

REGIONAL INNOVATION SURVEY FOR ETOBICOKE

PRELUDE

Etobicoke, Ontario is one of the six cities that form Metropolitan Toronto. This report is about a Regional (Community) Innovation Survey for Etobicoke. In this report “region”, as well as “community”, are being used for sub-provincial structures. The survey, performed in summer 1994, is part of the project on Community Systems of Innovation for Etobicoke (originally entitled Etobicoke technology strategy) which “seeks ways and means to develop technology strategy for economic development in Etobicoke.”

The Innovation Survey has been developed to provide a sound information pool about the current innovation capabilities and the technology development plans of Etobicoke businesses. Etobicoke Industrial Survey (another report of this series) has already elucidated that small and medium sized manufacturing industries constitute the backbone of Etobicoke’s economy, a case similar to many other cities in the industrial countries.

The innovation survey is consistent with the Holistic model of innovation, which is discussed earlier in this series. **Understanding the role of information/knowledge in the new economy and exploring the design and development capabilities of businesses is a corner stone of the holistic model.**

The Holistic model looks at innovation as a phenomenon much wider than “Research and Development” - R&D, which consists of a hierarchy of three stages: ‘basic research’, ‘applied research’ and ‘development.’ R&D is also divided into product and process development. By considering the three stages of R&D hierarchy along with product and process development, R&D can be characterized using a matrix with six cells.

R&D, as a classification for innovation and technology development, evolved during and in the early years after the Second World War. However, since 1960s, it has become the dominant measuring system and an index for science and technology development. The expenditure on R&D has been used as the main yardstick for quantifying the technology development capabilities of nations.

According to the most recent ‘Science and Technology Statistics’ by Industry Canada, in 1991, 3,566 Canadian business enterprises performed R&D. That number corresponds to only 0.4% of total Canadian businesses. The same source reveals that the top 100 firms accounted for 68% of total Canadian R&D expenditures and the remaining 3,466 firms accounted for 32%. Among the G-7 countries, Canada has the highest ratio of ‘government and university’ to ‘business’ R&D expenditure. However, despite this statistic, Canada it has so far achieved too little success in translating good research ideas into commercial success.

The R&D approach to technology development is based on a methodology that looks at technological change as a phenomenon which is exogenous to production system and is closely dependent upon, and directly generated by, prior scientific research. R&D, as an indicator of technological development, only measures the tip of the iceberg of innovation.

R&D based studies are not able to provide comprehensive information about the technological capabilities of small/medium sized enterprises - SMEs. New yardsticks are needed to classify and quantify the innovation and technological capabilities. The competitive advantage of a business depends on the application of a wide range of technologies. However, each business should figure out the best combination and synthesis of needed technologies based on its unique condition.

Developing methodologies, which are able to classify technological capabilities of SMEs, has never been an easy task. The innovation survey for Etobicoke was initiated to tackle this issue. The 'Background' part of this report delineates the developed methodology.

Keeping with the Holistic methodology, a questionnaire for the survey was developed. The pilot phase of the Etobicoke Innovation Survey covered a dozen of firms with a wide range of activities. Incorporating some refinements, the first phase of the survey was performed on about 40 randomly selected small/medium sized manufacturing industries in Etobicoke. Results of these studies, as well as the employed questionnaire, are presented in the coming section titled "Aggregate of Phase One of the Innovation Survey."

MAIN CONCLUSIONS

1. Surveyed businesses are basically outward-oriented. Only 10% of the businesses look to Etobicoke as their major market, compared with 75% and 65% that look to Canada and the US respectively. On the other hand, 40% and 80% of the businesses look at Canada and US as sources of competition.
2. 70% of businesses indicated that they have product development units. However, only 20% plan to develop this unit.
3. 70 % of businesses referred to "development/adaptation" as their major technology resource for product development. Only 15% indicated that they have performed basic research to explore new products, while 30% marked applied research. Production based on receiving well defined drawings (the supply stage) has been indicated by about 40% of businesses as a technology resource. The above data verify that traditional R&D criteria do not adequately reveal the whole range of technology development capabilities, e.g. adaptation.
4. More than 75% of businesses have marked that they have quality control units, which is the highest rate for technology development units, even higher than the product development units. However, the development of quality control capabilities has not been a major subject in traditional R&D studies.
5. More than three quarters of surveyed business revealed that they have no documented technology development plan. The same ratio marked that the processes of re-organizing their

technology development units and studying technological capabilities of their competitors are performed spontaneously and ad hoc. **Deficiency in management of technology, covering the above subjects, is the greatest inhibitor of the technological capability of the surveyed businesses.**

6. 60% and 40% of surveyed business have received support from the IR&ED Tax incentive and IRAP program respectively, corresponding to a national survey by Statistics Canada.

7. Cash flow and banks have been the major sources of financing for the businesses, 70% and 40% respectively.

8. Manually controlled machinery is still a major source of equipment for surveyed businesses. In fact, 55% of businesses indicated manually controlled machinery in their fabrication process. Office systems tend to employ the most advanced machinery. Almost three quarters of the businesses use computer systems in their offices.

TECHNOLOGY PLANING: THE MISSING LINK

Etobicoke businesses are trying very hard to cope with the challenges of the world competition. The adaptation stages of product development and quality control are their main source of technology development. However, as mentioned above, the major obstacle for further development of businesses is the deficiency in management of technology and technology planning. More than three quarters of the businesses explicitly indicated that they do not have documented their technology plans.

A technology plan should describe the main patterns and potential changes in the technological strategies of a business. The domain of a technology plan, therefore, is much broader than defining the technical aspects of products, R&D projects or management of engineering sections. A technology plan, as a management tool, should be integrated and associated with the conventional business plan - the management tool for planning, controlling and analyzing a firm. Business plans, in addition to managers, are also used by investors and government officers.

In the knowledge-based industries, where life-cycle of technologies may be shorter than life-cycle of projects, managers increasingly associate technology planning with business and financial planning. They should be careful that conventional accounting process and financial planning, following the traditional economic principles, are based on the context of given technologies, and next to no innovation.

In the new knowledge-based and technology-oriented economy, it will not be possible to rely on the traditional business plans which are not associated with proper technology plans. Fast changing economies, which are fueled by the increasing pace of technological developments and are based on ideas and innovation, cannot confine themselves to the context of technology-less business plans.

The integration of technology and business plans should create an excellent management tool to let managers to plan, execute, analyze and control innovative businesses. In addition, the integration of financial and technology planning should make it possible for managers and members of executive

boards to consider all of the aspects of a comprehensive business plan.

Banks and financial institutions are the main market and support for the development of technology plans. However, government technology support programs, such as IRAP and IR&ED tax incentive, may also find them very handy.

We have not yet configured the standard technology plans, which can be integrated and associated with business plans. This may become the first priority in assisting businesses to assist themselves. Ultimately, technology plans should become vision documents for managers, where financial criteria, such as rate of return and profitability, act as their compass. Canadian businesses have already started their voyage into the wonderland of new economy. They are using their compass, but they have not been equipped with proper plans and maps. Just knowing where the North pole is located is not sufficient to carry out a trip into unknown territories; if you do not know where you are going, you will wind up somewhere else.

BACKGROUND

Production is a process for transforming elements of production into desired products. Technology, here, is being defined as ‘the system that provides knowledge (including information) and artifacts (covering equipment and machinery) needed for a production’. Equipment and machinery, as generic terms, cover any work instrument. Knowledge may further be arranged into information, know-how, skills, ideas, attitude and organization. The proper taxonomy for a technology’s elements; i.e. knowledge and artifacts, is the key to a sound technology study.

Consistent with the Holistic model of innovation, information, based on its applications in the process of production, is organized into seven main groups: “Product”, “Process”, “Machinery/-Tool”, “Plant”, “Quality Control”, “Training” and “Management of Technology”.

The product development resources of a firm may be organized according to the procedure of acquiring information for the product design. In addition to R&D - basic and applied research, and development, the product development resources contain also “patent”, “adaptation” (imitation, improvement and upgrading), “license”, “technology transfer”, and “supply”.

‘Supply’ is the first level of the product development resources. Suppliers’ and sub-contractors’ technological capabilities are based on receiving ready to use technical documents, such as detailed blue prints. The technical information is provided by the clients/customers, or their parent company.

‘Technology Transfer’ is the second resource of product development technology. At this level, products are also being produced based on the already existing documents, similar to the supply stage. However, the factories which are in the innovation stage of ‘technology transfer’, have the capability to select and then make technology transfer agreements to acquire the needed product development documents.

‘License’ is the third group of the resource for product development. At this level of technology development, the acquired information and technical know-how are also based on technology transfer agreements. But, the factory is able to develop further the acquired know-how and

information into a set of product development documents.

‘Adaptation’ is the name for the fourth group of technology resources. At this stage, a company has the ability to develop and produce new types of products. There may exist similar products, but the new products, compared to the existing generation, have better quality or price characteristics.

‘Development’, is the name for the next stage of product development, which is has often been used exclusively for the whole process of product development. At this level, a firm has the ability to design, develop and produce genuine new products. ‘Patent’ is the name for next group of product development capabilities, when the given product is patentable.

The next level of product development has been named ‘Applied Research’. The companies that are in this stage, are able to make drastic innovations. The last group of product development resources has been referred to as ‘Basic Research’, which is mainly in the domain of scientific centers. However, basic research is also a resource for product development. In sundry textbooks and academic studies, technology development has been limited to the ‘research and development - R&D’. The resources for process development may also be organized similar to the resources for product development.

The above resources for products and process development technology are being organized as in the following form:

- Supply (Sub-Contracting, Order)
- Technology Transfer
- License
- Adaptation
- Development
- Patent
- Applied Research
- Basic Research

The questions related to ‘tool and equipment development capabilities’ concentrate on the internal applications. A firm or factory may also provide tool development services to other businesses, which are being considered as a product. The equipment and tool development resources are classified into the following groups:

- Equipment for the existing machinery
- Modifying existing machinery
- Upgrading/Improving existing machinery
- Upgrading machinery in a market
- Making new machinery

The quality control and quality assurance development resources have been classified based on ‘quality control of each product’, ‘statistical techniques’ and ‘ISO 9000’. Training methods, or technology resources for training, are classified as ‘on-the-job training’, ‘formal courses from outside sources’ and ‘formal courses from inside sources’. The appending matrix entitled

“Technology Development Resources” depicts some of the above mentioned relationships. The survey includes also questions related to ‘management of technology’, ‘technology support programs’, ‘sources of information’ and ‘sources of financing’.

Reverse engineering may be perceived as the process for starting from less complicated resources of product development, such as the supply stage, and going on to more complicated stages such as development and patent. Strategic business development plans should consider that reverse engineering is a continuous process and it has become a highly developed art form. On the other hand, technology development is not a one dimensional activity which is limited or restricted to product or process development. Making progress in the other technology development capabilities such as equipment development, plant development, quality control, training or management of technology should also be considered as technology development.

An innovation survey should cover both the current and the potential capabilities. Consequently, the questionnaire includes items about both the current (existing) capabilities, as well as the plans (future programs). The plans are classified into: less than 6 months, 6 months to 2 years, 2-5 years and more than 5 years. The questions are modular: First part explains current conditions and possible plans for technology development units. The questions include whether a clearly defined unit exists in-house or not and whether there is a plan for creation or development of such unit in future. The questionnaire includes also questions related to the interaction between development plans for each group of technologies and respected resources.

Technology, as it was discussed earlier, includes also equipment and machinery. The utilized machinery, based on their applications, are classified into the following main groups: “Fabrication”, “Assembly”, “Material Handling”, “Packaging”, “Storage”, “Engineering/Design”, “Control/Inspection” and “Office Systems”.

During the last five decades, the improvement in control system has constituted the major source of technology development in machinery. Control systems are classified into four main groups: “Manually Controlled/Operated”, “Mechanically Controlled”, “Individually Electronically Controlled” and “Integrated Electronically Controlled.” Consequently, the machinery, based on their control systems, have been classified into four main groups; arranged as in the following table:

- Manually Controlled/Operated
- Mechanically Controlled
- Individually Electronically Controlled
- Integrated Electronically Controlled

The questions related to the machinery for each group consist of two parts: Classification of the given machinery, and the plans for development, which by itself further subdivided into ‘whether the existing type of machines will be used’, or ‘more advanced machinery will be employed’. The appending matrix entitled “Classification of Machinery” depicts some of the above mentioned relationships.

TECHNOLOGY DEVELOPMENT RESOURCES

PRODUCT	PROCESS	EQUIPMENT AND TOOLS	QUALITY CONTROL/ QUALITY ASSURANCE	TRAINING	MANAGEMENT OF TECHNOLOGY
Supplying	Supplying	Tools for existing machinery	Quality control of each product	On-the-job training	Strategic technology development plan
Technology Transfer	Technology Transfer	Modifying in-house machinery	Statistical techniques	Formalized outside courses	Re-organization of technology units
Licensing	Licensing	Upgrading in-house machinery	ISO-9000	Formalized in-house courses	Comparing competitors' technologies
Adaptation	Adaptation	Upgrading machinery in market		Training by the suppliers of machinery	Other technology development units
Development *	Development *	Making new machinery		Training by customers or clients	
Patent	Patent				
Applied Research *	Applied Research *				
Basic Research *	Basic Research *				

* **Activities covered by conventional R&D**

CLASSIFICATION OF MACHINERY

	Fabrication	Assembly	Material Handling	Packaging	Storage	Engineering & Design	Control & Inspection.	Office
Manually Operated/Controlled Machinery								
Mechanically Controlled Machinery								
Individually Electronically /Controlled Machinery								
Integrated Electronically /Controlled Machinery								

AGGREGATE OF PHASE ONE OF THE INNOVATION SURVEY

The coming pages are the “Aggregate of Phase One” of the Innovation Survey for Etobicoke and the questionnaire, which developed for the innovation survey. **The number besides each item represents percentages of the businesses that have marked the given item.**

Certainly the vast information gathered in the Phase One of Etobicoke Innovation Survey is not limited to the main conclusion. Rather, the collected information produces a wide information pool, which, depend upon the needs and plans may be further explored.

GENERAL INFORMATION

Name of Company:

Address:

Telephone:()

Fax: ()

Contact Person:

Position:

Ownership/Parent Company (if applicable):

Year the company went into operation:

Approximate last year total sales: \$

Main Products (Please include both the goods and services which are produced or provided):

Approximate last year total production (if applicable):

Approximate percentage of production or sales for each group of products, both goods and services:

Main in-put parts/raw materials:

Number and classification of full time employees

Total:

Executive/Management:

Engineers (University graduates, BS or higher degrees):

Technical (College graduates, technicians and technologists):

Production Workers:
 Administration/Accounting:
 Sales:
 Other:

Part time employees, if applicable:

MARKET

Markets for main products are located in:	Approximate Percentage of Sales:
[10] Etobicoke	[]
[3] Metro-Toronto	[]
[20] Greater Metro-Toronto Area (GTA)	[]
[50] Ontario	[]
[75] Canada	[]
[7] US, Midwest	[]
[65] US	[]
[10] Latin America	[]
[25] EEC	[]
[7] Pacific Rim	[]
[3] Other, please specify	[]
[] Prefer not to respond	[]

COMPETITION

Main competitors for main products are located in:	Approximate Rank:
[3] Etobicoke	[]
[] Metro-Toronto	[]
[25] Greater Metro-Toronto Area (GTA)	[]
[40] Ontario	[]
[40] Canada	[]
[] US, Midwest	[]
[80] US	[]
[] Latin America	[]
[30] EEC	[]
[14] Pacific Rim	[]
[] Other, please specify	[]
[] Prefer not to respond	[]

PRODUCT DEVELOPMENT AND DESIGN CAPABILITIES

This section is about your main product. If there is more than one main product, please prepare separate form for each one.

Product Development Unit

In this questionnaire, unit includes terms such as; department, division, section, etc.

- [70] Clearly defined product development unit exists in-house
[] Create/development of product development unit within:
[20] 6 months [10] 6 months to 2 years
[] 2-5 years [] More than 5 years
[7] As required, you will provide product development service on a fee basis to outside clients
[15] No clearly defined product development unit exists in-house
[3] Do not intend to create product development unit in future
[] Other, please specify [] Not applicable [] Prefer not to respond

Product Development Resources

How do you receive and interact with new product development/design information?

- [40] **Supply**: Ready to use documents, blue prints and designs from client, supplier or parent company
[15] **Technology transfer**: Ready to use documents acquired through technology transfer agreements
[20] **License**: Technical know-how acquired through technology licenses, which are further, developed in-house
[70] **Adaptation** : Improve or upgrade existing products in-house
[75] **Development** of new products
[30] **Patent** applications developed in-house
[30] **Applied research**
[15] **Basic** research to explore new products
[] Other, please specify [] Not applicable [] Prefer not to respond

Product Development Plans

Is there a formally approved plan to upgrade the existing products or develop new products for the production facility?

- [40] 6 months [7] 6 months to 2 years
[30] Other, please specify [15] No, or not applicable [] Prefer not to respond

If you determine to upgrade/develop your products, describe the product development resource:

- [80] The same as you currently utilize
[] Extend the resource base, please specify
[3] Other, please specify [] No, or not applicable [] Prefer not to respond

PROCESS DEVELOPMENT CAPABILITIES

Process, in this questionnaire, is used to define the procedure of production. Process development

technologies are for in-house utilization and do not include equipment, plant and facilities.

How do you define your major process of production?

- [45] Job-Shop
- [20] Continuous
- [] Other, please specify
- [40] Batch
- [] Group Technology
- [] Not applicable
- [] Prefer not to respond

Process Development Unit

- [60] Clearly defined process development unit exists in-house
- [] Create/development of process development unit within:
 - [15] 6 months
 - [] 2-5 years
 - [3] 6 months to 2 years
 - [] More than 5 years
- [3] As required, you will provide process development service on a fee basis to outside clients
- [25] No clearly defined process development unit exists in-house
- [15] Do not intend to create process development unit in future
- [3] Other, please specify
- [] Not applicable
- [] Prefer not to respond

Process Development Resources

How do you receive and interact with new process development information?

- [20] **Supply:** Ready to use documents, blue prints and designs from client, supplier or parent company
- [20] **Technology transfer:** Ready to use documents acquired through technology transfer agreements
- [15] **License:** Technical know-how acquired through technology licenses, which are further developed in-house
- [75] **Adaptation:** Improve or upgrade existing processes
- [45] **Development** of new processes
- [10] **Patent** applications developed in-house
- [10] **Applied research**
- [7] **Basic research** to explore new processes
- [] Other, please specify
- [7] Not applicable
- [] Prefer not to respond

Process Development Plans

Is there a formally approved plan to improve the existing processes or develop new processes for the production facility?

- [30] 6 months
- [7] 2-5 years
- [20] Other, please specify
- [3] 6 months to 2 years
- [] More than 5 years
- [30] No or not applicable
- [] Prefer not to respond

If you determine to improve/develop the process, please specify the process resource.

- [70] The same as you currently utilize
- [3] Extend them, please specify the resources
- [] Other, please specify [15] No or not applicable [] Prefer not to respond

EQUIPMENT AND TOOL DEVELOPMENT

Equipment and tool are used here as generic terms, which include any in-house, produced work instrument such as die, jig, fixture, vessel or machine. This questionnaire addresses the internal production and utilization of produced equipment and tools. If a firm produces equipment and tools for other businesses, the produced tools and equipment should be treated as products.

Equipment/Tool Development Unit

- [40] Clearly defined equipment/tool development unit exists in-house
- [] Create/development of equipment/tool development unit within:
 - [7] 6 months [3] 6 months to 2 years
 - [] 2-5 years [] more than 5 years
- [] As required, you will provide equipment/tool development service on a fee basis to outside clients
- [50] No clearly defined equipment/tool development unit exists in-house
- [40] Do not intend to create equipment/tool development unit in future
- [] Other, please specify [] Not applicable [] Prefer not to respond

Equipment/Tool Development Resources

The current equipment development capabilities include mainly:

- [40] Providing equipment/tools for the already existing machinery
- [35] Modifying the currently used machinery
- [40] Upgrading/improving the currently used machinery in house
- [20] Making/upgrading the machinery that already exist in the market, but not in house
- [20] Making/developing new machinery
- [] Other, please specify [20] Not applicable [] Prefer not to respond

Equipment/tool Development Plans

Is there a formally approved plan to acquire (make or buy) new machinery or to improve the existing machinery?

- [40] 6 months [15] 6 months to 2 years
- [] 2-5 years [] More than 5 years
- [10] Other, please specify [20] No or not applicable [] Prefer not to respond

If you determine to improve/develop equipment or machinery, please describe the resource.

- [40] The same as you currently utilize
- [15] Extend them, please specify the resources
- [] Other, please specify [15] No or not applicable [7] Prefer not to respond

PLANT DEVELOPMENT CAPABILITIES

Plant development service, in this questionnaire, is for in-house utilization. Plant development includes all the services for development and setting up a factory or production facility. Plant development includes: site selection, machinery lay-out, facilities planning, mechanical and electrical utilities, and civil and architectural service.

Plant Development Unit

- [20] Clearly defined equipment/tool development unit exists in-house
- [] Create/development of plant development unit within:
 - [7] 6 months [] 6 months to 2 years
 - [3] 2-5 years [] more than 5 years
- [25] As required, you will provide plant development service on a fee basis to outside clients
- [40] No clearly defined plant development unit exists in-house
- [30] Do not intend to create plant development unit in future
- [] Other, please specify [3] Not applicable [3] Prefer not to respond

Plant Development Plans

Is there a formally approved plan to rehabilitate the existing plant or to develop/set up new plant or factory as part of the existing facility?

- [15] 6 months [20] 6 months to 2 years
- [7] 2-5 years [3] More than 5 years
- [7] Other, please specify [25] No or not applicable [3] Prefer not to respond

QUALITY CONTROL

Quality Control Unit

In this survey quality control includes quality assurance and will be referred to as QC/QA

- [75] Clearly defined QC/QA unit exists in-house
- [] Create/development of QC/QA unit within:
 - [10] 6 months [10] 6 months to 2 years
 - [] 2-5 years [] more than 5 years
- [] As required, you will provide QC/QA service on a fee basis to outside clients
- [15] No clearly defined QC/QA unit exists in-house
- [10] Do not intend to create QC/QA unit in future
- [] Other, please specify [] Not applicable [] Prefer not to respond

MANAGEMENT OF TECHNOLOGY

Is there a formally approved strategic technology development plan for the firm?

- [65] No [15] Yes, please name it and define the approximate time scope of the plan.
[] Other, please specify [] No or not applicable [3] Prefer not to respond

The process of re-organizing technology development units inside the firm is performed:

- [65] Spontaneously (ad hoc), without assigning any specific group or task force
[25] By a specific group or task force, please name it
[3] Other, please specify [3] No or not applicable [] Prefer not to respond

The process of comparing the technological capabilities of your firm with competitors' technological capabilities is performed:

- [70] Spontaneously (ad hoc), without assigning any specific group or task force
[20] By a specific group or task force, please name it
[3] Other, please specify [3] No or not applicable [] Prefer not to respond

In addition to the clearly defined development units mentioned previously, is there any other group or unit which provides technological development services in house?

- [65] No [20] Yes, please name it

If such a group or unit exists, which of the following services are provided by this group?

- [20] Product development [7] Process development
[3] Tool/equipment [3] Plant development
[3] QC/QA [] Training
[3] Management of technology
[] Other, please specify [] Not applicable [] Prefer not to respond

TECHNOLOGY SUPPORT PROGRAMS

There are numerous technology development programs, supported by government. Please check the programs that you gave used in the last five years.

- [60] IR&ED Tax incentives [40] IRAP
[] AMTAP [] TOP-AIM
[7] Industrial Adjustment Services [] New Venture
[7] International Business Development [] DIPP
[] Strategic Technologies Program
[30] Ortech [20] Jobs Ontario
[7] Other, please specify [7] Not applicable [3] Prefer not to respond

SOURCES OF INFORMATION

The sources of information used for the improvement and development of different aspects of technology consist of:

- [60] Text books
- [40] Standards
- [35] In-house library and information centers
- [20] Public libraries and information centers
- [65] Conferences, trade fairs and professional meetings
- [65] Market feed-back
- [40] Customers, clients or parent companies
- [45] Competitors' resources (existing products, processes, and so on)
- [] Other, please specify
- [53] Professional publications
- [30] Patent literature
- [32] Suppliers of machinery and equipment
- [] Not applicable
- [] Prefer not to respond

SOURCES OF FINANCING

The main current source of finance for development

- [70] Cash flow and short term suppliers' credits
- [30] Parent company resources
- [3] Venture capital firms; special firms providing risk equity or other not fully secured capital
- [] Joint Ventures
- [42] Financial institutions; banks and trust companies
- [3] Public equity markets; stock exchange
- [7] Governments; Federal Business Development Bank, government funded innovation centers
- [] Small Business Development Loans
- [15] Individuals; private individual investors, not elsewhere specified
- [10] Other, please specify
- [] Not applicable
- [7] Prefer not to respond

Planned sources of finance

- [70] The same source of finance that currently are used, will be used
- [20] New sources of financing will be explored, please specify
- [] Other, please specify
- [] Not applicable
- [10] Prefer not to respond

CLASSIFICATION OF MACHINERY

FABRICATION MACHINERY

Classification of main fabrication machinery

- [55] Manually controlled/operated machinery
- [40] Mechanically controlled machinery
- [30] Individually electronically controlled machinery; e.g. CNC machinery
- [7] Integrated electronically controlled machinery; e.g. CIM machinery

Other, please specify [15] Not applicable [2] Prefer not to respond

Plans for fabrication machinery

[30] For development plans, the existing type of fabrication machinery will be used
[30] For development plans, more advanced machinery are going to be searched for
 Other, please specify [10] Not applicable [5] Prefer not to respond

ASSEMBLY MACHINERY

Classification of main assembly machinery

[30] Manually controlled/operated machinery
[20] Assembly line and mechanically controlled systems
[15] Individually electronically controlled assembly machinery such as robotics
[3] Integrated electronically controlled assembly machinery
 Other, please specify [45] Not applicable Prefer not to respond

Plans for assembly machinery

[40] For development plans, the existing type of assembly machinery will be used
[10] For development plans, more advanced machinery are going to be searched for
 Other, please specify [20] Not applicable Prefer not to respond

INSPECTION AND CONTROL MACHINERY

Classification of main inspection and control machinery

[60] Manually and mechanically operated instruments; e.g. mechanical micrometers
[30] Individually electronically controlled instruments; e.g. electronic micrometers
[25] Computer aided inspection and control
[15] Integrated inspection and manufacturing systems
 Other, please specify [30] Not applicable Prefer not to respond

Plans for inspection and control machinery

[50] For development plans, the existing type of inspection and control machinery will be used
[21] For the development plans, more advanced machinery are going to be searched for
 Other, please specify [25] Not applicable Prefer not to respond

PACKAGING MACHINERY

Classification of main packaging machinery

[30] Manually controlled/operated machinery
[20] Packaging lines and mechanically controlled systems

- [7] Individually electronically controlled packaging machinery
- [] Integrated electronically controlled packaging machinery
- [] Other, please specify [40] Not applicable [] Prefer not to respond

Plans for packaging machinery

- [20] For development plans, the existing type of packaging machinery will be used
- [10] For the development plans, more advanced machinery are going to be searched for
- [] Other, please specify [40] Not applicable [] Prefer not to respond

Material Handling Machinery

Classification of main material handling machinery

- [45] Manually operated/controlled machinery
- [45] Mechanically operated/controlled machinery; e.g. conveyors
- [15] Individually electronically controlled machinery; e.g. robotics
- [7] Integrated electronically controlled machinery; e.g. AGVs
- [3] Other, please specify [15] Not applicable [] Prefer not to respond

Plans for material handling machinery

- [50] For development plans, the existing type of material handling machinery will be used
- [20] For the development plans, more advanced machinery are going to be searched for
- [] Other, please specify [15] Not applicable [] Prefer not to respond

STORAGE MACHINERY

Storage, in this survey, includes place for raw material, in-put part, and finished products.

Classification of main storage machinery

- [50] Manually operated/controlled machinery (e.g. manual lifters)
- [50] Mechanically operated machinery (e.g. two motors)
- [3] Individually electronically controlled storage machinery such as robotics
- [7] Integrated electronically controlled storage machinery
- [] Other, please specify [15] Not applicable [] Prefer not to respond

Plans for storage machinery

- [55] For development plans, the existing type of storage machinery will be used
- [15] For the development plans, more advanced machines are going to be searched for
- [] Other, please specify [30] Not applicable [3] Prefer not to respond

ENGINEERING AND DESIGN MACHINERY

Classification of main engineering and design machinery

- [30] Manually operated machinery; e.g. drafting board
- [55] Computer aided drafting and Design; e.g. CAD
- [35] Computer aided simulation and prototypes
- [15] Integrated design and manufacturing; e.g. CAD/CAM
- [3] Other, please specify [15] Not applicable [] Prefer not to respond

Plans for engineering and design machinery

- [45] For development plans, the existing type of engineering and design machinery will be used
- [30] For the development plans, more advanced machinery are going to be searched for
- [] Other, please specify [20] Not applicable [] Prefer not to respond

OFFICE MACHINERY

Office machinery, in this survey, includes machinery and equipment for performing administration, accounting, sales and procurement.

Classification of main office machinery

- [15] Mechanically controlled machinery; e.g. mechanical type writers
- [70] Independent computers systems; stand alone PCs with word processing software
- [70] Integrated computer systems; LAN, Mainframe
- [] Other, please specify [] Not applicable [3] Prefer not to respond

Plans for office machinery

- [30] For development plans, the existing type of office machinery will be used
- [60] For the development plans, more advanced machinery and systems are going to be searched for
- [] Other, please specify [] Not applicable [3] Prefer not to respond.