge on the subject, what their learning style is, and who will conduct the training. Do the employees have required skills? Are there changes to policies, procedures, software, or equipment that require or necessitate training?

**Work analysis / Task Analysis:** Analysis of the tasks being performed. This is an analysis of the job and the requirements for performing the work. Also known as a task analysis or job analysis, this analysis seeks to specify the main duties and skill level required. This helps
ensure that the training which is developed will include relevant links to the content of the job.

**Performance Analysis:** Are the employees performing up to the established standard? If performance is below expectations, can training help to improve this performance? Is there a Performance Gap?

**Content Analysis:** Analysis of documents, laws, procedures used on the job. This analysis answers questions about what knowledge or information is used on this job. This information comes from manuals, documents, or regulations. It is important that the content of the training does not conflict or contradict job requirements. An experienced worker can assist (as a subject matter expert) in determining the appropriate content.

**Training Suitability Analysis:** Analysis of whether training is the desired solution. Training is one of several solutions to employment problems. However, it may not always be the best solution. It is important to determine if training will be effective in its usage.

**Cost-Benefit Analysis:** Analysis of the return on investment (ROI) of training. Effective training results in a return of value to the organization that is greater than the initial investment to produce or administer the training.

**Principle of Assessment:** Use assessment instruments for which understandable and comprehensive documentation is available.

**Kirkpatrick’s Model of Training Evaluation**

Organizations spend a huge amount of money for training their employees at various levels and on various competencies, behavioural and technical. Every year new tools are designed to try and cater to individual learning styles and make the training more effective. After all an organization is concerned about its spending and the return on the same!

Donald Kirkpatrick, professor emeritus, university of Wisconsin began working on evaluating the effectiveness of training very early in his life. His early work on the same was published in the year 1959 in a journal of American Society of Training Directors. He laid out four levels for evaluation of any training. This model is arguably the most widespread for evaluation in use. It is simple, very flexible and complete. The four levels as described by Kirkpatrick are as follows:

1. **Reaction of the Trainee -** thoughts and feelings of the participants about the training.
2. **Learning -** the increase in knowledge or understanding as a result of the training.
3. Behaviour - extent of change in behaviour, attitude or capability
4. Results - the effect on the bottom line of the company as a result of the training.

The fifth level which is the ROI has been recently added which is not but a part of the original model. The graphic description is as follows:

The beauty of the model is that each level can only be predicted when the lower level prediction is complete. Thus evaluation at the level of behaviour may not be useful unless evaluation at the knowledge has been completed.

**Reaction**
Reaction implies how favourably the participants have responded to the training. This evaluation is primarily quantitative in nature and is a feedback to the training and the trainer. The most common collection tool is the questionnaire that analyses the content, methodology, facilities and the course content.

**Learning**
At the level of learning the evaluation is done on the basis of change in the ASK (Attitudes, skills and knowledge) of the trainees. The evaluation involves observation and analysis of the voice, behaviour, text. Other tools used apart from the observation are interviews, surveys, pre and post tests etc.

**Behaviour**
Behaviour evaluation analyses the transfer of learning from the training session to the work place. Here the primary tool for evaluation is predominantly the observation. Apart from the observation, a combination of questionnaires and 360 feedbacks are also used.

**Results**
The results stage makes evaluations towards the bottom line of the organization. Here the definition of the results depends upon the goal of the training program. The evaluation is done by using a control group allowing certain time for the results to be achieved.

There are many other models that are unique in their own ways, nut as mentioned earlier Kirkpatrick’s Model is the one that is accepted and used widely across all industries and with wider applications.


3.3.2 JUSTIFICATION AND QUANTITATIVE APPROACH:

Training can reduce real costs and have a positive impact on an organization in numerous ways. Too often however, Metropolitan Transport Corporation professionals are not equipped to justify training. The examples presented in this post can be utilized in real-world settings to illustrate and justify the value of training.

Cost avoidance is an excellent way to justify training, as the education provided by Infoblox Education Services can be immediately put to use on initial implementations as well as on managing subsequent changes due to evolving business requirements. Without training, organizations are left to rely on outside implementation services, which, while providing immense value on large projects, will considerably add to project expense. An investment in training from Infoblox Education Services will reduce these expenses and provide a compelling ROI that will meet the scrutiny of financial decision makers.

Avoiding or lessening the costs of using external resources is a very reasonable approach to justifying training. Using trained internal FTEs over outside contractors is usually significantly more cost effective for many projects, especially projects that will require additional work after the initial implementation.

The Info lox model is based on costs for ILT Info lox training taken from the 2016 Info lox Catalog for U.S.-based public training. The numbers, except for training course costs, are illustrative and can be used without modification. However, license, support, implementation costs, project NPV, and T&E costs can be modified if greater scrutiny is required. Additionally, the amount of training can be modified to match the organization’s requirements as the model uses the most basic, entry-level training for Inoblox roles of Administrator.


The first step in any systematic training needs assessment is to differentiate training wants from true training needs. A true training need exists when specific job knowledge, skills or abilities (KSAs) are important to a position and/or job level and the employee’s competence or proficiency level is moderately low or low. A training want may arise when specific KSAs are less important or critical to the job and an employee’s proficiency is also low.
A well designed competency based training needs assessment questionnaire can assist in identifying true training needs of an organization. This article discusses a quantitative survey approach to assessing training needs. It introduces a nine-step approach for identifying training needs and provides a sample competency based survey to assist practitioners in conducting organizational training needs assessment.

The two main measurement domains on the training needs assessment questionnaire include importance and proficiency. Importance is defined as the relevance of the KSA in a particular position or job level to ensure effective performance. Proficiency is defined as employee’s current level of knowledge or ability in each of the competencies identified as being at all relevant to the position.

To get a quantitative measure of the training need, separate ratings of importance and proficiency are collected by incumbents and managers on a set of job related competencies (these can be initially identified by interviews or focus groups with subject matter experts, incumbents). A “critical training need index” is calculated by multiplying the importance rating by the proficiency rating for each competency included in the training needs assessment questionnaire. Competencies are then ranked according to the “critical training need index” (product of importance by proficiency scores) to determine those most critical to address for future training and development interventions. A convergent approach can also be used by comparing the “critical training index” competency rankings of incumbents to the rankings of management.

A comprehensive training needs assessment process includes the following nine steps:

1. Step 1: Conducting a job profile with subject matter experts and incumbents to identify critical knowledge, skills, abilities and competencies.
2. Step 2: Developing a competency based training needs survey instrument measuring both importance and proficiency.
3. Step 3: Administering the training needs survey to incumbents and/or managers.
4. Step 4: Analyzing the survey by calculating and ranking the critical training needs index (importance X proficiency).
5. Step 5: Interpreting the survey results and using appropriate statistical techniques to compare incumbent and manager ratings.
6. Step 6: Using targeted focus groups to further interpret and clarify specific training needs for the future;
7. Step 7: Providing written and oral feedback to internal client(s) about the results of training needs assessment.
8. Step 8: Developing behavioral based training objectives based on the survey results.

At the organizational level, outcomes have been investigated from an Organizational and Human Resource Development [HRD] perspective. This is influenced by human capital theory (Davenport, 1999) which perceives employees as organizational assets whose value is based on their skills, knowledge and competence. As a result, investment into education and training should lead to increased productivity and is crucial to organizational effectiveness. One empirical study which surveyed just under 1,000 organizations in the US demonstrated that investment into development and training predicts higher productivity, lower turnover and improved financial performance (Huselid, 1995). Guzzo, Jette and Katzell (1985) used analytic techniques to investigate the impact of `high performance work practices', Increasingly, there is an emphasis on development which is seen as wider, broader, and more future-directed and career related than training. This has resulted in a growing body of research on employee and management development which has sprung from diverse theoretical orientations, such as organizational and individual competence, self-awareness, feedback effects and participation in development activities. However, such research has not yet fully demonstrated the validity of employee and management development (Latham & Seijts, 1998). It appears that we still know little about the effects of a diverse range of development activities, such as development centers, developmental appraisals, multi-source feedback or coaching and mentoring on individuals and organizations. This lack of evidence for the construct and predictive validity may be due to the split in theory and methodology between training and development, and the diverse approaches to the latter.

**Need to achieve**

One motivational construct that has been researched extensively in organizational psychology in general, but perhaps to a lesser extent in the context of learning or training, is need to achieve. Researchers have observed over the years that some people appear ambitious whereas others are not so concerned about their achievement(s). This phenomenon
prompted David McClelland and colleagues at Harvard University to conduct extensive, mainly laboratory based research. They proposed as a distinct human motive that can be clearly distinguished from other needs (McClelland, 1967): nAch refers to individuals' motivation to achieve or exceed a recognised external standard which implies two conditions. First, individuals have internalised an external standard which they accept as representing personal achievement or fulfilment. Secondly, individuals strive to achieve this fulfilment. Individuals high in need to achieve are thought to behave differently (if they have control over the outcome) by setting themselves difficult but achievable goals, and by preferring to work on a problem, rather than leaving the outcome to chance. In the domain of training authors have treated as a stable personality trait (Colquitt, et al., 2000). However, research from other areas has shown that levels of change as a result of psychological interventions. It is tenable that levels of niche are also liable to the influence of psychological interventions or indeed other psychological variables in the context of training or development research. One study on training effectiveness demonstrated that levels of interact with other variables as those high in are more motivated to learn (Mathieu, Martineau&Tannenbaum, 1993). Similarly Steers (1975) found a positive correlation between the amount of feedback received and performance for those high in nAch when researching feedback effects. Niche is relevant for the prediction of training but may also be associated with development outcomes, as it implies a concern for personal achievement rather than for extrinsic rewards (such as praise, promotions or salary increases).

3.3.3 INSTRUMENTATION:

The instrumentation course involves an extensive understanding of current loops and the devices typically found on them. Candidates look in detail at the devices used to measure temperature, pressure, level and flow, and briefly at control valves, load cells, turbidity, density and PH.

An instrument is a device that measures a physical quantity such as Flow, Temperature, Level, Pressure, Distance and Angle. Instruments may be as simple as direct reading thermometer or may be complex multi-variable process analyzers. Instruments are often part of a control system in refineries, factories, and vehicles. The control of processes is one of the main branches of applied instrumentation. Instrumentation can also refer to handheld devices that measure some desired variable. Diverse handheld instrumentation is common in
laboratories, but can be found in the household as well. For example, a smoke detector is a common instrument found in most western homes.

Instruments attached to a control system may provide signals used to operate solenoids, valves, regulators, circuit breakers or relays. These devices control a desired output variable, and provide either remote or automated control capabilities. These are often referred to as final control elements when controlled remotely or by control systems.

A Transmitter is a device that produces an output signal, often in the form of a 4 - 20 mA electrical current signal, although many other options using voltage, frequency, pressure are possible. This signal can be used for informational purposes, or it can be sent to a PLC, DCS, SCADA,ESD/SIS,FGS system, or other type of computerized controller, where it can be interpreted into readable values and used to control other devices and processes in the system.

Cost Benefit Analysis for Training

As discussed in previous articles, it is very important to evaluate the benefits of the training and be able to put that in terms of numbers. Training comes at a cost and therefore any organization would be interested in knowing the return on investment (ROI).

Organizations use different methods to assess the benefits of training in terms of numbers i.e. the profits. Some of the frequently used methods are ROI and Utility analysis. There are many costs that are associated with the training apart from the direct and apparent costs. These costs can be described under two headings:

There are costs incurred towards the training needs analysis, compensation of the training program designers, procurement of training material and various media like the computers, handouts, props, gifts and prizes, audio visuals etc. Then there is another category is costs incidental to the training session itself such as trainers fee / salary, facility costs / rental etc.

Finally there are costs involved is losing a man day of work (for those who are sent for training), travelling, boarding and lodging and training material that cannot be reused in some other training program.

The various models that are used to estimate the benefits of the training program are as under.

The Return on Investment Model (ROI)
Organizations spend huge amount of money on employee development, it is therefore very important to ascertain the benefits of training. Different studies were conducted to evaluate the effectiveness of training programs. In one of the studies it was found out that sales and technical trainings gave better ROI compared to managerial training programs. Ford, for example, evaluates all the training programs against the profitability in a given product line. The basic formula for calculating the ROI for training is as:

\[
\text{ROI (in percent)} = \frac{\text{Program benefits}}{\text{Costs}} \times 100
\]

Let’s assume that the total costs incurred towards a certain training is Rs 80,000/- all inclusive and the benefits in terms of overall improvement in productivity and quality are Rs 4, 00,000/-. Thus the ROI is 525 %, which means for each rupee invested the return in Rs 5.25 Over and above the cost of the program.

This problem however relies upon the assessment of benefits from outside, sometimes which requires that non financial benefits may be converted into financial benefits. This requires precision and the sources have to be credible.

**Utility Analysis**

This is another way of reflecting upon the usefulness of a training program. Utility itself is a function of the duration up to which the training leaves an impact upon the trainee, the relative importance of the training program, the importance of the position or profile that received training and the cost of conducting the training. For example leadership programs conducted for top and middle management tend to be high on value where as sales training programs for the front line sales staff tends to be low on value scale.

Utility analysis basically derives the effectiveness from analyzing the change in the behavior of the trainee and the positive financial implications of the same. This model is not very famous because the deductions made are essentially subjective in nature.

**3.3.4 INSTRUMENTS TO MEASURE POST TRAINING EFFECTIVENESS**

Evaluation is not just for the trainers and learning professionals, it’s for the adult learner, the middle managers and everyone involved in the process of training and development – Even more important, in today’s recession, training is unfortunately one of the first areas in a business to be trimmed or cut. So we have to have an effective instrument to evaluate post training, showing the people who “hold the purse strings” the value training and development plays in organizations.
Instruments include feedback, Donald Kirkpatrick’s training evaluation model, and Bloom’s taxonomy of learning domains are invaluable in post training evaluation. Here is that may want to look at to explore more evaluation tools.

Learners and trainers alike benefit from evaluation at the end of training; it is reinforcement for both parties. As we end the training remembers to try and be positive and give constructive criticism try and show the positive outcomes and if there are negative outcomes discuss these in a positive manner.

There are several ways to evaluate training from surveys, interviews, performance reviews etc. One important thing to keep in mind is follow-up, make sure each training is followed up at intervals of 3, 6, 12 months and depending on the extent of the training might want to follow up at 24 months. (This could be useful when doing an ROI).

3.3.5 DEVELOPING MEASUREMENT INSTRUMENTS

Requirements
- Clearly define the construct of the measurement instrument;
- Conduct a pilot study to test the measurement instrument;
- Determine the validity of the measurement instrument.

Documentation
- Clear description of the construct
- Old and new versions of items
- Formulation why certain scorings were chosen
- Results of pilot testing
- Final version of the measurement instrument

Responsibilities

Project leaders:
- Decide whether a new measurement instrument is necessary to develop;
- Inspect the defined construct by reading and adding comments;
- Evaluate each step in the development of the instrument with the executing researcher;
- Ensure that pilot tests are executed.
- Ensure that the measurement instrument is carefully evaluated.

Executing researcher:
- Define a clear construct;
- Chose for appropriate measurement method;
- Search, select and formulate clear items;
- Chose scoring system carefully;
• Perform pilot tests in a small group of the selected population and make sure to adapt the instrument wherever needed;
• Evaluate the instrument according to the ‘Evaluating instruments’ guidelines.

When there is no instrument available that measures the construct of interest, you may decide to develop a measurement instrument yourself. Therefore, the following steps need to be performed:

Step 1: Definition and elaboration of the construct intended to be measured

The first step in instrument development is conceptualization, which involves defining the construct and the variables to be measured. Use the International Classification of Functioning, Disability and Health (ICF) (WHO, 2011) or the model by Wilson and Clearly (1995) as a framework for conceptual model. When the construct is not directly observable (latent variable), the best choice is to develop a multi-item instrument (De Vet et al. 2011). When the observable items are consequences of (reflecting) the construct, this is called a reflective model. When the observable items are determinants of the construct, this is called a formative model. When you are interested in a multidimensional construct, each dimension and its relation to the other dimensions should be described.

Step 2: Choice of measurement method (e.g. questionnaire/physical test)

Some constructs form an indissoluble alliance with a measurement instrument, e.g. body temperature is measured with a thermometer; and a sphygmomanometer is usually used to assess blood pressure in clinical practice. The options are therefore limited in these cases, but in other situations more options exist. For example, physical functioning can be measured with a performance test, observations, or with an interview or self-report questionnaire. With a performance test for physical functioning, information is obtained about what a person can do, while by interview or self-report questionnaire information is obtained about what a person perceives he/she can do.

Step 3: Selecting and formulating items

To get input for formulating items for a multi-item questionnaire could examine similar existing instruments from the literature that measure a similar construct, e.g. for different target population, and talk to experts (both clinicians and patients) using in-depth interview techniques. In addition, should pay careful attention to the formulation of response options, instructions, and choosing an appropriate recall period (Van den Brink & Mellenbergh, 1998).
Step 4: Scoring issues

Many multi-item questionnaires contain 5-point item scales, and therefore are ordinal scales. Often a total score of the instrument is considered to be an interval scale, which makes the instrument suitable for more statistical analyses. Several questions are important to answer:

How can calculate (sub) scores? Add the items, use the mean score of each item, or calculate Z-scores.

Are all items equally important or will use (implicit) weights? Note that when an instrument has 3 subscales, with 5, 7, and 10 items respectively, the total score calculated as the mean of the mean score of each subscale differs from the total score calculated as the mean of all items.

How will deal with missing values? In case of many missing’ (>5-10%) consider multiple imputation.

Step 5: Pilot study

Be aware that the first version of the instrument develop will (probably) not be the final version. It is sensible to (regularly) test instrument in small groups of people. A pilot test is intended to test the comprehensibility, relevance, and acceptability and feasibility of measurement instrument.

Step 6: Field-testing

See guideline Evaluation of measurement properties.

3.4 VARIABLE MEASUREMENT

Variables are first defined by conceptual definitions. These are definitions that explain the concept the variable is attempting to capture.

Second, variables are defined by operational definitions. These are definitions of how the variable will be measured in practice.

For example, the variable "work effort" can be defined conceptually as the amount of effort required to do the work, including speed, hardness, effort, dexterity, and repetitiveness. Each of these aspects must have an operational definition if it is to be measure.

There are different levels of measurement. These levels differ as to how closely they approach the structure of the number system we use. It is important to understand the level of measurement of variables in research, because the level of measurement determines the
type of statistical analysis that can be conducted, and, therefore, the type of conclusions that can be drawn from the research.

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In order to do an analysis, the variables have to be quantified; this means measuring giving values and scale. Sometimes identification of variables and determining how to measure them looks quite simple, but due to vaguely defined variables measuring can be difficult too.

There are four levels of measurements on a continuum of discrete and continuous: nominal-scale, ordinal-scale, interval scale and ratio-scale. Nominal scale is used when the variables can be categorized but cannot be ranked. E.g. gender, marital status, Department Where Employed, Designation, Education Qualification etc. Ordinal scale is one were the variables are categorized that can be ranked. Eg. Levels of pain mild, moderate or severe. Interval scale measures equal numerical distances between the intervals. It can be categorized, as well as ranked. Eg. How long have been working with the Metropolitan Transport Corporation. So the interval is of working experience in both the categories. Ratio scale measures variables which can be categorized, ranked, have equal intervals and can represent a continuum of values. Thus, the most difficult part of planning a research study is identifying the research variables and research design. Considerable time and thought needs to be given to this step.

Once the key variables have been identified, then the research study can be developed.

3.4.1 THE LEVEL OF ORGANIZATION TRAINING - DEPENDENT VARIABLE:

Dependent variable not under the experimenter’s controls usually the outcome to be measured. Typically, we are interested in measuring the effects of independent variables on dependent variables. On the job training help employee to improve and get insight knowledge about the job. Individuals always learning a better way from their own experiences.

Training is crucial for organizational development and its success which is indeed fruitful to both employers and employees of an organization. Here are some important benefits of training and development.
• Increased productivity
• Less supervision
• Job satisfaction
• Skills Development

3.4.2 INDEPENDENT VARIABLE:
A variable in a functional relation whose value determines the value or values of other variables, as \( x \) in the relation \( y = 3x^2 \).

1. Name
2. Age
3. Gender

3.4.3 INTERVENING VARIABLE:
The original relationship between the independent and dependent variable vanished when the possible intervening variable was controlled for, concluded that the control variable really was an intervening variable that helped to explain the link between the independent and dependent variables.

• Training practices
• Evaluation of training programme
• Model is used in organization for evaluation of training
• Management development training areas
• Training objectives communicated to employees
• Equipment’s & facilities
• Benefits and effects of the training course
• Department where employed
• Designation
• Education qualification
• Time period working with the Metropolitan Transport Corporation
• Barriers of training in the order of their impact
• Training as a part of organizational strategy
• Performance appraisal
• Properly trained in the evaluation methodology
3.4.4 MODERATING OR MEDIATING VARIABLE:
A moderating variable, also called a moderator variable or simply m, changes the strength or direction of an effect between two variables x and y. In other words, it affects the relationship between the independent variable or predictor variable and a dependent variable or criterion variable.

- Types of training programme
- Management development training areas
- Opportunity for application of training
- Metropolitan Transport Corporation analyze training needs periodically
- Employees satisfied with the training practices in Metropolitan Transport Corporation
- Training areas
- Valuable to career

3.5 DATA CAPTURING
This section requires the specification of information needed to address the objectives of the research listed in chapter 1. Data that had been collected from the employees of the Metropolitan Transport Corporation. The Employees are divided into two parts. The first part requires data regarding the demographic profile of the respondents and the data regarding the various determinants that influence on the effectiveness of training programme along with the moderators on performance of the employees.

3.6 SOURCES OF DATA
Data and Sources
Both types of data viz., secondary and primary have been used in this study. The secondary data were at first collected from the secondary sources such as books, journals, records etc. The primary data were collected from the 1100 employees of Metropolitan Transport Corporation Limited at Chennai.

Interview Schedule
An interview schedule has been prepared to collect the data from the sample employees of Metropolitan Transport Corporation Limited at Chennai. Formerly, it was pre tested among 100 employees of Metropolitan Transport Corporation Limited at Chennai. On the basis of experience gathered at the time of pre testing, the questions of the schedule were modified accordingly.

**Framework of Analysis**

As the present research is a survey in nature the primary data were analyzed carefully. Studying about training effectiveness of the sample employees of Metropolitan Transport Corporation in their organization has been possible in the beginning section of the analysis. For this, data relating to the socio economic profile, designation, skill sets required for the employees of Metropolitan Transport Corporation Limited were used.

**SOCIO-DEMOGRAPHIC VARIABLE:**

Socio-demographic characteristics include, for example, age, sex, education, migration background and ethnicity, religious affiliation, marital status, household, employment, and income. Different index variables are formed on the basis of socio-demographic variables.

- Name
- Age
- Gender
- Management development training areas
- Opportunity for application of training
- Benefits and effects of the training course
- Management development training areas

**3.7 POPULATION SAMPLE:**

A sample size of 1100 employees was chosen for this study. The samples includes employees across different organizational levels, working in different branches and workshops of the Metropolitan Transport Corporation Limited, and having at least 2 years of relevant experience, in the area of work.

For the study, I have opted for stratified random sampling methods. The employees are targeted in a strata or group. From each group sample respondents are selected through simple random sampling method.
Pilot Study
A pilot study was conducted at the initial stage on January 2017 in order to know the possibility and scope for this study. During the pilot study, it was felt that the employees of Metropolitan Transport Corporation Limited are not familiar with the training effectiveness in their Organization. Their involvement and participation were intensive but they had little idea about the outcome of such training. On the basis of perception of this in the pilot study, the present research was undertaken at full fledged scale.

3.7.1 DATA COLLECTION PROCEDURE:
Dimensions of the Study
Apart from the demographic and socio economic aspects of the employees of Metropolitan Transport Corporation Limited, the present study takes the problems, motivation and success factors of the training effectiveness as the dimensions of research. These dimensions are split into various sub-dimensions in the analysis section of the research.

Sampling Technique
A sample size of 1100 employees was chosen for this study. The samples includes employees across different organizational levels, working in different branches and workshops of the Metropolitan Transport Corporation Limited, and having at least 2 years of relevant experience, in the area of work.

For the study, the sampling methodology opted for was stratified random sampling methods. The employees are targeted in a strata or group. From each group sample respondents are selected through simple random sampling method. The various depots of MTC located are divided into four groups, from each group samples drawn based on simple random sampling method.

Pilot Study
A pilot study was conducted at the initial stage on January 2017 in order to know the possibility and scope for this study. During the pilot study, it was felt that the employees of Metropolitan Transport Corporation Limited are not familiar with the Organization. Their involvement and participation were intensive but they had to meet loss or earn a little profit. On the basis of perception of this in the pilot study, the present research was undertaken at full fledged scale.

3.7.2 THE PROCEDURES FOR ANALYSIS OF DATA
Interview Schedule
An interview schedule has been prepared to collect the data from the sample employees of Metropolitan Transport Corporation Limited at Chennai. Formerly, it was pre tested among 100 employees of Metropolitan Transport Corporation Limited at Chennai. On the basis of experience gathered at the time of pre testing, the questions of the schedule were modified accordingly.

Framework of Analysis
As the present research is a survey in nature the primary data were analyses carefully. Studying about training effectiveness of the sample employees of Metropolitan Transport Corporation Limited in their organization has been possible in the beginning section of the analysis. For this, data relating to the socio economic profile, designation, skill sets required for the employees of Metropolitan Transport Corporation Limited were used.

Analytical Tools
Apart from the percentage, chi square test, ANOVA test, Friedman rank test, Structural Equation Modeling, Factor Analysis and other relevant tools were used to make interpretations from the analysis of data. For, this, SPSS 22 and AMOS, has been utilized.

Presentation of Analysis
The analysis part has two sections such as general or simple analysis with the help of percentages. In this section, the analysis is presented in the order of questions of the questionnaire. The demographic and socio economic dimensions are given in a comprehensive table briefly. The second section consists of statistical analysis where the advanced statistical techniques are used to test the hypotheses.

Measurement and Scaling Technique Used
Perception towards the effectiveness of training, skills required, knowledge of the employees of Metropolitan Transport Corporation are measured with the help of five point scale such as

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree
Perception towards the satisfaction of the employees of the Metropolitan Transport Corporation are measured with the help of five point scale such as

- Highly dissatisfied
- Dissatisfied
- Slightly Dissatisfied
- Satisfied
- Highly satisfied

3.8 SAMPLING DESIGN

According to Politand Hungler(1999), “Sampling refers to the process of selecting a portion of the population to represent the entire population”. The representative sample consists of subsets of the elements of a population which allows for the study results to be generalized. The characteristics of the sample population are intended to be representative of the target population. This study incorporates simple random sampling, as the population of Metropolitan Transport Corporation Limited employees in Chennai were taken up for the study.

3.9 POPULATION AND THE STUDY AREA

The sample population taken from the Chennai city with regards to Metropolitan Transport Corporation Limited and the study area is Effectiveness of Training practices of Metropolitan Transport Corporation Limited. This study area incorporates Chennai and focuses on employees of Metropolitan Transport Corporation Limited.

3.10 SAMPLING TECHNIQUES

Simple random sampling techniques are deployed in this study.

3.11 SAMPLE SIZE

This study is carried out with the sample size of 1100 employees of the Metropolitan Transport Corporation Limited in Chennai.

3.12 DATA COLLECTION

Data collection was carried out with the help of questionnaire from the employees of Metropolitan Transport Corporation Limited in Chennai.

Primary data
Primary Data collection was carried out with the help of questionnaire from the employees of Metropolitan Transport Corporation Limited in Chennai. The field survey technique was employed to collect the pertinent data from 1100 employees in the study area. Interview schedule was the main tool for collecting the primary data. Much effort was taken to prepare the interview schedule in a systematic way by designing adequate and relevant questions to ensure better achievement of the research objective. The interaction technique is applied to collect certain relevant data in order to facilitate the study.

**Secondary data**

The Primary data was supplemented by spate of secondary data. The secondary data pertaining to the study was gathered from the various Metropolitan Transport Corporation Limited operating in India. The latest information about the training practices strategies adopted by the Metropolitan Transport Corporation Limited and the theoretical framework were gathered from well-equipped libraries. Further, the secondary data were collected from leading journals and a number of standard reference books were referred to obtain pertinent literature on training programme.

**3.13 DATA ANALYSIS FRAMEWORK**

After analyzing the various data collection methods and research instruments, an questionnaire having questions with multiple-choice responses and a 5 point ‘Likert-type scale’ with -2 being Strongly Disagree and 2 being Strongly Agree, was selected as the survey instrument. After analyzing the various data collection methods and research instruments, an questionnaire having questions with multiple-choice responses and a 5 point ‘Likert-type scale’ with 1 being Strongly Disagree and 5 being Strongly Agree, was selected as the survey instrument.

Data entry, processing and analysis were done using SPSS for Windows (Version 22.0) spreadsheet program and Microsoft Excel 2007. Descriptive statistics (frequencies, scores, mean, maximum, minimum) were determined. The actual processing and analysis started with data cleaning to remove the gaps and ensure consistency. In order to test the association between independent variables and dependent variables, chi-square test was applied; Correlation, Factor Analysis, ANOVA, ‘t’ test and SEM model was applied to find out the variation within samples and between samples.
The present study is descriptive cum exploratory in nature. The study is descriptive as it describes the talent management strategies of Information Technology Organizations. It also seeks to explore and measure the level of talent possessed by the employees of the Industry.

Perception towards the effectiveness of training, skills required, knowledge of the employees of Metropolitan Transport Corporation Limited are measured with the help of five point scale such as

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

Perception towards the satisfaction of the employees of the Metropolitan Transport Corporation Limited are measured with the help of five point scale such as

- Highly dissatisfied
- Dissatisfied
- Slightly Dissatisfied
- Satisfied
- Highly satisfied

3.14 CONCLUSION

This chapter highlighted the research methodology carried out in this research. This chapter analyzed the research design, sampling design, sample size etc., showed that the detailed information of research methodology. This chapter organized the research by formulating and defining a research problem. This helps to focus the research process so that one can draw conclusions reflecting the real world in the best possible way.

Hypothesis

In research, a hypothesis is a suggested explanation of a phenomenon. A null hypothesis is a hypothesis which a researcher tries to disprove. Normally, the null hypothesis represents the current view/explanation of an aspect of the world that the researcher wants to challenge. Research methodology involves the researcher providing an alternative hypothesis, a research hypothesis, as an alternate way to explain the phenomenon.
The researcher tests the hypothesis to disprove the null hypothesis, not because he/she loves the research hypothesis, but because it would mean coming closer to finding an answer to a specific problem. The research hypothesis is often based on observations that evoke suspicion that the null hypothesis is not always correct.