

## Training Factors within the Ontario Manufacturing Sector

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Résumé de l'article

L'objet de cette étude est de valider les facteurs organisationnels identifiés par Pettigrew et al. (1988) affectant les activités de formation d'une entreprise. L'étude repose sur trois hypothèses.

*Hypothèse 1* : La formation offerte par une entreprise (en nombre de jours) varie proportionnellement et positivement en fonction des quatre catégories de facteurs suivants: la stratégie de l'entreprise et l'importance attribuée à la compétence et à la formation des employés; le marché externe et interne de main-d'œuvre et l'importance accordée au marché interne; le support des personnes clés (ex.: la direction) et des systèmes de gestion à la formation; l'appui à la formation venant de l'extérieur de l'entreprise.

*Hypothèse 2* : L'influence des personnes clés et des systèmes de gestion est prépondérante.

*Hypothèse 3* : La formation varie de façon proportionnelle et négative en fonction des trois facteurs suivants: la simplicité du produit, la nouveauté des compétences requises et le petit nombre d'employés impliqués, et la préférence des gestionnaires pour le recrutement et l'embauche d'employés temporaires.

Deux-cent-trente-huit entreprises ont complété un questionnaire (taux de réponse de 25%). Afin de vérifier les hypothèses, deux variables dépendantes ont été créées: (1) ADPT ou la moyenne de jours de formation directe offerte par année à chaque employé, et (2) ATI ou la moyenne de temps et d'effort consacrés à la formation de chaque employé selon une grille qualitative. Une analyse factorielle des composantes principales (avec rotation varimax) a fait ressortir 15 facteurs (les variables dépendantes mises à part) similaires à ceux identifiés par Pettigrew et al. (1988).

Cependant, quelques précisions sont de mise pour le secteur manufacturier: les décisions d'allocation budgétaire semblent découler de l'engagement des gestionnaires envers la formation; les exigences des consommateurs quant à la qualité du produit créeraient une pression pour un produit plus complexe; et les opportunités de promotion découleraient des structures organisationnelles et de la prise de décision.

L'analyse de régression a permis d'identifier les sept facteurs ayant un pouvoir prédictif à l'égard de l'ATI (en ordre de puissance): F1 - les systèmes formels et actifs de formation; F2 - l'engagement des gestionnaires et des ressources; F4 - l'infrastructure de formation extérieure à l'entreprise et les liens entre les deux; F3 - l'importance stratégique des compétences et de la formation; F11 - les chances de promotion et les décisions liées aux produits et marchés; F7 - les sources externes de financement; et finalement F10 - les contraintes à la formation. Une deuxième régression a retenu seulement deux prédicteurs de l'ADPT: F14 - l'utilisation des talents du personnel régulier pour les programmes de formation et F2 - l'engagement des gestionnaires et des ressources.

Les résultats démontrent une augmentation de la quantité de formation offerte dans le secteur manufacturier au cours des dix dernières années: présentement, la moyenne se chiffre à 2,6 jours par année par employé. Les analyses ont révélé que la formation ne découle pas seulement d'une gamme de facteurs situés à l'intérieur de l'entreprise mais également de facteurs extérieurs. De plus, contrairement au sens commun, il est surprenant de constater que les variables suivantes aient eu un impact négatif sur la formation: la présence d'un syndicat, la formation obligatoire en santé et sécurité, et la formation offerte par les fournisseurs; d'autres recherches sont nécessaires afin d'expliquer cette situation. Finalement, bien que ces résultats soient encourageants, il reste un travail important à faire pour rendre le questionnaire plus robuste et pour valider l'importance des facteurs de formation dans d'autres secteurs de l'économie.

# *Training Factors within the Ontario Manufacturing Sector*

**Rolland LeBrasseur**  
**and**  
**Marie-Josée Lambert**

*This article presents the results of a survey of the Ontario manufacturing sector, and identifies intra- and extra-organizational factors influencing the training activities of firms. On average, employees received 2,6 days of directly provided training, and some supported training. It was concluded that improvement in training participation rates has taken place throughout the 1980s, and that leading companies are reaching new levels in the duration of training offered. A variety of factors, such as Management Commitment, were found to be significant predictors of training activities.*

In an era of increasing automation and global competition, employees must be ready to take on the relatively more complex tasks which evolve as part of the new ways of operating the organization (Economic Council of Canada 1987). In this context, the role of business and management in the training and retraining of employees has been emphasized by government (Ontario Manpower Commission 1986; Ministry of Skills Development 1989). Through on-site and supported training, business has a crucial role to play in the supply of specialized and multi-skilled workers. Business surveys (CLMPC 1989; CMA 1989a) have indicated a positive response by senior managers to the issue of training: they recognize that firms need to provide training, either jointly with schools or independently thereof.

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Within the organizational literature, there exists a growing body of literature which recognizes the importance of linking the management of human resources to the overall company strategy (Fombrun et al. 1984; Beer et al. 1984; Bélanger et al. 1988), and of aligning training activities with company goals (Casner-Lotto & Associates 1988; Roscow and Zager 1988). Viewing training within this larger organizational framework gives it more relevance from a management perspective, and facilitates the meaningful study of the dynamics of training activities within firms.

As part of this current development, Pettigrew et al. (1988) reported on 20 case studies of medium and large firms where training was viewed as part of a change process taking place within companies in Great Britain. Contextual factors around and within the firm were found to promote and inhibit the growth of the organization's training and development activities. Four categories of positive factors were identified: (1) business strategy and the recognized importance of training to its success; (2) external/internal labour market conditions which emphasize the importance of the internal labor force; (3) internal actors and systems in terms of management training commitment and infra-structure supporting the delivery of training activities; and (4) external support and pressure for training whether by government, legal requirements, or suppliers. In addition, three other categories inhibited training: (5) the nature of the products and tasks, where simple products/tasks detract from training concerns; (6) novel skills with few employees involved and with a long learning curve, thus training is viewed as inappropriate for the moment; and (7) preference for temporary recruitment as a human resource management style.

## **PURPOSE OF THIS STUDY AND HYPOTHESES**

The findings of Pettigrew et al. (1988) have considerable validity, because they are based on detailed case studies where the full complexity of organizational reality was taken into account (Jackson 1988: ch. 2). The question remains, however, as to the extent to which these findings can be generalized to the Canadian population of companies. Consequently, the authors undertook the development of a questionnaire focused on the factors influencing training, and the execution of a survey of the most important manufacturing region in Canada, that of Ontario. The manufacturing sector is constantly undergoing change (Economic Council of Canada 1988; Ministry of Skills Development 1989), making it an appropriate subject for the present study. Only medium and large companies were targeted, in keeping with the case studies of Pettigrew et al. (1988), and with the fact that small firms do comparatively little training.

*Hypothesis 1.* We expected that the amount of training taking place (numbers and hours) would vary proportionally and positively with the following four categories:

- business strategy linked to skills and training;
- external/internal labour market emphasizing the internal labour force;
- internal actors and systems supporting training;
- external support for training.

*Hypothesis 2.* Of these four groupings of factors, internal actors and systems would have the strongest relationship with training, in keeping with the findings of Pettigrew et al. (1988).

*Hypothesis 3.* We also expected that training would vary proportionally and negatively with the following three factors:

- level of complexity of products;
- novelty of skills and their limited use;
- preference for temporary recruitment.

## **METHOD**

### **Sample and Procedure**

The Canadian Trade Index Database (CMA 1989b) was accessed for mailing purposes; a stratified random sample of 1000 medium (100-499 employees) and large (500+) companies was obtained. Omitting duplicates and wrong addresses, the sample was adjusted to 964 firms. The questionnaire was addressed to the senior human resource manager, otherwise to the senior executive, at the firm's head office. Contact persons were advised to pass on the questionnaire to a knowledgeable management staff member when appropriate. Two weeks after mail-out, reminder cards were sent to all companies. In all, 238 usable questionnaires were received, representing a corrected response rate of 25%. Follow-up telephone calls were made to some respondents to complete key items omitted.

In order to check for bias, a systematic sample of non-respondents (326 out of 626) was selected; these individuals were contacted: 135 (41%) were prepared to answer training questions over the phone<sup>1</sup>; the remaining 191 (59%) gave the following reasons for not participating: not interested

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<sup>1</sup> The results of this part of the study are reported in LeBrasseur and Nasierowski (1990).

(30%), no time (18%), not a manufacturer (4%), firm closing, moving or merging (4%), and other reasons (4%). Thus, 30% of the sample consists of firms with little or no interest in training. In representing at most 70% of the sample, the survey results may be upwardly biased estimates of training interest and activities in the population.

The higher response rate of the telephone follow-up as compared to the mail-out (41% vs. 25%) may be attributed to the following: persuasiveness of the voice-to-voice communication, active search for the appropriate respondent when the contact person was absent or inappropriate, few questions asked and none on the quantitative aspects of training activities (15 minutes was required to complete compared to a minimum of 40 for the questionnaire), and immediacy of the request.

### **Instrument**

The questionnaire was composed of 149 variables, and divided into sections: (A) Profile of respondents; (B) Definitions of training and occupational groups; (C) Instructions; (D) General description of the company; and (E) Questions on training. Most quantitative items were fill-in-the-blank types (e.g., How old is the company?). Most opinion items used a 0-through-100 disagree-to-agree scale.

### **Occupational Groups**

The workforce was defined as follows:

Managerial: Executives, managers and supervisors.

Professional/Technical: Engineers, lawyers, accountants, technicians, computer/systems people, technologists.

Production: Processing, fabricating, assembling.

Trades: Construction (plumber, carpenter...), repair and industrial maintenance (mechanics, elec...)

Other: Sales and marketing, clerical and office, service, transport and handling.

### **Dependent Variables**

Training Investment was measured qualitatively for each occupational group (managerial, professional/technical, production, trades, other) by

the following disagree-to-agree item: "We invest considerable time and effort in training...". Training was also measured quantitatively (No. of employees participating, and average duration per trainee in days<sup>2</sup>) for each occupational group in terms of Directly Provided Training (i.e., the company implements the programs or purchases training courses over which it has control) and Supported Training (i.e., the company assists by paying tuition or by providing paid time-off).

It was decided to ask for head counts and days of training: other surveys had encountered difficulties, especially with financial information, because of the data collection practices of companies (Statistics Canada 1989; Ontario Manpower Commission 1986). Most budgeting and control systems serve a variety of company specific purposes (e.g., translating the business plan into a concrete budget for resource allocation purposes, generating financial statements and tax reports, and monitoring the efficiency of operations). The systems were not designed to capture training costs. Given this difficulty, the alternative approach of asking for head counts and hours of training can be adopted.

## RESULTS

The proportion of medium and large companies was consistent across sample frame, sample, and respondent sample. Though no information was available on the geographic distribution for the sample frame, regional representation was considered adequate across samples<sup>3</sup>.

Respondents had on average 10,9 years of tenure. The majority (64%) were managers or executives in human resources; 14% were executives in another area; and 22% were officers, for the most part in personnel services.

On average the companies were 52,4 years old, and were widely distributed throughout fifteen industries (based on two-digit SIC codes). The largest industries were fabricated metal products (16,8%) and electric and electronic equipment and components (15,1%). The smallest were lumber and wood products (1,3%) and furniture and fixtures (1,3%). On average, the industry selected by the respondent represented 92% of the firm's annual sales revenues. Ninety percent of the firms had a human resource or personnel department, but only 40% had staff persons whose primary responsibility was the training of other employees.

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2 One day of training was defined as 6 hours.

3 Detailed sampling information can be obtained from the first author.

The results on Directly Provided Training and Supported Training were disappointing: at best, 70% of respondents supplied this quantitative training data. Several respondents commented that their firm covered all supported training requested by staff, but data was not available. It appears that there was some unwillingness to make a concerted effort to obtain the data, perhaps because training information varied in detail and location within the firm (centralized/decentralized). Where multiple plants or divisions were involved, the head office (our contact point) may or may not have had centralized training data. Given the extent of missing data, some caution is appropriate in interpreting the results, but the data can be viewed as fair estimates in light of the finding that firms which actively train are less concerned with justification through hard data (Pettigrew et al. 1988). We conclude that firms which are unable to supply data easily may yet be active trainers.

On average, respondents disagreed that they could supply comprehensive data ( $M = 40,6$ ,  $S.D. = 27,6$ ,  $n = 225$ ). They also disagreed that their company kept accurate training cost records ( $M = 41,8$ ,  $S.D. = 32,1$ ,  $n = 233$ ).

A measure of Average Directly Provided Training (ADPT) was created by combining the occupational groups Management, Professional/Technical and Production as follows: number of employees trained, times training days per trainee (for each occupational group), added across occupations, and divided by total number of employees for those occupations. Trades and Other were ignored because of substantial missing data. ADPT was found to be 2,6 days per employee ( $S.D. = 4,6$ ,  $N = 167$ ).

A measure of Average Training Investment (ATI) was calculated by averaging across all occupational groups, including Trades and Other. Respondents indicated a moderate degree of investment in training ( $M = 53,6$ ,  $S.D. = 20,2$ ,  $n = 238$ ). Note that these two averages (ADPT & ATI) were significantly, though weakly, correlated ( $r = ,24$ ,  $n = 167$ ,  $p = ,001$ ).

A principal components factor analysis (followed by a varimax rotation) was executed on all training variables, excluding the dependent variables. Fifteen factors with eigenvalues greater than 1,0 were extracted, accounting for 63% of the variance. The means, standard deviations and factor loadings of the individual items are given in Table 1.

Factors scores were calculated, and zero-order correlations between the factors and the dependent variables were computed (see Table 1). A stepwise multiple linear regression was computed where ATI was regressed onto

**Table 1**  
**Means, S.D.s, Eigenvalues, Factor Weights of Variables,**  
**Correlations Between Factors & Dependent Variables**

	Mean <sup>b</sup>	S.D.	Eigenvalue/ Factor Weight	Zero-Order Correlations Avg. T.I. <sup>c</sup> Avg. DPT <sup>d</sup>
<i>Factor 1: Developed &amp; Active Training Organization &amp; Systems</i>				
Q69	54,5	32,9	8,61	,45 <sup>g</sup>
Q70	45,4	28,8	,83	,13
Q70	43,9	29,0	,80	
Q73	43,4	27,8	,80	
Q60	54,0	26,3	,72	
Q75	65,9	24,3	,69	
			,62	
<i>Factor 2: Management commitment, champions, resources &amp; budgets</i>				
Q62 <sup>f</sup>	57,8	26,5	2,75	,35 <sup>g</sup>
Q58 <sup>f</sup>	54,0	30,4	,76	
Q56 <sup>f</sup>	58,2	27,0	,68	
Q61 <sup>f</sup>	49,0	31,2	,68	
Q79	36,9	27,3	,61	
Q63	67,6	22,4	,51	
Q41 <sup>f</sup>	62,8	27,9	,48	
Q71 <sup>f</sup>	64,2	25,4	,45	
			,42	
<i>Factor 3: Strategic importance of skills &amp; training</i>				
Q31	78,6	20,6	2,27	,23 <sup>g</sup>
VAR2 <sup>a</sup>	79,3	13,4	,61	-,03
Q39	63,9	24,3	,59	
Q40	70,6	23,9	,47	
Q57	63,3	26,6	,46	
Q47	66,1	22,5	,46	
Q59	57,1	26,7	,44	

*Factor 1: Developed & Active Training Organization & Systems*  
 Q69 System and people in place with training responsibilities.  
 Q70 The company has a well-established training program.  
 Q70 Careful system for evaluating training activities.  
 Q73 Tried method to determine employee need in training.  
 Q60 Personnel/training function is active and innovative.  
 Q75 Programs effectively presented by qualified personnel.

*Factor 2: Management commitment, champions, resources & budgets*  
 Q62<sup>f</sup> Managers believe that training is too costly (time/money).  
 Q58<sup>f</sup> No consensus on the position and role of training.  
 Q56<sup>f</sup> Improving our training programs not considered a priority.  
 Q61<sup>f</sup> Training strategy is rarely discussed at the board level.  
 Q79 Line managers have access to extra budgets and relief staff.  
 Q63 Company commitment to helping employees prepare for change.

Q41<sup>f</sup> Resources focused to survive difficult circumstances  
 Q71<sup>f</sup> Managers with low opinion of training people and system.

*Factor 3: Strategic importance of skills & training*  
 Q31 Introduction of new technology to improve performance.  
 VAR2<sup>a</sup> Management believes that future success depends on skills.  
 Q39 Awareness of skills required to obtain expected benefits.  
 Q40 Staff training is critical to our survival.  
 Q57 Some senior managers oppose any cutback in our training.  
 Q47 When hiring, we look for new skills for the future.  
 Q59 Senior managers believe that training benefits are obvious.



<i>Factor 4: External training infrastructure &amp; linkages</i>									
Q91	Ties with outside training organizations/schools.	69,2	29,1	1,96	,25 <sup>g</sup>	,08			
Q92	Several training organizations/schools exist locally.	76,4	24,0	,63					
Q93	Making good use of outside specialists for training.	65,4	26,0	,62					
<i>Factor 5: Customer quality requirements &amp; product complexity</i>									
Q96	Some customers expect our employees to have high skills.	73,2	24,0	1,84	,06	,14 <sup>e</sup>			
Q102	No customers insist on certifying training standards.	0,57	0,50	-,67					
Q110	Simple product: little learning for producing or servicing.	26,4	25,2	-,54					
<i>Factor 6: Line management responsible for resources &amp; performance</i>									
Q77	Line managers responsible for resources and profits.	69,2	26,6	1,64	,09	-,07			
Q78	Line managers accountable for employee performance and training.	68,4	23,1	,80					
<i>Factor 7: External source of finance</i>									
Q109	Regular use of external sources of financing for training.	48,8	32,0	1,58	,12 <sup>g</sup>	,06			
Q108	Aware of external finance sources to cover training costs.	73,2	23,2	,85					
<i>Factor 8: Downsizing or expanding</i>									
Q50	Undergone growth or expansion during the 1980s?	0,77	0,42	1,48	-,01	-,01			
Q48	Undergone downsizing during the 1980s?	0,55	0,50	,74					
<i>Factor 9: Recruitment success &amp; quality personnel management</i>									
VAR1 <sup>a</sup>	We are able to hire regularly the skilled people we need.	62,9	17,0	1,40	,07	-,07			
Q52	Long tradition of quality personnel management.	59,8	23,2	,78					
<i>Factor 10: Constraints on training</i>									
Q80	Does your company has a union(s)?	0,66	0,47	1,29	-,12 <sup>g</sup>	-,08			
Q103	Training mandated by health and safety legislation.	84,1	21,9	,61					
Q94	Training offered by equipment suppliers (capital cost).	0,78	0,41	,51					
Q76 <sup>i</sup>	Poor facilities in which to carry out training.	57,4	31,8	-,34					

<i>Factor 11: Promotion opportunities &amp; product/market decisions</i>									
Q55 <sup>f</sup> In general, we offer few promotion prospects.	60,1	25,4	1,19	,76	,15 <sup>f</sup>				-,06
Q104 Is your company a subsidiary, division, group or consortium?	0,75	0,44	-,49	,46					
Q20 Intro. of product/market changes to improve performance.	77,4	19,7	1,16		-,04				-,09
<i>Factor 12: Recruitment standards &amp; high pay</i>									
Q54 Pay employees at higher rates than most of our competitors.	52,2	24,7	,79						
Q53 Maintain a minimal recruitment standard, below unacceptable.	68,6	25,9	,43						
<i>Factor 13: Long learning time &amp; part-timers</i>									
VAR3 <sup>a</sup> Rely on recruitment; skills new and the learning time long.	47,1	20,6	1,11	-,80	,08				,02
VAR4 <sup>a</sup> Prefer to hire part-time employees or on contract.	16,0	14,6	-,35						
<i>Factor 14: Using staff talent in training</i>									
Q74 <sup>f</sup> Program could make better use of staff talents.	33,1	22,3	1,08	,74	,07				,22 <sup>f</sup>
<i>Factor 15: Novel skills &amp; few employees</i>									
Q116 Employ people with new skills where training requirement not yet clear and the numbers involved are few at present.	40,8	27,0	1,05		-,00				-,04

<sup>f</sup> These items were recoded as follows: 100 - Q.

<sup>a</sup> Each of these items have five sections corresponding to occupational groups. The mean response across groups was used.

<sup>b</sup> N varies from 224 to 238. <sup>c</sup> N = 193. <sup>d</sup> N = 138.

<sup>e</sup> p < ,05. <sup>f</sup> p < ,01. <sup>g</sup> p < ,001.

the fifteen factors. Seven significant factors were retained in the final equation which explained 50% of the variance (F: 26,43, df: 7,185,  $p < ,001$ ). These factors, and their standardized regression coefficients (or beta weights), were as follows:

- F1<sup>4</sup>: Developed and Active Training Organization and Systems (beta of ,46);
- F2: Management Commitment, Champions, Resources and Budgets (,37);
- F4: External Training Infrastructure and Linkages (,26);
- F3: Strategic Importance of Skills and Training (,20);
- F11: Promotion Opportunities and Product/Market Decisions (,16);
- F7: External Sources of Finance (,11); and
- F10: Constraints on Training (-,11).

A second regression was computed with ADPT as the dependent variable. The final equation contained only two factors, and accounted for 8,5% of the variance (F: 5,87, df: 2,135,  $p < ,01$ ). The factors, and their beta weights, were:

- F14: Using Staff Talents in Training Programs (,21); and
- F2: Management Commitment and Resources (,19).

## DISCUSSION

The training participation rates of over 40% across occupations which were found in our survey compare favorably with the average of 24% reported by the Ontario Manpower Commission (1986). For each occupation, the increase in participation is impressive, varying between 20% and 30%. Average Directly Provided Training (ADPT) days per employee of 2,6 is slightly greater than the average of 1,7<sup>5</sup> found by the Ontario Manpower Commission (1986), and considerably less than the 5 to 13 days<sup>6</sup> reported by the Ontario Task Force (Currie et al. 1985) of selected manufacturing industries. This comparison improves when Supported Training is stacked onto the average of 2,6 days, though an exact figure is difficult to obtain because of missing data. Furthermore, 12% out of 167 firms that supplied quantitative data reported levels of ADPT of between 5,0 and 39,0

4 F1 to F15 coincide with the factors described in Table 1.

5 We estimated that trainees received 6,9 days per year, or 1,7 day per employee.

6 Training costs of between 2 and 5% of total labour costs were considered equivalent to 5 to 13 days a year of training per employee.

days per employees. We can conclude that some improvement in training participation rates has taken place since the mid 1980s, and that leading companies are reaching new levels of average duration of training per employee.

The training factors which emerged from the factor analysis fit well with those outlined by Pettigrew et al. (1988), though with some adjustments. Management commitment and champions are grouped with resource and budget items (Factor 2), suggesting that training budget decisions made by the management team flow from their commitment to training. Product complexity is accompanied by customer quality requirements (Factor 5). It suggests that, in addressing customer requirements, simple products become progressively more complex. A variety of items were grouped as Factor 10 (Constraints on Training), representing an assortment of external influences on training activities. Factor 11 (Promotion Opportunities and Product/Market Decisions) seems to focus on the promotion opportunities and the decision-making structure and process which create these opportunities.

The correlations between the measures of training (Average Training Investment and Average Directly Provided Training) and the factors (see Table 1) gave some support to the following hypotheses:

- the positive influence of a business strategy linked to skills and training (Factor 3);
- the positive influence of actors, namely managers (Factor 2), and training systems (Factor 1);
- the positive influence of external support for training (Factor 4 and 7).

No support was found for the hypothesis that the importance of the internal labor force would be a positive influence on training (Factors 9 and 12). As predicted, the level of complexity of the product had a negative association with training as shown by the negative factor weight (item Q110 of Factor 5); simple products detract from training. No support was found for the hypotheses that the following factors would have a negative influence on training: novelty of skills and their limited use (Factor 15) and preference for temporary recruitment (Factor 13). Examination of the mean and S.D. of item VAR5 suggests that the use of part-time and contract employees is relatively rare in the manufacturing sector.

The multiple regression on Average Training Investment retained seven factors (50% of the variance), confirming that training activities are influenced by a complex array of variables within and outside the firm. The only surprise was the negative regression coefficient given to Factor 10:

Constraints on Training. This result was consistent with the correlation between this factor and Average Training Investment ( $r = -.12$ ), and cannot be attributed to a suppressor effect. It appears that the presence of a union, mandated health and safety training, and training delivered by suppliers are a negative influence on training. This result contradicts the findings of Pettigrew et al. (1988), but given the small number of items which compose the factor, it remains in need of clarification.

The regression on Average Directly Provided Training was less successful, accounting for 8,5% of the variance, and retained only two factors: Using Staff Talent in Training (Factor 14) and Management Commitment, Champions, Resources and Budgets (Factor 2). The latter factor was also retained in the previous regression, thus giving some support to the hypothesis (No. 2) that this factor is the most important determinant of training activity. The factor Using Staff Talent in Training may be indicative of a training culture which impacts on all staff through the availability of a variety of training roles (e.g., trainees, occasional and dedicated trainers, speakers, organizers).

The greater success of the regression on the qualitative measure of training (Average Training Investment) as compared to the quantitative measure (Average Directly Provided Training) may be partly attributable to the nature of the measures taken. Most of the independent variables are qualitative and are presumably compatible with Average Training Investment, a qualitative variable. Similarly, despite the best attempts of the researchers to keep respondents focused on formal training, respondents may have unconsciously expanded their attention to include staff development such as task and job rotations, and coaching. On the other hand, Average Directly Provided Training is quantitative in nature, and poor data collection within firms is associated with this kind of measure. Verifying this explanation would require a complete and quality data set.

## CONCLUSION

This article builds on the conceptual work of Pettigrew et al. (1988), and has begun the work of creating a standardized instrument for measuring the factors which influence training activities, both within and around the organization. Clearly, additional efforts are required to refine and expand the battery of items, and confirm the existence of the training factors in other sectors and regions of the Canadian economy. Certain factors which were important predictors of training would benefit greatly from additional investigation, namely the Constraints on Training (Factor 10:

unions, health and safety, equipment suppliers), the decision-making context for promotion opportunities (Factor 11), and Using Staff Talent in Training (Factor 14). In addition, the redefinition of these factors into homogeneous indices and the articulation of their relationships would permit the use of causal (path) analysis. Though Pettigrew et al. (1988) offer considerable guidance in articulating the precise relationships among the factors, their case study analyses rely on dense empirical descriptions, and present numerous pathways to change with complex feedback loops. These results are transferred with difficulty to the framework of tests and measurement.

Quantitative studies of training within organizations will continue to be hampered by the data collection practices of firms. Some improvement may take place in the foreseeable future as a growing number of firms tackle training and skill issues. We may also witness increasing mandatory reporting requirements as federal and provincial governments monitor closely the competitiveness of their economies and the contribution made by the availability of a skilled workforce. Applied researchers could assist management by developing and implementing new planning and control systems where training would receive the attention it deserves.

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### ***Les facteurs de formation dans le secteur manufacturier ontarien***

L'objet de cette étude est de valider les facteurs organisationnels identifiés par Pettigrew et al. (1988) affectant les activités de formation d'une entreprise. L'étude repose sur trois hypothèses.

*Hypothèse 1.* La formation offerte par une entreprise (en nombre de jours) varie proportionnellement et positivement en fonction des quatre catégories de facteurs suivants: la stratégie de l'entreprise et l'importance attribuée à la compétence et à la formation des employés; le marché externe et interne de main-d'oeuvre et l'importance accordée au marché interne; le support des personnes clés (ex.: la direction) et des systèmes de gestion à la formation; l'appui à la formation venant de l'extérieur de l'entreprise.

*Hypothèse 2:* L'influence des personnes clés et des systèmes de gestion est prépondérante.

*Hypothèse 3:* La formation varie de façon proportionnelle et négative en fonction des trois facteurs suivants: la simplicité du produit, la nouveauté des compétences requises et le petit nombre d'employés impliqués, et la préférence des gestionnaires pour le recrutement et l'embauche d'employés temporaires.

Deux-cent-trente-huit entreprises ont complété un questionnaire (taux de réponse de 25%). Afin de vérifier les hypothèses, deux variables dépendantes ont été créées: (1) ADPT ou la moyenne de jours de formation directe offerte par année à chaque employé, et (2) ATI ou la moyenne de temps et d'effort consacrés à la formation de chaque employé selon une grille qualitative. Une analyse factorielle des composantes principales (avec rotation varimax) a fait ressortir 15 facteurs (les variables dépendantes mises à part) similaires à ceux identifiés par Pettigrew et al. (1988). Cependant, quelques précisions sont de mise pour le secteur manufacturier: les décisions d'allocation budgétaire semblent découler de l'engagement des gestionnaires envers la formation; les exigences des consommateurs quant à la qualité du produit créeraient une pression pour un produit plus complexe; et les opportunités de promotion découleraient des structures organisationnelles et de la prise de décision.

L'analyse de régression a permis d'identifier les sept facteurs ayant un pouvoir prédictif à l'égard de l'ATI (en ordre de puissance): F1 - les systèmes formels et actifs de formation; F2 - l'engagement des gestionnaires et des ressources; F4 - l'infrastructure de formation extérieure à l'entreprise et les liens entre les deux; F3 - l'importance stratégique des compétences et de la formation; F11 - les chances de promotion et les décisions liées aux produits et marchés; F7 - les sources externes de financement; et finalement F10 - les contraintes à la formation. Une deuxième régression a retenu seulement deux prédicteurs de l'ADPT: F14 - l'utilisation des talents du personnel régulier pour les programmes de formation et F2 - l'engagement des gestionnaires et des ressources.

Les résultats démontrent une augmentation de la quantité de formation offerte dans le secteur manufacturier au cours des dix dernières années: présentement, la moyenne se chiffre à 2,6 jours par année par employé. Les analyses ont révélé que la formation ne découle pas seulement d'une gamme de facteurs situés à l'intérieur de l'entreprise mais également de facteurs extérieurs. De plus, contrairement au sens commun, il est surprenant de constater que les variables suivantes aient eu un impact négatif sur la formation: la présence d'un syndicat, la formation obligatoire en santé et sécurité, et la formation offerte par les fournisseurs; d'autres recherches sont nécessaires afin d'expliquer cette situation. Finalement, bien que ces résultats soient encourageants, il reste un travail important à faire pour rendre le questionnaire plus robuste et pour valider l'importance des facteurs de formation dans d'autres secteurs de l'économie.