TRANSITION FROM EDUCATION TO WORK: FIRM LEVEL EVIDENCE FROM BANGALORE CITY

Subhashini M. and S. Madheswaran*

In the global production network scenario, the nature of skills demanded by the firms cannot be met by general and technical education alone. This limitation can be overcome to a large extent when firms provide training to their employees. In this context, we examine the provision of firm level training by using data from six firms in three industries, namely readymade garments, pharmaceuticals and auto component industries located in Bangalore city. The study could identify, besides the human capital variables, the nature of industries as the most important determinant for both short and long duration training by the firm. It was also possible to categorise the skills formed into general and specific skills. We suggest that the responsibility for developing firm level skills should be the responsibility of the firms themselves and not of the educational system and if there are failures, the government may provide support to this form of skill formation.

I. INTRODUCTION

The fast pace of globalisation is resulting in growing interdependence between the developed and developing countries. The process of ‘outsourcing’ has been gathering pace since the 1970s. This global outsourcing has given rise to global value chains, which requires labour to be located within national boundaries to work for firms operating outside their countries (Freeman, 2005). Feenstra and Hanson (1997) conclude that the increasing integration of production across the globe has increased the demand for skilled labour. The requirement today is of a new kind of worker—highly literate, numerate and, above all, flexible—and a team-based rather than individual approach to work (Ozaki, 1996).

For Indian firms to become globally competitive, equipping the labour force with the right types of knowledge, skills and attitudes is of paramount importance. The general, technical and vocational education and training provided in the country is, in many ways, inadequate to meet the changing skill needs of firms. The skill needs are increasingly becoming complex and are often decided by international forces. Firm level training plays an important role in intermediating between education and skill formation in industries. Thurow (1970) contends that firms are creators of job-specific human capital. Fuller (1976) had found that acquisition of trade skills through vocational education and training is inferior to company-based training and is costlier per trainee than firm level training. Fuller thus suggested that it may be desirable for work-related training to take place in firms and not in vocational training institutions. Thus, the transition from the world of education to the world of work has to be supplemented by firms providing training to their employees. Firms need to provide structured and focused training to equip the educated workforce with work-specific skills and to integrate them with the global labour standards.

This argument raises three important questions. First what are the different reasons for a firm to provide training to its employees? What is the nature of skills that it needs to develop in

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its employees? What are the factors it will consider while providing both short duration and long duration training to its employees? Or in other words, what are the characteristics of employees that will enable them to receive training? This paper makes an attempt to answer these three questions.

The rest of the paper is organised as follows. Section I of the paper presents a brief literature review highlighting the issues relevant to this study. Section II presents a snapshot of the training and skill development scenario in India. Section III presents the empirical evidence about firm level training and skill formation, and Section IV presents the econometric results of the determinants of firm level training.

II. A BRIEF REVIEW OF LITERATURE

Economists of all schools of thought have always emphasised the part played by human beings in the creation of wealth. A brief historical record of the early literature on the importance of human beings and skills in the process of production is seen in the writings of Smith (1776), Say (1821), Marshall (1890) Fisher (1906) and Mill (1926). Blaug (1966) and Kicker (1968) observe that significant research supporting the field of enquiry had been conducted throughout the 1950s, mainly by Friedman (1953), Abramowitz (1956), Mincer (1958), Fabricant (1959) and Kendrick (1961). However, these studies are somehow not considered as pioneers in the field. The concept of human capital was formalised and designated as such only in the early 1960s with the emergence of the human capital theory of Schultz (1961). Becker (1962) went on to postulate the powerful theory of investment in human capital, namely the investment in on-the-job training. This had its setting in perfect markets. The theory of the Economics of Training was thus developed and was tested empirically in terms of returns from investing in such training by Mincer (1958, 1962). Mincer maintained that education is a form of investment in human capital. Human capital thus found a place in mainstream economic analysis. Ziderman and Katz (1989), Stevens (1994), Franz and Soskice (1995) Chang and Wang (1996), Bishop (1996) Autor (1998), and Acemoglu and Pischke (1998), however, developed another set of alternative theories set in the imperfectly market situation.

From this brief theoretical review, we now present an empirical review on firm level training. Studies show that the importance of firm level training has increased in recent times due to a variety of reasons. Technological change as a reason was identified by Tan and Batra (1995), Lynch and Black (1995, 1998), Frazis and Lowenstein (1998), Machin and Reenen (1998), Berman, et al. (1998), Goldin and Katz (1998), and Bartel, et al. (2003).

Middleton, et al. (1993) stated that firms provide training to improve workers’ productivity in current jobs and to facilitate worker mobility into higher productivity positions. Okada (2004), and Maurin and Thesmar (2004) identified structural changes as the reason for higher level of competencies demanded in the workforce. Osterman (1994) found that some factors associated with an establishment’s adoption of innovative work practices such as teams, job rotation, quality circles, and Total Quality Management (TQM) require high levels of skill.

Another set of literature deals with who actually receives formal training in firms. Some studies like that of Welch (1970), Altonji and Spletzer (1991), Booth (1991), Lillard and Tan (1992), Lynch and Black (1995), Blundell, et al. (1999), Veum (1999), and Barret and O’Connell (2001), identified individual employee characteristics such as age, level of education, the perceived turnover of employees, current earnings, and the period of tenure with the current employer as important determinants of training. Mincer (1962) identified marital status as a determinant of firm level training. Lerman, et al. (1999) stated that workers with higher level of education receive more training.
The studies reviewed here identified different reasons for firms providing training. Both individual and firm specific characteristics determine the provision of training. However, these studies are not industry-specific; they do not differentiate between general and specific skills, and between short duration and long duration training. These studies relate to situations in other countries and none to industries and firms in India or in Bangalore. Finally, most of the earlier studies have used firm level panel data or longitudinal data and have not used a sample of workers from firms belonging to different industries to make a comparative study. Taking stock of the skill formation process in enterprises in India is a complex issue. Such firm-based studies on training and skill formation are yet to take root in India and this study is thus a forerunner. There is thus a significant scope of studying firm level training, its determinants, and the nature of skill formation in industries, especially in Bangalore city. We now present the education and skill development scenario in India.

III. TRAINING AND SKILL DEVELOPMENT: INDIAN SCENARIO

In this section, we present a snapshot of the general and technical education in the country.

1. General and Technical Education

The general education system, consisting of schools, colleges and universities, has often raised the issue of relevance, quality and employability in terms of skill development. The vocational training system in India is provided at the school, higher secondary and professional levels. Training is also provided under the Directorate General of Employment and Training. Several shortcomings have been identified by the National Vocational Skill Training System (World Bank, 2006) about the nature and relevance of the skill formation that takes place in such vocation training programmes. They indicate a demand–supply mismatch in the provision of vocational training.

2. Skill Development Scenario in India

This section examines the skill development scenario in India. An analysis of the 61st National Sample Survey (NSS) Round reveals that unemployment rates are higher among those with secondary and above level of education. Regarding formal training, among the age of 15 years and above, only 2 per cent had technical degrees, diplomas, or certificates (NSS, 61st Round). About 59 per cent had below graduate level and 27 per cent had graduate and above level of formal vocational training. This indicates that the nature of education and training provided does not increase their employability.

In order to understand the nature of training that individuals seek to enter the labour market, the NSS 61st round identified 21 specific areas of trade as the field of training. For males in the rural areas, the field of training most in demand was ‘computer trades’ (21 per cent), followed by ‘textile-related trades’ (15 per cent), ‘electrical and electronic engineering trades’ (11 per cent), ‘driving and motor mechanic work’ (10 per cent), and ‘mechanical engineering trades’ (8 per cent). In the urban areas, computer-related trades are demanded by 38 per cent, which is higher than the corresponding demand in the rural areas. This is followed by ‘electrical and electronics’ (11 per cent) and ‘mechanical engineering’ (6 per cent). Thirty-one per cent of rural female youths had formal vocational training in the field of ‘textile-related work’, followed by the ‘computer trades’ (21 per cent), and ‘mechanical engineering’ (10 per cent). Among the urban female youths, it was ‘computer trades’ (39 per cent), ‘textile-related work’ (18 per cent) and ‘health and paramedical-related work’ (9 per cent). This shows the nature of skills that are demanded by the youth in rural and urban
areas. After this brief overview of the education and skill development scenario in India, we now present a brief description of firm level training in India.

3. Firm Level Training In India

Evidence of firm level training and its various dimensions is not available in national statistics. No micro-level study on employee characteristics and training provided by firms is available in India. However, Investment Climate Surveys have been fielded by the World Bank in over 40 developing countries, including India. This data from the ‘India: Investment Climate and Manufacturing survey’ conducted by The World Bank and the Confederation of Indian Industry (CII) World Bank (2004) is presented in Table 1.

We find that this survey is the first of its kind and gives some insights into the area of firm level training in India.

<table>
<thead>
<tr>
<th>Firm size</th>
<th>Incidence of formal training (Any In-house training External training)</th>
<th>Sources of external training (Univ. VET Govt. training institute Private training institute Partner firms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro</td>
<td>6 6 2</td>
<td>0 19 9 6 0</td>
</tr>
<tr>
<td>Small</td>
<td>16 19 10</td>
<td>4 16 17 26 4</td>
</tr>
<tr>
<td>Medium</td>
<td>35 29 20</td>
<td>9 35 29 38 11</td>
</tr>
<tr>
<td>Large</td>
<td>56 41 31</td>
<td>7 33 20 48 9</td>
</tr>
<tr>
<td>Total</td>
<td>17 23 14</td>
<td>5 24 18 31 6</td>
</tr>
</tbody>
</table>

Note: Micro firms have 15 or fewer workers, small firms have 16 to 100 workers, medium firms have 101 to 250 workers, and large firms have more than 250 workers (2002).


IV. DATA SOURCE

Blaug (1972) confessed that we know almost nothing about the economics of training, its incidence, cost and benefits. In tune with this statement, our study is both exploratory and descriptive in nature. Using firm level micro-data of employees from three different industries
in Bangalore city, namely readymade garments, pharmaceuticals and auto components, we have examined the reasons, nature and types of skills formed.

We found that the readymade garments industry is labour-intensive. The pharmaceutical industry deploys people with high level of education and we designate this industry as a knowledge-intensive industry. The auto component industry employs a technically qualified workforce and we designate this industry as a technology-intensive industry. These industries thus satisfied our need to study different kinds of training and skill formation processes. Besides, this choice of industries enabled us to make inter-industry comparisons regarding training and skill formation. These three industries are connected to the global market in some definite way, either by way of their origin or by their exports. All the six firms were in the private sector. Three of them were multinationals while three were Indian private companies. We had 100 respondents from each of the three industries totalling 300 respondents. The stratified random sampling method was employed in an attempt to obtain representation from five categories of the workforce and a schedule interview was conducted. The data thus collected answered the three questions raised in this paper.

V. EMPIRICAL RESULTS

The firm’s decision to provide training is complicated as it involves two agents, namely the firm and the individual. The firm may select the employees to be trained, considering the characteristics of the employees and of the firm such as the nature of the latter’s production process, firm size, exports orientation and the like. Individuals, on the other hand, may show initiatives in getting trained based on their individual characteristics and motivations. It is apparent that workplace characteristics too become a major determinant of firm level training. We now present the empirical findings.

1. Reasons for Firm Level Training

Discussions with managers revealed that training needs could arise from the job source, which includes knowledge skill and attitudes (KSA) that are needed to perform and improve the nature of the present job, both from an individual employee’s perspective and from an organisation’s perspective.

Managers from the technology-intensive industry declared that new production processes, setting up of new capital equipments, and catering to new customers are important reasons for training their workforce. Research and development leading to the introduction of new products too requires training. The knowledge-intensive industry is not subject to frequent technical and

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of firms</th>
<th>% providing training</th>
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<tbody>
<tr>
<td>Leather products</td>
<td>65</td>
<td>6</td>
</tr>
<tr>
<td>Garments</td>
<td>260</td>
<td>8</td>
</tr>
<tr>
<td>Metal products</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Auto components</td>
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<td>15</td>
</tr>
<tr>
<td>Textiles</td>
<td>228</td>
<td>17</td>
</tr>
<tr>
<td>Food processing</td>
<td>175</td>
<td>17</td>
</tr>
<tr>
<td>–</td>
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<td>–</td>
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</table>

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of firms</th>
<th>% providing training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals</td>
<td>191</td>
<td>18</td>
</tr>
<tr>
<td>Electronics products</td>
<td>132</td>
<td>19</td>
</tr>
<tr>
<td>Electrical white goods</td>
<td>150</td>
<td>20</td>
</tr>
<tr>
<td>Machine tools</td>
<td>63</td>
<td>27</td>
</tr>
<tr>
<td>Sugar</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>189</td>
<td>30</td>
</tr>
<tr>
<td>Software</td>
<td>3</td>
<td>33</td>
</tr>
</tbody>
</table>

production-related changes. The employees in this industry require training to meet their research needs, to maintain harmonious production processes, and to comply with various safety and hygiene norms.

Workplace practices such as teamwork, implementation of quality management systems as seen in the technology-intensive industry, and to some extent, in the knowledge-intensive industry is a determining factor for the provision of training. It is important for the technology-intensive industry to have its entire workforce trained as this helps them adapt to change quickly. Training of employees reduces supervision costs as modern production systems demand that even shop floor workers should take decisions. Managers opined that workers can learn the required skill in the labour-intensive industry while on the job and, therefore, did not feel the need to train workers. However, the recent restructuring of work processes in terms of ergonomic practices has necessitated some amount of training. The introduction and use of computerised numerically controlled machines and its advanced form requires continuous training, especially in the technology-intensive firms. This kind of training is necessary for skill upgradation to develop employees who can understand the market dynamics and have the ability to shoulder newer responsibilities as they evolve.

2. Acquisitions of Present Skills
We collated data relating to the skill formation process by asking respondents to tick a set of seven statements with 1, if they strongly disagreed and 5, if they strongly agreed. On-the-job training is the most important path of skill formation in all the three industries. Respondents stated that working on the job is the best way to learn job-specific skills. There is a difference among industries regarding other sources of skill formation. Entry level training known as induction training has been the second important path of skill formation in the labour—and knowledge-intensive industry while learning from superiors is an important source of skill formation in the technology-intensive industry.
3. Firm Level Training and Categories of Skill Formation

In order to understand the nature of skill formation, it is important to know the different kinds of responsibilities that respondents handled. Knowledge about this variable can indicate the nature of skills that need to be developed. The mean of the key responsibilities are shown in Figure 1.

This set of key responsibilities was matched with the next question about the name and type of training that the respondents had attended during the preceding two years. The information thus obtained was then categorised into main groups of general and specific skills as attempted by Barret and O’Connell (2001).

4. Categorisation of Skills Acquired

The skills developed were categorised on the basis of the utility of those skills in the present job and in future jobs in other firms and industries. Those skills which were considered useful in carrying out the present job but may not be useful in other industries or firms were categorised as specific skills while those skills which could be of use in other firms or industries were categorised as general skills. The items in the category were also checked later with the training managers and other senior managers who agreed to this type of classification. The names of the training programmes were also cross-checked with the firms’ training manuals. The classification we arrived at is presented below.

6. General Skills

Training programmes that provided broad skills or knowledge were categorised as general training. The general category included those skills, which could be of use to the employees even if they left the present firm and joined another firm, that is, the skills are transferable. A brief description of the different skills and knowledge is presented below.

The first category includes soft skills like communication, leadership, delegation, team working, and problem-solving, among others. Of all the skills that need to be developed, communication skills are critical to the smooth functioning of the firm and for enhancing the use of other skills. Managers opined that most fresh graduates lack effective communication and other soft skills. They provide such training to the needy but prefer to recruit candidates who possess reasonably good English and communication skills. They look for workers who can work in collaborative teams and can use analytical and other academic skills for dialogue and innovation. These sets of skills are essentially people-related skills and have a wide range of application.

The second category of general skills, often called awareness training, provides information on the policies and practices that affect the employees’ work environment. Programmes on health, hygiene and first aid belong to this category. These skills and knowledge are necessary to maintain cleanliness at the workplace and at the personal level, especially in industries like pharmaceuticals where contamination is a serious issue.

The third category of skills is related to safety and fire. Occupational safety training provides information on safety procedures and regulations that are necessary while working with heavy and hazardous machines. The use and care of respiratory and other protection devices is a part of the training. The other category of skills and knowledge is related to environment protection and recycling, specially in the pharmaceutical and auto component industry wherein firms follow SHE, that is, safety, health and environment guidelines for maintaining the health and safety of workers.

In this category, fire is a low probability, high causality event, and firms are continuously preparing their workers with fire drills for emergency preparedness, carrying out programmes
for preventing fire and the use of fire-fighting equipments. The skills and knowledge acquired from these training programmes are useful in any firm and thus transferable.

The fourth category relates to personality development with skills for personal effectiveness, interpersonal relationship, time management, stress management, motivation, and creativity among others. These knowledge, skills and attitudes are necessary to carry on an effective work relationship.

The fifth category of skills relates to general management skills such as effective interviewing, effective supervision, conducting effective meetings, and conflict resolution skills. The sixth category includes computer training or data processing, which includes training in computer literacy, security, programming, the use of standard commercial and other software as general management skills. These skills are useful not only in the present jobs but also in higher level of jobs in the same firm and are transferable across firms. Only 2 per cent of the respondents from the labour-intensive industry received training in general skills. However, observing workers on the shop floor gave the impression that some general training to the supervisors to handle workers in assertive ways could be of help to the shop floor management. However, their short tenure does not encourage firms to provide such training.

Ninety-one per cent of the knowledge-intensive industry respondents received some form of general training in the last two years. Forty-four per cent attended training on health and hygiene, and 42 per cent received soft skill training. Training programmes related to data processing and environment issues were not well-attended. Training in personality development and soft skills are considered necessary to keep the production process going smoothly. Forty-two per cent of the respondents from the technology-intensive industry received training in soft skills followed by health (35 per cent), data processing, fire (16 per cent), and personality development (6 per cent).

For the total sample, the largest numbers of respondents were trained in soft skills (28 per cent), followed by health and hygiene (26.6 per cent), general management (16 per cent), fire (16.3 per cent), data processing (10.3 per cent), personality development (10 per cent), and environment protection (5.7 per cent). In total, 61.3 per cent received training, which helps in forming general skills.

7. Firm-specific Skills

In contrast to the above-mentioned knowledge and skills, some skills and knowledge are identified as being more useful in carrying out the present job held by the worker and these skills may not be useful in other industry or firms. These professional and technical skills are termed as specific skills.

Some machines are typical to the firm while some are to the industry. The skills learnt and knowledge gained from the training programme about operating and maintaining such machines can be useful only when similar machines are available elsewhere, which may not be the case. Such technical skills are thus firm-specific. The second set of skills and knowledge relate to processes and quality. They are specific because they relate to a particular product or production process and the parameters and conditions are relevant only to that situation. The third specific skill set learnt enables workers to develop new products or new materials for products used in production. This knowledge finds use only in a particular firm and may not be transferable to other firms like planning, design application, computer programming for a specific production process and the like. Gaining industry/firm knowledge and skills related to marketing, client lists and other technical advances are specific skills to the industry. The fourth set of skills and knowledge relate to new hire and induction whereby new workers learn company values, mission,
and culture. The firm attempts to instil loyalty to the organisation in the employees through such training. Even senior managers receive some sort of re-orientation on the firm’s mission, values and goals on a regular basis. Production and construction-related training in areas such as operating or repairing machinery and equipment; manufacturing, assembling, distributing, installing, or inspecting goods; and constructing, altering, or maintaining buildings and other structures are firm-related skills.

Only 19 per cent of the respondents from the labour-intensive industry underwent training in operating new machines and computerised machines. Five per cent of the respondents underwent quality-related training like fabric inspection and quality checking. Both the firms in the sample have employed industrial engineers to put ergonomic practices in place. These help in minimising wastage of time and energy at the workplace by minimising the movement of labour. Speed alignment, line balancing, bar coding, and documentation procedures were the other new skills that employees learnt which are specific to the firms. Regarding the knowledge-intensive industry, specific training was related to good manufacturing and laboratory practices, code of conduct, quality-related Six sigma, documentation for analysis, and dispensing, among others. These skills are industry-specific and not firm-specific, as the respondents from both these firms appear to have undergone similar training programmes.

For the technology-intensive industry, training is provided in the ISO series, 5S-housekeeping Kaizen, Six sigma, productivity, preventive action planning, statistical programme for reducing scrap and defects, fault analysis, company values, foreign language, new product, process orientation, mechatronics, and hydraulics, among several other programmes. The programmes offered by both the firms are different, indicating that the skills are firm-specific. Although the firms produce auto components, the products are different and thus the training is also different. Workers have little possibility of changing firms.

From this analysis, we find that it is possible to separate general and specific skills, to some extent. These skills are complementary in nature and managers shared this opinion. The general proclamation was that it is not possible to train workers for specific skills without imparting adequate training in general skills. Therefore, we conclude that firms or industries that provide more training provide more of both general and specific training. In the next part, we present the empirical findings about who received training.

8. Who Received Firm Level Training?

It was important to identify the individual characteristics that influenced firms in providing training to its employees. Some of the factors were of a human capital nature while some were related to the nature of the firm. The factors affecting training have been identified for short and long duration training. Short duration training was for less than a week while long duration training was for more than a week and could be as long as a month or more. The empirical data helped us identify some of these factors that influence the receipt of firm level training or factors that the firm may consider while providing training.

The relationship between age and training is well established. Discussion revealed that it is difficult to train older workers in new technologies and methods of productions as well as to include them in general skill training. Similarly, firms are apprehensive about providing any short duration training other than induction training to the youngest age group, as their tenure with the firm is uncertain. Empirical evidence regarding the role of age in long duration training proved the human capital model, wherein the maximum training takes place during the early years of one’s career. The older age group gets almost no long duration training in all the three industries.
Occupational segregation and gender differences in training are well known. We observed that fewer women received short duration training as compared to men in all three industries. In the labour-intensive industry, only 6.1 per cent of the female employees received short duration training, while 17.6 per cent of the males received such training. In the knowledge- and technology-intensive industry too, more male employees have participated in training than female employees, as their representation in the sample is more than female employees. The pattern for long duration training is slightly different. Among the females, 71.4 per cent and among the males, 45.1 per cent get long duration training in the labour-intensive industry while this is not the case in the knowledge- and technology-intensive industry. Marital status as a determinant of training does not show any new results. Among the married employees, 81.6 per cent received short duration training and 54.4 per cent married employees received long duration training.

Better-educated workers are more amenable to training. Respondents with degree and above level of education receive higher training than those with high school and pre-university level of education. However, in the technology-intensive industry the high school and pre-university category of respondents receive more training than those with degree and above education. The more educated in this industry are expected to be self-learners.

The relationship between the receipt of long duration training and the educational level of respondents is different. We observed that of the 58 per cent who had undergone long duration training in the labour-intensive industry, 69 per cent had high school plus pre-university level of education. The findings for the technology-intensive industry are similar. Of the 39 per cent who received long duration training, 53.8 per cent had high school and pre-university level of education. The results are, however, different for the knowledge-intensive industry. This industry does not have requirements for long duration training for its employees.

The quality of education as determined by the grade obtained in the last qualifying examination was identified as an important determinant of training. In the labour-intensive industry, among those 12 per cent who received short duration training, 33.3 per cent (4) had obtained a second-class result while 41.7 per cent had a third class result. In the knowledge-intensive industry, 48 per cent of those with a first class result received training while in the technology-intensive industry too, the results are similar. Of those who received short duration training, 56 per cent had a first class result. For the total sample too, 49.8 per cent of those who received short duration training had obtained a first class in their last qualifying examination. Thus, we see that in general, those with a first class result receive more short duration training than those with second and third class results.

It was found that even long duration training was more accessible to those respondents who had obtained a first class result in their last qualifying examination. The level of education and the quality of education determined by the grade obtained in the last qualifying examination is an important determinant of both short and long duration training. The nature of jobs performed becomes an important determinant of training. A senior manager’s job includes planning, executing, managing resources, monitoring and leading teams. The skills required are more general and managerial in nature. The functions of middle level managers include planning, executing, supervising, managing resources, identifying and solving problems, leading teams, and documentation. The supervisor’s job includes supervising, training, motivating and leading a production unit team mainly on the shop floor. Workers carry out jobs assigned to them on the shop floor, use computers, operate machines and work in teams. In both the knowledge- and technology-intensive industry, the worker category received more training than the managers did. This is understandable as the worker category is not highly educated and hence needs to be trained to cope with production changes. For the total, sample too, the worker category received the maximum training.
The nature of skills required are important reasons for the difference in the provision of short and long duration training by industries. The knowledge-intensive industry provides the maximum short duration training to its workforce, followed by the technology-intensive industry. These firms are large, employ new workplace practices like teamwork, follow quality managements systems, employ an educated workforce, use computers, export goods and make investments in research and development. All these characteristics require a well-trained workforce. Both the labour-intensive firms provide less short duration training as the skills required in the industry are relatively simple and can be acquired without any formal training.

The knowledge-intensive industry provides lesser long duration training than the technology-and labour-intensive industry. This can be explained by the fact that the knowledge-intensive industry does not experience technological changes, which require long duration training. Besides, employees in the knowledge-intensive industry are expected to continuously learn and acquire knowledge while on the job. The technology-intensive industry imparts more long duration training to new recruits and to older employees during times of major technological change. However, as compared to these two industries, employees in the labour-intensive industry receive longer duration training as skill formation in this industry takes place while workers are on the job.

The employee’s tenure with the present firm is a determinant of short duration training. In the readymade garments industry, 58.3 per cent of the employees with a tenure of 4-6 years get the maximum training. This short tenure is often stated as a reason for firms not providing training to their employees. In the knowledge-intensive industry, the maximum number of employees who received short duration training belongs to the 1-3 years category (17.3 per cent), while in the technology-based industry, the relationship between tenure and short training is different. The maximum number of employees (20.6 per cent) who received short duration training belonged to the 13-15 years tenure category followed by employees having tenure of 25-27 years (19.6 per cent). Older employees received training for skill upgradation as they work with younger workers in teams and have to learn and adapt to changes in workplace practices. The maximum long duration training was received by employees during the early years of their tenure with the present firm, that is, during the tenure period of 1-3 years in all the three industries. This is a period of acquiring job-related skills. A long tenure results in lesser training as is seen in the case of the pharmaceutical industry.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>sht_y_n</td>
<td>Short duration training =1; 0 otherwise</td>
<td>0.69</td>
<td>0.463</td>
</tr>
<tr>
<td>lgtr_yrn</td>
<td>Long duration training =1; 0 otherwise</td>
<td>0.38</td>
<td>0.486</td>
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<td>age</td>
<td>Individual’s age in years.</td>
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<td>agesq</td>
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</tr>
<tr>
<td>gender</td>
<td>Male=1; 0 otherwise</td>
<td>0.76</td>
<td>0.4277</td>
</tr>
<tr>
<td>marital</td>
<td>Married =1; 0 otherwise</td>
<td>0.233</td>
<td>0.4236</td>
</tr>
<tr>
<td>degabove</td>
<td>Degree and above =1; 0 otherwise</td>
<td>0.416</td>
<td>0.493</td>
</tr>
<tr>
<td>mana</td>
<td>Manager =1; 0 otherwise</td>
<td>0.31</td>
<td>0.463</td>
</tr>
<tr>
<td>superv</td>
<td>Supervisor=1; 0 otherwise</td>
<td>0.19</td>
<td>0.392</td>
</tr>
<tr>
<td>knowledg</td>
<td>Knowledge intensive industry =1; 0 otherwise</td>
<td>0.333</td>
<td>0.472</td>
</tr>
<tr>
<td>technolo</td>
<td>Technology intensive industry =1; 0 otherwise</td>
<td>0.333</td>
<td>0.472</td>
</tr>
<tr>
<td>firstcla</td>
<td>First class=1; 0 otherwise</td>
<td>0.4</td>
<td>0.490</td>
</tr>
<tr>
<td>second</td>
<td>Second class=1; 0 otherwise</td>
<td>0.266</td>
<td>0.442</td>
</tr>
<tr>
<td>thisfrm</td>
<td>Number of years with present firm employer.</td>
<td>9.103</td>
<td>8.947</td>
</tr>
<tr>
<td>N</td>
<td>Number of observations</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

Source: Collated from fieldwork.
VI. DETERMINANTS OF TRAINING—ECONOMETRIC RESULTS

From the descriptive analysis presented earlier, we now present the econometric results of the determinants of short and long duration firm level training.

1. The Model

We have used the Probit model to analyse the determinants of short and long duration training. The results of the model are corroborated by empirical findings presented in the earlier part of the paper. A description of the main variables included in the model is presented in Table 3.

The estimated model for short duration and long duration training is presented in Table 4.

The Pseudo R-square for the short duration model is 0.7251. This implies that 72 per cent of the variation in a dependent variable is explained by the independent variables included in the model. The overall significance of the model can be judged from the chi-square value, the calculated chi square value is 269.34, which is highly significant, and the model has a good fit. The margin effect of each independent variable shows the increment in the probability of the variable affecting training in the model.

The Pseudo R-square for the long duration model is 0.3022. The calculated chi square value of 120.42 is highly significant. The results of the models are corroborated by the descriptions of the variables based on fieldwork presented in the foregoing part of the paper. A brief description of the results obtained from the short and long duration training model is presented below.

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Short training</th>
<th>Long training</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>0.3252 (2.30)  **</td>
<td>-0.1339 (-1.50)</td>
</tr>
<tr>
<td>agessq</td>
<td>-0.0040 (-2.36) **</td>
<td>0.0017 (1.60) ***</td>
</tr>
<tr>
<td>gender</td>
<td>0.4410 (1.96)  **</td>
<td>-0.3319 (-2.39) **</td>
</tr>
<tr>
<td>marital</td>
<td>0.7462 (1.81)  ***</td>
<td>0.4227 (1.93) ***</td>
</tr>
<tr>
<td>degabovet</td>
<td>0.1844 (2.51)  **</td>
<td>0.0635 (2.26) **</td>
</tr>
<tr>
<td>firstcla</td>
<td>0.502 (2.15)   **</td>
<td>0.406 (1.74) ***</td>
</tr>
<tr>
<td>second</td>
<td>0.202 (1.65)   ***</td>
<td>0.304 (1.73) ***</td>
</tr>
<tr>
<td>knowledged</td>
<td>3.393 (7.08)   *</td>
<td>-0.654 (-2.32) **</td>
</tr>
<tr>
<td>technolo</td>
<td>3.201 (6.33)   *</td>
<td>0.248 (1.88) ***</td>
</tr>
<tr>
<td>mana</td>
<td>0.3741 (0.87)</td>
<td>-0.3513 (-1.82) ***</td>
</tr>
<tr>
<td>supervis</td>
<td>0.3539 (0.89)</td>
<td>-0.4911 (-1.79) ***</td>
</tr>
<tr>
<td>thisfrm</td>
<td>0.0001 (2.00)  **</td>
<td>-0.073 (-4.05) *</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.7987 (-2.88)</td>
<td>2.803 (1.68)</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-51.0602</td>
<td>139</td>
</tr>
<tr>
<td>Chi2(12 degrees)</td>
<td>269.34</td>
<td>120.42</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.7251</td>
<td>0.3022</td>
</tr>
<tr>
<td>Number of observations</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses indicate T-values.

* 1% significance is 2.58; **5% significance is 1.96; ***10% significance is 1.65.

Reference category: gender: female; marital status: unmarried; education level: pre-university+high school; class obtained: third class; industry group: labour industry; employee category: workers; firm change: no firm change.

Source: Computed from fieldwork.
2. Age and Age Square
Age and age square are positive and negative, respectively, in the short training equation. The coefficients are also significant at the 5 per cent level. This implies that the probability of obtaining short duration training is increasing with age but at a decreasing rate, giving rise to an inverted U-shaped curve. On the contrary, for the long duration model, the coefficient of age is negative, which forms a convex curve showing that long duration training decreases with increasing age. The results are corroborated from fieldwork. In the case of short duration training, employees receive more short duration training while they are young, but continue to receive some amount of short duration training even as they grow older, to upgrade their skills. However, in the case of long duration training, younger employees receive it more during the early years of their careers to learn firm-specific skills, but as they grow older, the need for long duration training decreases sharply and firms too do not provide such training.

3. Gender
From the model for short duration training, we see that the coefficient of gender is positive and significant, which implies that the likelihood of men receiving short duration training is greater than that of women. On the contrary, the probability of male employees receiving long duration training is lesser than that of women. The coefficient is negative and the $t$ value is significant at the 5 per cent level. From the fieldwork, we see that more women employees belong to the readymade garments industry and they learn their job-specific skills through long duration training.

4. Marital Status
The probability of receiving both short and long duration training is greater for the married respondents as compared to the unmarried ones. The coefficient in both cases has a positive value and is significant at the 10 per cent level.

5. Educational Level and Grade Obtained
The model identified the education level of employees as an important determinant of short duration training. As expected, the coefficient is positive and significant at the 5 per cent level. The results are as expected. The probability of getting short duration training is more for the higher educated employees as compared to the less educated. Respondents with degree and above level of education receive more training than those who have high school and below category of education. The quality of education of the respondents in terms of the grades obtained shows that those who obtained first class and second class results in their last qualifying examination have a higher probability of receiving training than those employees who got a third class result. These coefficients are positive and significant at the 5 per cent and 10 per cent levels, respectively.

The role of the level of education in receiving long duration training reflects the same behaviour as that of the short duration training. The coefficient is positive and significant at the 5 percent level. This implies that employees with a higher educational level are more likely to receive long duration training than employees with a lower level of education. The grade obtained in the last qualifying examination as a determinant shows that those who obtained first class and second class results have a higher probability of receiving long duration training than those who got a third class result. Both the coefficients are positive and significant at the 10 per cent level. This corroborates the finding of the fieldwork.
6. Category of Employees
Managers and supervisors are less likely to receive short duration training as compared to workers. As the t values are not significant, we conclude that members of the reference category, which is the worker category, receive more short duration training. The results for long duration training are similar to those of short duration training with the coefficient value for the managers and supervisors category being significant at 10 per cent only. This implies that the chances of these categories of employees receiving long duration training are lower as compared to the worker category.

7. Nature of Industry
The nature of the industry is an important determinant of short duration training. The knowledge-intensive and technology-intensive industries are likely to provide more short duration training than the labour-intensive industry. The t values are 7.08 and 6.33, respectively, which is highly significant. Employees from the knowledge-intensive industry receive more short duration training as compared to employees of the technology-intensive industry. Employees from the labour-intensive industry, which is the reference category, receive the least amount of short duration training. The marginal effect for the two industries is 0.5696 and 0.5441, respectively, pointing out that this variable is the most important determinant of short duration training.

On the other hand, the results for the long duration are different. The t value is negative for the knowledge-intensive industry indicating that this industry does not provide long duration training to its employees. Since the t value is positive, we conclude that the technology-intensive industry does provide long duration training but with the duration being less than that of the reference category, which is the labour-intensive industry.

8. Tenure
The probability of receiving short duration training is more for those employees who have longer tenures with the present firm, as the t value is significant at the 5 per cent level. This is corroborated from the fieldwork, where it is seen that longer tenures of the employees with the present firm increase the chances of the employees receiving short duration training. On the other hand, since the coefficient for long duration is negative and the t value is highly significant, we infer that the probability of receiving long duration training is lower for those employees who have longer tenures with the present firm. The variables chosen for the Probit model reveal that they confirm the prescriptions of the human capital model across the three industries chosen for the study in Indian conditions as well. The nature of the industry emerges as the most important determinant of both short duration and long duration firm level training.

VII. CONCLUDING REMARKS AND POLICY IMPLICATIONS
General and technical education provides the basis for firm level training. The limitations of general and vocational education in terms of developing market skills can be overcome to a large extent when firms provide training. It may be far-fetched to expect the general and technical education system in the country to develop firm level or industry-specific skills as such type of education has to perform other functions as well. Enhancing industry–institute linkages can improve the quality of general and technical education, thereby making entry into the labour market smoother and making it easier for firms to provide firm level training later.

Among all the variables that were included as determinants, the nature of the industry was the most significant in terms of studying the firms providing both short and long duration training. Employees too receive different levels of training depending on the industry they are
employed in. Thus, the study could identify an important determinant besides the human capital variables, which determine firm level training and the nature of skill formation.

Assuming that our findings have some general validity, we suggest that the responsibility for developing firm level skills should be the responsibility of the firms themselves and not of the educational system. However, some firms may not have the resources or the necessary infrastructure and motivation to provide such training. In such cases, it may be necessary for the government to create training infrastructure and provide some financial incentive so that this firm level skill formation can take place to meet the challenges of the globalising labour market. The results need to be interpreted as being explorative and descriptive. However, we feel that the study provides valuable insights into firm level training and skill formation in industries in the Indian context.

References


Frazis, Harley, and Lowenstein, M.A. (1997), Re-examining the Returns to Training: Functional Form, Magnitude,


