

Pharmaceutical and Biotechnological Industry Case Studies

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1. Focus

The pharmaceutical and biotechnological industry, and more especially the biotechnology non-generic sub-sector, with regards both to its strong applied research component in a much specialized area and to the globalization of its market and the intense competition involved, constitutes a significant area of the New Economy. The rapid growth of this knowledge intensive industry is observed in its Research and Development section as well as in its production units and in the new pattern of relation that it develops within in its market through clinical research and new “professional” distribution involving the mediation of health specialists and practitioners. This sector is a heuristic one to study the relation between work organisation, intensive high-technology context and learning, and, more immediately, the changing learning practices and modes of knowledge transfer.

These two case-studies are intended to provide complementary and possibly more in-depth understanding of the formal and informal learning practices documented across the adult population through the general survey; it will do so by studying these processes directly in immediate knowledge-intensive work context, by observing, in such workplaces, the evolving practices and reactions of employees and by getting the meanings that the different groups of employees, according to their conditions, give to the changing learning demand and the various modes of learning.

Based on the general analysis of the modalities of relations between work and learning in this sector, special attention will be given in this regard to the gender dimension especially at critical moments of the typical occupational biography of women as well as to the aging personnel and the immigrants employees.

2. Literature Review

This economic sector is already under pressure like many other industrial domains to develop “learning enterprises” (Senge 1990) because of the demand coming from global competition for “internal” flexibility. In this industry, where “fast-paced radical innovations are crucial for success” (Lam 2002), the growing integrated Research and Development component pushes in the direction toward learning intensive organization. This economic sector is also operating under growing international and national health and drugs quality control as well as ethical norms that generates, at all levels of its occupational hierarchy, a new learning demand related to new approach for clinical research and testing as well as to continuous review of techniques of production.

The significance of the evolving lifelong learning policies of these firms needs of course to be studied at the level of the organisation as such, looking at the relations between the new technology intensive context, on one hand, and, on the other, the education and training strategies as well as the support and recognition given by the institution to non formal

learning processes (Doray, 1999; OECD 2000). This analysis does not suffice, however, to apprehend the overt and diffuse mediation processes taking place between the external production related learning demand and the subjective learning experience and aspirations of employees (Belanger, 2000). Such phenomenon and the significance of informal learning in these processes could not be documented and fully understood, without examining also the micro dynamics taking place at work post level where the tension between the prescribed and the real task comes into play (Teiger, 1998; Chatigny 2001) Only then, will we be in position to relate organized adult learning to these various possible “communities of practice” (Wenger 1998) and to observe the complex relations between “tacit and explicit knowledge” (Polanyi, 1966), only then will we be in position to observe the approaches and practices supporting learning transfer processes, where non-formal learning may become critical.

The contrasting qualification requirements observed in this sector, will be of particular research interest to study the relation between changing work organisation and various patterns of organized and informal learning activities and of knowledge transfer because of the coexistence of research and production activities, of its diversified occupational population, of the particular gender balance of its workforce (52% women), of the importance of its aged population (24.6% in the 45 to 54 year age bracket) and, finally, of the presence of immigrant employees.

When focusing on a specific gender dimension, we will looking at the critical biographical period (25-35) where reproductive momentum enters in conflict with the most intensive work-related adult learning phases. We will analyse as well the way ageing employees, a group at risk, cope in this learning intensive context (Bélanger, 1992). Special attention will also be given to the situation of immigrant specialists who, as an external source of innovation and high level competence (Cohen, S.S. and Field, G., 1999) and as members of a cultural minority both at the work-place and in the community, make up a critical economic and cultural component of this specific labour market.

3. Objective

The aim is to analyze the ways employees produce, acquire, transfer and use new knowledge and skills in this high tech domain characterized by continuing innovation and recurrent adjustment of techniques of production. The project will study the factors supporting or inhibiting organized and informal learning, the mediation processes between the economic demand and the individual needs and aspirations (i.e. the supply-demand interactive theories), the impact of different work contexts like the R&D and the line-production sub-sectors, and the different relation patterns (cumulative, contradictory or weak) between formal and informal learning practices.

More specifically, we will address four questions:

1. What kind of and how learning formal and informal activities are organized and/or supported by enterprises ? Who participates in what kind of learning activities and why? What kind of formal and non formal activities are required from the different groups of employees to cope with the implementation of technical and organizational change?

2. How typical knowledge intensive activities and specific organizational/technical changes relates to different type of learning activities? What are the conditions facilitating production and transfer of knowledge into practices? How the organisational process of increasing the qualification of jobs relates to the various ways taken by individuals to increase their qualification? How different training and education conditions tend to produce different learning dynamics? How the changing work and production context transforms these dynamics?
3. How different categories of workers construct and upgrade their professional knowledge? What is the relationship between formal and informal as well as individual and collective knowledge construction and transfer processes? How work environments induce and transform dynamics between informal and formal learning? Under which contexts, organized learning tends to mobilize tacit knowledge and support informal construction and transfer of operational knowledge (“par et dans l’action”)?
4. What role the different actors play in the enlarged decision processes from initial expression of learning demand to follow-up activities and assessment? How the social learning demand and its potentially contradictory components is being mediated and negotiated? What are the representations of the different actors about the learning strategy of the other actors and about the education and training policies of the firm and its approach toward informal learning?

5. Methodology

The two case-studies retained are two large-size bio-pharmaceutical non-generic firms, one unionized and the other none, both situated in Montreal (Quebec) where an innovative high-tech cluster of such enterprises is emerging (Comité sectoriel, 1999). In Montreal, this economic sector is developing rapidly because of the exceptional demographic context it offers for epidemiological research and clinical testing, but also because of its mobile and active labour occupational labour market, hence of the possibility of inter-firms mobility and the growing concentration of large and medium-sized enterprises, as well as small high tech innovative firms. Such an “occupational community factor” made possible by a local mobile labour market (Lam, 2002) creates a unique “learning environment” where inter-enterprise formal and informal communication facilitates tacit processes of knowledge transfer within firms as well as between them.

The difficulty in such case-studies is to study, at local level within an organisation, the supply-demand interactive theories and to document the different relation patterns between organized and non formal learning in the different immediate work contexts. The challenge is to research the learning strategy of the organisation and of its different departments as well as to capture, at the micro level, the tension between the prescribed and the real tasks (Teiger, 1993) and the implicit learning and interlearning processes that tends to take place.

The research design, to be implemented in each of the two firms during a two years period (leading to a third year for the analysis of data) will combine, through a specific sequence, observation, semi-structured interviews, special micro-observation completed by small focus groups and follow-up co-analysis interviews.

First year

- 1.1 Production, with the “education and training contact person,” of a differentiated picture of the organized education and training activities, that have taken place during the last two years, and of the explicit support and recognition given to informal learning,
- 1.2 Observation phase (150 hours in each organisation) with unstructured interviews in both the research and the production units allowing us to grasp the different internal contexts and learn the “codes” used to speak about knowledge and skill transfer in order to finalise the questionnaire for the next phase,
- 1.3 Administration of semi-structured interviews (30 over the first year in each of the two firms) that will be administered with representatives of general management, of the human resource and personnel department, of the education service, of directions of operation, representative of employees, groups of employees, and representatives of involved external education and training agencies. The protocol will include questions used in the survey.

Second year

- 2.1 Direct observations (*open* observation leading to *systematic* observation using defined indicators) completed, all along, with a series of short work-task related interviews, using the methodology developed in work ergonomic research (Guérin et al., 1997), since implicit individual and collective learning and learning transfer processes can be best observed and understood at the work place (Teiger 1993, 1998). Such an approach allows “la mise en mots de ce qu’on ne sait pas qu’on sait, ou qu’on sait sans avoir jamais pu le parler” (quoted by Chatigny). This will be done with small group of employees (some being current participants in organized learning) in each of the two firms. For such observation procedures (of a average duration of 120 hours each), a RnD unit and a production section will be selected in each of the two firms.
- 2.2 Follow-up short interviews (20 in each of the two firms) with individual and groups met in the first round for a phase of co-analysis with the different actors.

6. Role of researchers and team of students

The leader of the project, Paul Belanger, will be responsible for theoretical framework, methodological options, supervision of field work and the analysis of data. The professional assistant will take charge of the planning, coordination, training and monitoring of students and will assist all along in the analysis. The interviews and the direct observation will be undertaken by graduate students, while the transcription will be done by undergraduates.

Fieldwork and preparation of data

Two of the four interviewers will, at the beginning, prepare the schedule of interviews and produce the preliminary picture and undertake the general observation phase (see 1.2). Each

of the 60 interview of the first year requires 14 hours: 2 hours for preparation and transport, 2 hours for the interview, 10 hours for transcription and coding, while the 40 interviews of the second year will require 8 hours (2,2 and 4). Two days will be required for the immediate training of interviewers.

The direct observation will be of a duration of 120 hours each. Five days will be required for the immediate training of the “observers”.

Paul Bélanger is already conducting a study on the institutionalization of formal learning and of support to informal learning in this specific sector, a project undertaken in partnership with the “Commission des partenaires du marché du travail du Québec” and the “Comité sectoriel de main d’œuvre des industries des produits pharmaceutiques et biotechnologiques du Québec.”

7. Training

For conducting interviews, graduate students in sociology and adult education will receive immediate training on interview techniques taking into account the specific context of the case-studies. For direct observation, students from work ergonomics graduate programs will get also specific training to observe new dimensions at work-post including informal learning and knowledge transfer. The undergraduate students, through transcription and coding work will get first hand experience with field research. More generally, the project will give all of them an opportunity to be given continuous coaching throughout their work and to integrate themselves in the life and overall research program of the UQAM’s Research Centre on Lifelong Learning (CIRDEP). The graduate students will have the opportunity to further use and study the data for graduate academic work.

8. Dissemination

The dissemination will be undertaken in two steps. In the second year, the foreseen follow-up interviews will offer an opportunity for co-analysis and appropriation of data by the actors in the two organisations under study. Afterwards, with the final report, a series of information and consultation meetings will be organized in coordination with the *Comité sectoriel de main d’œuvre des industries des produits pharmaceutiques et biotechnologiques du Québec*, a managerial-labour coordination structure created in the bio-pharmaceutical sector and with which the main researcher is already cooperating for selecting the organisations and providing critical information on education and training in this domain (Comité sectoriel, 1999).

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