UNIVERSITY of TORONTO

Brief for the Appraisal of the *Master* of Management of Innovation Program in the Graduate Department of Health Administration

Submitted to the
School of Graduate Studies
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VOLUME I: The Program

THE PROGRAM

Executive Summary

This proposal is for a 12 month Master of Management of Innovation (MMI) professional degree program. It fulfills a need in the health care industry, is of interest to graduate students, and provides a greater presence of life sciences at UTM. Furthermore, this program is part of the University of Toronto's plan (SteppingUp, 2004) to increase graduate program activity of the UTM campus. The proposed MMI program focuses on economic analysis and would be complementary to the successful M.Biotech program at UTM providing more graduate level courses in management at UTM that address issues particular to organizations which deal with the innovation process.

This program would expand the graduate management offerings of Health Administration, attracting high quality graduate students generally at an earlier stage of their careers than those in the M.H.Sc. Much of the teaching will be from faculty in other divisions and cross appointed faculty from Management, Economics, and Political Science. The program also differs from the M.B.A. in that it is focused on the health care industry, there is a greater emphasis on economic analysis, and it is shorter in duration. Programs in other divisions may be affected in that MMI students may apply to take electives among the existing courses in those programs. Supporting letters from the affected departments can be found in Appendix C.

The proposed program uses existing libraries and computing facilities and mostly existing faculty with an additional faculty member to be hired and space which is being added at UTM. The enrollment is expected to reach a steady state of 24 students per year with a tuition fee and BIU income that is expected to recover costs. The program has been reviewed by the Curriculum Committee of HPME, the Principal's Advisory Council of UTM, the Committee of Deans of the School of Graduate Studies, and at Department of Management meetings at UTM.

The Masters of Innovation Management, while a new graduate program in Health Administration, has primarily management courses that deal with the innovation process. Other similar programs exist around the world, in a variety of formats, sometimes under the rubric of Technology Management. This program consists of core course requirements of: Prices and Markets, Applied Econometrics, Finance, Accounting, Negotiations, Marketing Science, Economics of Business Strategy, Management of Technology, Technology Strategy and Policy, and a required Group Project. Four elective half courses complete the program requirements. Graduate faculty members involved include the full members: V. Aivazian, BS, MA, Ph.D.; R. Deber, SB, SM, Ph.D.; H. P. Gunz, Bsc., DPhil, Ph.D.; M. Tombak, B.A.Sc., M.B.A., A.M., Ph.D.; A. P. Williams, Ph.D.; A. Wensley, BA, PGCE, MA, MBA, Ph.D.;D. A. Wolfe, BA, MA, Ph.D., and the Associate Members: T. Astebro, M.Sc., TechLic, Ph.D.; G. DeFranco, B.A., M.B.A., Ph.D.; C. Dewa, Ph.D.; S. Meza, BSc, M.B.A., Ph.D.; M. Weber, BA, MA, MBA, Ph.D.

1 INTRODUCTION

1.1 A Brief description of the program

The Department of Health Policy, Management and Evaluation (HPME) of the Faculty of Medicine would like to offer a graduate program leading to the professional degree of Master of Management of Innovation (MMI). This program will be taught in collaboration with the Department of Management at the University of Toronto at Mississauga (UTM) and takes advantage of UTM's distinct competency in the area of the economics of innovation. It is supported, in part, through the donation of a chair from Hatch Consulting. The program is designed for those who wish to pursue careers in: the health care industry (e.g., as R&D managers); investment funds oriented towards the sector; public sector or nongovernmental organizations at agencies involved in supporting R&D and technology transfer. It will prepare people for a management role in technology-focused organizations particularly in the health care industry. The structure of the program is similar to that of the M. Biotech with a small and selective student intake. Admissions to the masters program will be from students in the sciences or some technology oriented undergraduate program. The program will have an 8 month core academic program requirement for all students which would consist of the core management and economics courses. In addition, the students will be given an option to take their electives in either management or health care management. The students will be required to take four electives and a group project.

1.2 Objectives of the program

The objective of the Master of Management of Innovation Program is to provide a superior management education by refining critical, scholarly and professional skills in the area of innovation management for students who aspire to a career in technology-focused organizations of the health care sector in either a professional practice, industry or government. This program will allow students to acquire the foundation skills, and strategic perspective necessary to become future leaders and senior managers responsible for driving business growth through innovation, and to become effective agents for change in their organizations. The aim of this graduate program is to train highly qualified personnel for the management and support of innovative activities of organizations. That is, to train people with a background in science and technology for the management of the R&D functions and other supporting functions within an establishment. The objectives of the program are to be achieved through course work, teaching and research seminars, technical training, and major research papers.

1.3 Method used for the feasibility study

Three surveys have been conducted: a survey of potential employers; a survey of graduate students; and a survey of executives in health care research institutions. The survey of employers and executives provides a check on what the demand for graduates of the program will be and what sort of jobs such graduates may be able to obtain. The survey of the graduate students provides data on how attractive such a program will be to students, i.e, what the supply of graduate students to the program will be. Furthermore, questions on the design, content, schedule format, and pricing were addressed. A summary of the results of the surveys is included in Appendix A.

1.4 Fields in the programs

None.

1.5 Special matters and innovative features

The University of Toronto has a special capability in the management of innovation. There are many faculty throughout the university (e.g., Rotman, Law, Political Science, Medicine) with special interests in the area. One of the unique features of this program is that it is a collaborative effort across two faculties (Management and Medicine). The core faculties listed below have all been hired recently and constitute one of the highest concentrations of academics in this niche outside the greater Boston metropolitan area. The program also has the financial support of a Research Chair from the HATCH group, a Mississauga-based international engineering and technological consulting firm. HATCH has donated $1 million towards a chair in Technology Management and Strategy at UTM.

The MMI program is the only one in the world to combine world-class scholars supplying applied economics tools to graduate students and focus on the special features of organizations in environments with rapidly evolving technologies. Appendix B lists a number of graduate programs that share some of the features of this program and also describes how this program differs.

The content of the program differs from that offered in the typical M.B.A. in that there is a greater emphasis on economic analysis. The program is more focused in this regard, as the courses normally in an M.B.A. which are of an applied psychological and sociological nature are not included here, this permits the 12 month format. Furthermore, there is a greater emphasis on the Health care sector than in a typical M.B.A. program. For example, the program would begin with tours of research facilities in medicine and pharmaceutical sciences such as MARS. As this is a professional degree the economic analysis will be more of an applied nature than that offered in the M.A. in economics.

The MMI program differs from the M.H.Sc. in Health Administration in that it focuses on innovation management and that it targets people in earlier stages of their

management career. The M.H.Sc. in Health Administration has as a requirement that students have a minimum of 5 years management experience. The proposed MMI program, while finding some work experience desirable, makes no such requirement for admission.

2 THE FACULTY

2.1 List of faculty by home unit

Table 2.1 lists the faculty members involved in the graduate program, identifies their: rank; home unit; graduate student supervisory privileges; and indicates gender.

TABLE 2.1

Faculty Members by Field			
Faculty Name & Rank	**M /F**	**Home Unit**	**Supervisory Privileges**
Category 1			
Astebro, Tom, PhD Professor	M	UTM, Mgmt.	Full
Deber, Raisa, Ph.D. Professor	F	HPME UofT	Full
Gunz, Hugh, Ph.D., Professor	M	UTM, Mgmt.	Full
Tombak, Mihkel, PhD - Professor	M	UTM, Mgmt.	Full
Williams, Paul, Ph.D, Professor	M	HPME UofT	Full

Category 3			
Aivazian, Varouj, Ph.D., Professor	M	UTM Mgmt.	Full
DeFranco, Gus, Ph.D., Assist. Prof.	M	UTM Mgmt.	Full
Dewa, Carolyn, Ph.D., Assoc. Professor	F	HPME UofT	Full
Meza, Sergio, Ph.D., Assist. Professor	M	UTM, Mgmt.	Full
Weber, Mark, Ph.D., Assist. Professor	M	UTM, Mgmt.	Full
Wensley, Anthony, Ph.D., Assoc. Professor	M	UTM, Mgmt.	Full
Wolfe, David, Ph.D., Professor	M	UTM, Poli. Sci.	Full
Category 6			
Grauer, Shanon, LL.B., Adj. Professor	F	HPME UofT	

Note: None of the above faculty are expected to retire in the next 7 years. There are plans for a new faculty member to be hired at UTM for the academic year 2006/2007 for the MMI program specifically in the area of Economics of Innovation (see letter from Vice-Principal, Academic, C. Misak, Appendix B).

Category 1: tenured or tenure-track core faculty members whose graduate involvement is exclusively in the graduate program under review. For this purpose the master's and doctoral streams of a program are considered as a single program.

Category 3: tenured or tenure-track core faculty members who are involved in teaching and/or supervision in other graduate program(s) in addition to being a core member of the graduate program under review.

Category 6: non-core faculty who participate in the teaching of graduate courses.

2.2 External operating research funding

As this is a professional masters program, few of the students will be on research assistantships. Nevertheless, many of the faculty involved in the program have been successful in obtaining research grants. For example, Mihkel Tombak and Tom Astero have been the recipients of NSERC operating grants and Tom Astebro and Hugh Gunz have held SSHRC operating grants. M. Tombak has been: Principal Investigator: Canadian Automotive Materials and Manufacturing Research Grant, 2001-2004 and received; Natural Sciences and Engineering Research Council (NSERC) Operating Grants, 1992—1996 and, 2000-2004; Academy of Finland, Technology Policy Project, 1997-99 and; Ministry of Education, Finland, 1995. Tom Astebro has received NSERC operating grants from 1996-1999 and 2000-2004 and SSHRC Special Incentive grants in 1999, 2000, 2002 and an SSHRC INE for 2002-2005. Raisa Deber and Paul Williams have attracted substantial funding to the Medicare to Home and Community (M-THAC) Research Unit which is funded under the Community Alliances for Health Research program of the CIHR.

2.3 Graduate supervision - Career number, and current, supervisorships of master's, doctoral, and post-doctoral students, by faculty member

TABLE 2.3

Career and Current Numbers of Thesis Supervisions by Faculty Member						
	Career			Current		
Member	**Master's**	**PhD**	**PDF**	**Master's**	**PhD**	**PDF**
Category 1						
Astebro, Tom	7	1	0	0	0	0
Deber, Raisa	3	9	0	1	10	1
Gunz, Hugh	1	8		0	3	
Tombak, Mihkel	7	1	0	0	1	0
Williams, Paul	1	8	0	2	5	0
Category 3						
Aivazian, Varouj						
DeFranco, Gus,						
Dewa, Carolyn	8	0	0	8	0	1
Meza, Sergio	0	0	0	0	0	0
Weber, Mark	0	0	0	0	0	0
Wensley, Anthony						
Wolfe, David	1	9	1	7	4	0
Category 6						
Grauer, Shanon	0	0	0	0	0	0

2.4 Current teaching assignments - (graduate and undergraduate), showing the number of courses taught by each faculty member

TABLE 2.4

Teaching Assignments for 2004/2005				
Faculty Member	**Rank**	**Undergraduate**	**Graduate[3]**	**Expertise**
Category 1				
Astebro, Tom	Associate Professor	MGT 422	BTC 2002Y	Economics of Innovation, Entrepreneurship, Financing of new ventures
Deber, Raisa	Professor		HAD 5765 HAD 5020 H	Case Studies in Health Policy
Hugh Gunz	Professor	MGM 300 MGM101	MGT 3064H	R&D Mgmt., Organizational Behaviour, Careers
Mihkel Tombak	Professor	MGT 492	BTC 2001H MGMT 3090 H	Innovation and Industrial Organization, Strategic Management Course, BioTech Program
Paul Williams	Professor		HAD 5010 H,	Canada's Health System and Health Policy,
Category 3				

Aivazian, Varouj	Professor		MMPA2281	Financial Economics
DeFranco, Gus	Assistant Professor	MGT 220		Accounting
Dewa, Carolyn	Associate Professor		HAD5725 H	Health Economics
Grauer, Shanon	Adj. Professor		HAD5741H	Health Law
Meza, Sergio	Assistant Professor	MGT252H5, MGT353H5		Principles of Marketing, Introduction to Marketing Management
Weber, Mark	Assistant Professor	MGT 461		Negotiations
Wensley, Anthony	Associate Professor	CCT206H5		Management Information Systems
Wolfe, David	Professor	POL 317Y5 Y	POL 2307F JPJ 494HS	Comparative Public Policy and Admin.

[3] *Graduate courses that form part of other graduate programs.*

[4] *Each H course entails 3 contact hours per week for one term, a Y course involves 3 contact hours per week for two terms.*

2.5 Commitment of faculty members from other graduate programs and/or from other institutions -

This graduate program is administratively housed in the Faculty of Medicine HPME for which UTM is contributing resources to the program by allowing faculty to be cross-appointed to HPME for the purpose of teaching in the program and by providing the physical location and financial resources for the program thus, it clearly enhances interdepartmental collaboration. Furthermore, it involves faculty from other departments in the university as well. Faculty in the department of Political Science and in the Faculty of Law (e.g., in the Centre for Innovation Law and Policy) are teaching graduate courses, giving seminars that are particularly appropriate for students of Innovation Management. Programs in other divisions may be affected in that MMI students may apply to take electives among the existing courses in those programs. See the supporting letters from the Dean of UTM and the Chairs of: the Department of Management, and; Political Science in Appendix C.

3 PHYSICAL AND FINANCIAL RESOURCES

3.1 Library resources - The report should include information on what unique resources are available on site and what access, if any, faculty and students have to other resources.

The students will have access to resources available at the University of Toronto libraries. There are journals in the subject areas of research policy, technology management, and industrial economics. For example the journals: *International Journal of Industrial Organization, Journal of Industrial Economics, Economics of Technological Innovation, Research Policy, R&D Management, IEEE Transactions on Engineering Management,* and *Rand Journal of Economics* are all available at the University of Toronto Libraries. A letter from the Chief Librarian of the University of Toronto attesting to the availability of suitable library resources for the program is in Appendix C.

3.2 Laboratory facilities –

The students of the MMI program will not need access to laboratory facilities as there will be no laboratory assignments.

3.3 Computer facilities

All faculty and graduate students are provided with an account on the university mainframe computer. This account gives them access to electronic mail facilities, internet and statistical software packages [*e.g., SPSS, SAS*]. There will also be access to the basic computer applications such as MS Office Suite. The students will have access to all the computer labs located at University of Toronto at Mississauga which are in the South Building, North Building, Kaneff Center and CCIT Building. There are hundreds of microcomputers currently available to the faculty and students.

The UTM Library has over 100 computers available on all floors to access a variety of resources. These are available for student use whenever the Library is open including our Extended Hours. Many of UTM Library computers are located on the Main Floor as you enter the Library but there are also additional machines upstairs, downstairs and in the Reference area. These computers provide Internet access to our Library Catalogue and an extensive collection of electronic resources as well as the MS Office Suite applications - Word, Excel, & PowerPoint. In addition, the UTM Library now has a wireless network to allow laptop computers to connect to the campus backbone network. This means you may use your laptop to access the Library's electronic resources or the catalogue while sitting in one of our lounge chairs or having a meeting in one of our Project Rooms.
The South Building has four labs which are Computer Centre Lab, Computer

Science Lab, Hitachi Lab and the Psychology Lab available to students. There is also Kaneff Centre Computer Lab in the Kaneff Centre. The CCIT Building itself has available six computer labs.

3.4 Space

The required space for offices, study space, and classrooms will be provided see supporting letter from Prof. Cheryl Misak, Vice-Principal and Dean, UTM, in Appendix C.

3.5 Financial support of graduate students

All students will be eligible to apply for financial support from the Ontario Graduate Scholarship (OGS) funded from the Ontario Student Assistantship Program (OSAP). With application to OSAP, students also become eligible for the University of Toronto's Advanced Planning Program (UTAPS). There is also a general School of Graduate Studies Bursary Fund to which students in need may apply. Some scholarships for graduate studies will be available for these students to which they can apply.

4 PROGRAM REGULATIONS AND COURSES

4.1 The intellectual development and the educational experience of the student

Professional education requires the students to engage in diverse and varying learning experience and types of evaluation. The complexity of the learning experience will evolve throughout the program. Students will be encouraged to develop a sense of responsibility for their education and professional development. Collaborative learning experiences will be fostered with students, faculty professors and in internship placements. Each student will have access to an academic advisor to assist him/her with the academic planning of his/her educational program. The case-based learning format of the curriculum will allow for intellectual development of their professional education.

4.2 Program regulations

4.2.1 Admission requirements

For applicants to be considered for acceptance into the MMI program they must first meet the minimum academic criteria (outlined below under *Academic Eligibility*). Applicants are required to submit an official transcript, 2 letters of reference, and a resume. Applicants who submit all required documentation and meet the academic criteria will be ranked on basis of their grades. The top ranked applicants will be

invited to write a personal statement. Applicants will be ranked using a cumulative score including scores from the personal statement and their grades to determine those students who will receive an offer of admission.

Academic Eligibilty

1. Applicants must meet the requirements for entry into the School of Graduate Studies of the University of Toronto. These include a 4-year University of Toronto bachelor's degree in the health professions, sciences, or engineering, or its equivalent from a recognized university. Students applying in the final year of their degree program must provide proof of completion of the degree requirements prior to the date of enrollment. In addition, applicants must complete the specific prerequisites or their equivalents set by MMI program.
2. Applicants must have achieved a minimum overall grade point average of B^+ or 77-79%, 3.3 on a 4.0 scale over the last two years of full-time academic study.
3. Applicants whose primary language is not English and who graduated from a non-Canadian university where the language of instruction was not in English must provide scores of an acceptable English facility test. The minimum Toefl scores for admission are: Paper-based test &TWE: Overall Score 580 & TWE 5; Computer-based Test & Essay Rating: Overall Score 237 & Essay Rating 5; Internet-based Test & Writing & Speaking Sections: Overall Score 93 & Writing Score 22 & Speaking Score 22. Applicants who obtained a degree outside Canada must arrange for GMAT or GRE (General) examination results to be sent to the Department.

References and Resume

At least two letters of reference and a resume must be submitted by the applicant. One reference must be provided directly from a faculty member familiar with the applicant's work who holds an appointment within the program from where the applicant most recently graduated.

Personal Statement

An on-site writing of a Personal Statement will be employed.

Interview

An interview will be conducted with at least two faculty who will evaluate problem solving capabilities and communication skills. A short sample of the candidate's writing will be requested to be prepared on site.

4.2.2 Program requirements

The program requires a minimum of 1 year of study, the maximum program duration is 5 years. The completion of the following courses (or their equivalents) will be required from all MMI graduates.

Courses	**Graduate credits**
Prices and Markets	½
Applied Econometrics	½
Finance	½
Accounting	¼
Negotiations	¼
Marketing Science	½
Economics of Business Strategy	½
Management of Technology	½
Technology Strategy and Policy	½
Group Project	1

The courses above, with the exception of the Management of Technology, and Technology Strategy and Policy courses are all new courses.

In addition MMI students could choose elective courses from the following (already existing courses):

HPME: Canada's Health Care System and Health Policy (Parts 1 & 2); Health Economics; Health Law
Law: Innovation and Knowledge Transfer in Regional Industry Clusters;
Political Science: The Political Economy of Technology;

Others electives upon the approval of the director

Total requirements –
12 graduate half courses (7 half courses and 2 quarter courses in the core, 4 half courses as electives)+ group project

4.3 Part-time studies

The program will not (initially) be offered on a part-time basis.

4.4 Total graduate courses listed and level -

Program Structure

Standard Program:

Fall Session: September 2006 - December 2007	Graduate Credits
Prices and Markets	½
Applied Econometrics	½
Negotiations (Sept. - Oct.)	¼
Accounting (Nov. - Dec.)	¼
Management of Technology	½

In addition: two elective half courses

Winter Session: January 2007 - April 2007

Marketing Science	½
Finance	½
Economics of Business Strategy	½
Technology Strategy & Policy	½

In addition: two elective half courses

Summer Session: May 2007 - August 2007

Group project which requires the approval of the course co-ordinator and supervision by a faculty member.

Table 4.4 lists the graduate courses that will be offered and the faculty responsible

Table 4.4

Courses to be offered to MMI Graduate Students		
Course[1]	**Faculty member(s) responsible[2]**	**2006/07**
CORE COURSES		
Prices and Markets*	Mihkel Tombak	
Applied Econometrics*	Tom Astebro	
Finance*	Varouj Aivazian	
Accounting*	Gus DeFranco	
Negotiations*	Mark Weber	
Marketing Science*	Sergio Meza	
Economics of Business Strategy*	Mihkel Tombak	
Management of Technology	Tom Astebro	
Technology Strategy and Policy	Tom Astebro	
Group Projects*	Mihkel Tombak, Tom Astebro, Gus DeFranco, Sergio Meza, Mark Weber, Hugh Gunz, Anthony Wensley	

ELECTIVE COURSES		
HAD 5010H Canada's Health System and Health Policy - Part 1	Paul Williams	
HAD 5020H Canada's Health System and Health Policy - Part 2	Paul Williams	
HAD 5725H Health Economics	Carolyn Dewa	
HAD 5741H Health Law	Shanon Grauer	
JPJ 494HS Innovation and Knowledge Transfer in Regional Industry Clusters	David Wolfe	
POL 2307F The Political Economy of Technology: From the Auto-Industrial to the Information Age	David Wolfe	

*These are new graduate courses.

The departments do not offer combined courses in which both graduate and undergraduate students would enroll with the exception of POL2307F.

Unit Descriptions

MANAGEMENT COURSES

MMI 1010 Prices and Markets (13 weeks)
An intermediate treatment of the basic tools of microeconomic analysis. Applications may include: choice under uncertainty, oligopoly, industrial organization, pricing, resource allocation, externalities, public goods, income distribution and welfare economics.
Exclusions: ECO 2050H

MMI 1020 Applied Econometrics (13 weeks)
This course teaches you to use econometric methods. It provides a solid foundation in the theory and practice of those statistical techniques that have proved most useful for analyzing economic data. In addition, computer problem sets and a substantial empirical project (term paper) provide "hands-on training" in formulating and testing economic hypotheses.
Exclusions: ECO 2410H

MMI 1030 Marketing Science (13 weeks)
Examines the processes by which businesses decide how to compete in the markets they choose to serve. The

emphasis is on the analysis of market opportunities and sources of competitive advantage. The course also looks at the strategic implications of market evolution and methods of allocating resources to new and established products. Course focuses on the major decisions facing marketing managers in the attempt to harmonize the resources of the organization with the opportunities in the market.
Co-requisite: MMI 1020 or equivalent

MMI 1040 Negotiation (6 weeks)
We negotiate every day - with potential employers, coworkers, roommates, landlords, parents, bosses, merchants, service providers, and even our friends and romantic partners. Negotiation is the art and science of securing agreements between two or more interdependent parties. It is a craft that must hold cooperation and competition in creative tension. It can be very difficult to do well. Even the most experienced negotiators often fall prey to common biases and errors in judgment. This course is highly experiential - students will practice, reflect, analyze, and practice again - and draws its insights from research in the cognitive, behavioral and social sciences.

MMI 1050 Accounting (6 weeks)
Course introduces the theory and concepts of financial accounting. Students learn how to construct and interpret financial statements. Topics include an understanding of accounting and the context within which accounting occurs. Cases are used to develop critical thinking and communication skills. ***Topics include*** accounting's conceptual framework, analysis of business and financial statements, accounting for assets, and valuation of bonds.

MMI 1060 Finance (13 weeks)
Topics include: valuation models, cost of capital, capital budgeting, investment under uncertainty, the use of leverage, dividend policy, the financial environment within which Canadian companies operate. Course material also includes the characteristics of various debt and equity instruments available in the Canadian capital market.
Prerequisite: MMI 1010 or equivalent

MMI 1070 Economics of Business Strategy (13 weeks)
This course is intended to introduce you to the core ideas, concepts and models used in the area of strategic management, drawing on recent advances in the literatures on competitive strategy, organizational economics and industrial organization. This course focuses on industry analysis and different models of the firm.
The key questions addressed are:
Why do some firms succeed where others fail?
What strategy should a firm employ to reach its goals?
Why does firm performance vary across industries?
Why does performance vary across firms in a given industry?
How does the external environment affect a firm's performance?
What types of competitive strategies are available to managers?
When are different types of strategies more or less likely to be successful?
Prerequisite: MMI 1010 or equivalent

MMI 1080 Management of Technology (13 weeks)
This course will focus on the managerial and business issues that are associated with the process of taking a new technology to the marketplace.
Topics to be covered include:
• Basic project management, including costing techniques
• Market analysis and forecasting
• The development of business cases to support the transition of new technologies from "bench to market"
• Production capabilities, distribution, and channel and sales management
Exclusions: BTC 2002

MMI 1090 Technology Strategy and Policy (13 weeks)
This course focuses on the evolution of technology and how firms need to match their strategies to different stages of a technology's development. The first half of the course is organized around understanding the different phases of technology cycles: discontinuous changes, standards competitions, dominant designs and periods of incremental changes. The second part of the course is organized around firm-level issues: make or buy decisions in R&D, understanding the use of complementary assets, management of knowledge workers, government policy, sources of new product ideas and project management. Topics to be covered include:
• Strategic planning and competitive analysis
• The economics of innovation (including evaluation methodologies)
• Protection of intellectual property (patenting/licensing research)
Exclusions: BTC 2002

MMI 1100 Group Project (13 weeks)

A group of four students could either develop a business plan for a company or, research an issue in innovation management. For the business plan projects the students will find a company or a strategic business unit of a company for which they will develop a business plan under the supervision of a faculty member. The first draft is to be presented to a committee of faculty members, the revised plan is then to be presented to the management of the company. The final version is then again presented to the faculty committee. Where the group project is involves researching an issue in innovation management or evaluating an innovation policy the project is to be supervised by a faculty member with the topic approved by the director. The project is to be presented to a committee of faculty.

ELECTIVE COURSES

HAD 5010H Canada's Health System and Health Policy - Part 1 (13 weeks)

The Canadian health care system is widely seen as the jewel in the crown of the post-war state and a top policy priority for federal and provincial governments.

Yet the health care system faces mounting challenges. Because of concerns about the public debt, governments have been reluctant to fund increases in health care costs. An aging population, technological advances, ethno-cultural diversity, declining social networks and changing values have generated new and more complex service demands, as well as mounting debate about the "sustainability" of publicly funded health care. There is an increasing emphasis on community-based health promotion and social support in contrast to more traditional acute care in hospitals. Individuals and communities are demanding a greater role in decisions about their health and the use of scarce health resources at the same time as the pressures of globalization begin to limit the capacity of governments to implement policy solutions.

This is the first in a series of three courses which develop and apply a policy analysis "tool kit" to critically analyze key issues and trends in Canada's health care system. Course sections examine the current "crisis" in health care, changes in the public-private mix, the roles of doctors and hospitals, and the shift toward home and community care, paying particular attention to the ideas, interests, and institutions which have shaped the health care system in the past, and which now shape its future.

This course is designed for health professionals and students of health policy who need to "make sense" of a rapidly changing and increasingly politicized health care environment in which "evidence" is often only one, and not even the most important factor, driving change.

HAD 5020H Canada's Health System and Health Policy - Part 2 (13 weeks)

As recent high profile federal and provincial health care commissions have emphasized, universal health insurance (Medicare) remains the top policy priority and top ranked national symbol for Canadians. Under Canada's single payer public system, health spending has been relatively well contained and all Canadians have access to medically necessary hospital and doctor services without regard to their economic means.

A potential erosion of publicly funded health care coverage has been identified as a key "pressure point" for Canadian society. It has been suggested that such erosion could lead to increased costs, reduced access to care, weakened social cohesion and reduced health status. Although health systems constitute only one, and not even the most important determinant of health, they determine how the costs of illness are paid: by those who are ill, or by society as a whole. The international literature suggests that social inequalities, even more than absolute levels of economic development, impact negatively on health.

Nevertheless, perceptions of such erosion have been growing and prescriptions for the future vary considerably. While some argue that changes are needed within Medicare to ensure that hospital and doctor services remain accessible, and that areas of growing importance such as home care and prescriptions drugs are also publicly covered, others argue for a greater role for commercialized health care markets where individuals would be free to purchase any health care services they could afford.

This course develops and applies a policy analysis "tool kit" to critically analyze key issues and trends in Canada's health care system. It is designed for health professionals and students of health policy who need to "make sense" of a rapidly changing and increasingly politicized health care environment in which "evidence" is often only one, and not even the most important factor, driving change.

HAD 5725H Health Economics (13 weeks)

This course is designed to provide a basic understanding of the principles of economics as they relate to health care management. The course will focus on providing learners with intuition and examples of how microeconomic theory can be used to understand the structure of the existing health delivery system in Canada and other countries. The course will also provide learners with the opportunity to develop understanding and skills in the use of economic analysis for decision-making. Prior knowledge of economics is not required.

HAD 5741H Health Law (13 weeks)

Traditionally, health law has focused on the physician-patient relationship; however, increasingly, lawyers are turning their attention to larger system issues and the complex web of relationships between governments, private insurers, doctors and other health professionals, public and private hospitals, pharmaceutical companies, and patients.

This course will focus on the structure and dynamics of Canada's health care system. It will locate Canada's system amongst the variety of approaches taken internationally to the financing and allocation of health insurance and health services and to the regulation of the quality of health services.

Issues to be explored include what different theories of distributive justice demand in terms of access to health care, the extent of market failure in health insurance and health service markets, how to determine what services are publicly funded and means of review of these decisions, how to ensure the accountability of decision-makers, why the present system fails Aboriginal peoples, regulation of privately financed health care (in vitro services, drugs, medical equipment, homecare, etc.), the shift from institutional care to care in the home, the need for reform of the medical malpractice system, managed care, and general issues of privatization, deregulation and re-regulation.

4.5 Collateral and supporting departments –

Department of Health Policy, Management and Evaluation, Faculty of Medicine provides faculty for teaching some of the elective courses, graduate supervision, and academic program governance. That is, any changes to the program, the addition or deletion of courses to the program must be approved by the Curriculum Committee of HPME.

Department of Management, University of Toronto at Mississauga provides administration, and teaching of the core courses and graduate supervision. That is, the UTM Department of Management will be managing the program.

University of Toronto at Mississauga provides the budget, physical space and budgetary governance.

5 OUTCOMES

5.1 Projected graduate enrolments -

Table 5.1 presents the projected enrolment for the next seven years for the master's and doctoral programs.

TABLE 5.1

PROJECTED ENROLMENTS						
YEAR	**FULL-TIME**	**PART-TIME**	**TOTAL**			
	M	**D**	**M**	**D**	**M**	**D**
2005	0		0		0	
2006	6		0		6	
2007	18		0		18	
2008	24		0		24	
2009	24		0		24	
2010	24		0		24	
2011	24		0		24	
2012	24		0		24	

The trend in graduate enrolment is expected to be increasing in the first three years as the program becomes better known followed by a fairly stable intake.

Appendix A
Results of the surveys

Three surveys have been conducted: a survey of potential employers; a survey of graduate students; and a survey of executives in health care research institutions. The survey of employers and executives is a check on what the demand for graduates of the program will be and what sort of jobs such graduates may be able to obtain. The survey of the graduate students provides data on how attractive such a program will be to students, i.e, what the supply of graduate students to the program will be. Furthermore, questions on the design, content, schedule format, and pricing were addressed.

Employer Survey Results

Background
As part of the development process for the MMI program, research was required among potential employer companies to determine the appeal of the programs as designed, and understand what, if anything, is required to increase their overall appeal. In addition, specific design elements, such as length of program and full-time versus part-time needed to be probed.

Camelford Graham Research Group Inc. was asked to conduct research into the feasibility of the two programs.

Methodology
In-depth interviews were conducted with 38 executives of target companies. Target companies were:

- located in Mississauga
- technologically – focused
- taken from two lists: one supplied by the University of Toronto at Mississauga of companies they would like to target, and the other from the members of the Mississauga Technology Association – a trade association of technologically focused organizations in Mississauga

In-person or telephone "long interviews" (lasting 30 minutes to one hour) were conducted with 17 individuals, targeted by University of Toronto at Mississauga, as most important to contact. Shorter interviews were conducted by telephone with 21 individuals from other companies. These interviews took place during June and July, 1996 where interviewees were asked to comment on an earlier version of the program design.

Note on Interpretation
The results gathered are based on the opinions of 38 specially-targeted individuals. As a result, they should be taken as directional rather than as generalizable to the target population as a whole.

Summary
The MMI program has strong appeal to many businesses in Mississauga. They see it as:

- filling an important gap in management training for technology companies
- more useful because it is targeted to technology-based industries, which they feel have unique management issues
- addressing important issues such as ethics and role of technology in society

Program Components
Their vision of what the program will be is perhaps more strongly management-oriented than the current concept description. Areas the program that they thought must include are:

- interdisciplinary approach, including technology and society, and the regulatory process
- communication skills
- management skills for dealing with interdisciplinary teams
- practical experience in technology-based companies (either as a requirement for admission or in a co-op format)
- financing new technology/cost recovery, etc.
- faculty that include business people with real experience

Other useful areas would be:

- marketing
- accounting/finance

Most felt that a one-year program would be too short, particularly if a co-op component were included. A co-op component would have to be significant – 4 to 5 months, to give the person substantive experience. Most also were enthusiastic about participating in the co-op experience through providing placement opportunities for students.

Target Companies
The target companies for graduates with the MMI degree would appear to be small to medium-size companies. Although some larger companies were enthusiastic about the potential of graduates, the really big companies (e.g., Xerox) have a strong international orientation to their training and would be less interested in the program's graduates. These large companies look to the prestige and opportunity for high-level contacts available at schools such as Harvard, Stanford and Wharton.

Target Students
Although most of those interviewed feel experience in a technology-based company is essential, they are reluctant to say they would send their employees to the program, either full- or part-time. Employees are seen as both too valuable to risk them "getting away", or already over-extended, resulting in less enthusiasm for part-time studies. The best choice would be to start with a full-time program designed for recent undergraduates, and expand as the program proves itself.

Recommendations of those surveyed
The MMI program should be introduced as a full-time program designed as an entry point to technology-oriented industry rather than as an executive program. As the program builds a reputation, it could evolve to include a part-time program along the lines of Executive Management programs (one day per week).

The program should include a strong management component focusing on communication and group processes, as well as an introduction to other traditional management topics. A co-op component of at least 3-4 months will give both the students and the program credibility to the industry. Introducing the program with the co-op component will lead to better placement of the graduates and alleviate skepticism among industry people who value experience significantly above academic learning.

Graduate Students Survey Results

The Hitachi Survey Research Center at UTM conducted a survey of over 1200 graduate students at the University of Toronto in June 2005 to determine their interest in the proposed graduate MMI program. The graduate students were in their second year of graduate programs at the UofT in various fields of science, engineering, life sciences, and computer sciences. This survey was designed to obtain input on seven essential issues:

1. Considering the description of the program would they have preferred such a management degree to the Masters program in which they are currently registered?
2. Would they consider enrolling in such a management degree in the next five years?
3. Would they want to combine the MMI program with their current Masters program they are presently enrolled in giving them a dual Masters of combined duration which would cost less than the sum of the two programs.
4. Preference of the MMI program versus an M.B.A.
5. Amount of tuition per year they are willing to pay for such a degree.
6. The format and structure of the program that best suits their requirement.
7. Given the option of two concentrations of either Management or Health Care Management in which would they be interested in enrolling?

There were a total of 1235 graduate students enrolled in various Master degrees who were in either sciences or engineering disciplines that participated in this survey. The graduate students that were targeted were enrolled in 57 different Master degrees that were specializing in a specific science or engineering discipline. The vast variety of Master degree enrollment of these graduates ensured that the views of all students that relate to the science or engineering field which the program is designed to target would have the opportunity to provide input.

This feedback was valuable to give an idea of the projection of the potential

enrollment demand that the MMI program will generate amongst graduates. It also yielded information about preferred program structures (full-time vs. part-time), courses that they would be interested in taking and their willingness to pay for such a program. The following are a sampling of the results.

The graduate students were given a brief description of the program and asked whether they would have wanted to enroll in such a graduate program in lieu of the program from which they just graduated.

Based on that description of the new program would you have preferred such a

	Frequency	Percent
Yes	189	15.3
No	993	80.4
Don't know	53	4.3
Total	1235	100.0

When asked about possible future intentions (in the next five years) we received the following rather encouraging result

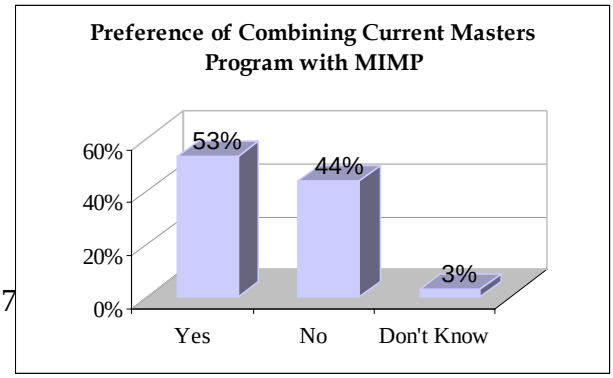
Would you consider enrolling in such a management degree in the next five

	Frequency	Percent
Yes	429	34.7
No	753	61.0
Don't know	53	4.3
Total	1235	100.0

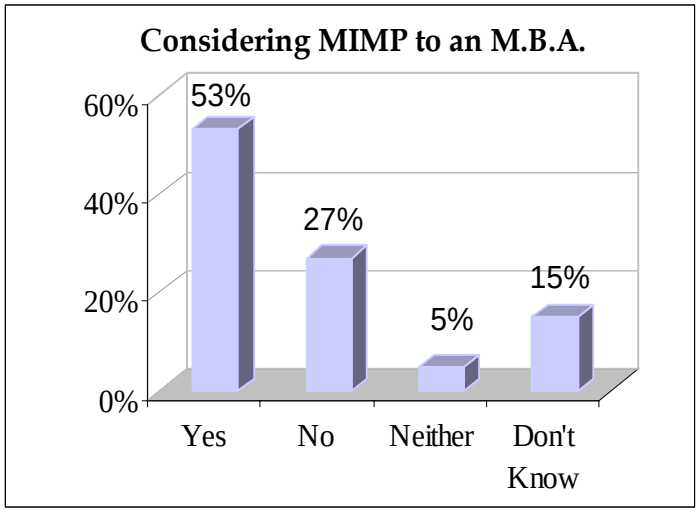
Of course, many of the responses could be rather flippant, but about 20 of the respondents went further and asked for their contact information to be recorded so that they could get additional information should the program become available. The response was even more encouraging when graduates were asked about the possibility of combined degrees.

Preference of Combing Masters Program with MMI

It appears that more than half, about 53% of the students surveyed are interested dual Masters Program. It gives an impression that combining MMI with another masters program will be an asset, since MMI is more focused in its approach compared to the traditional MBA which has a broader mission.



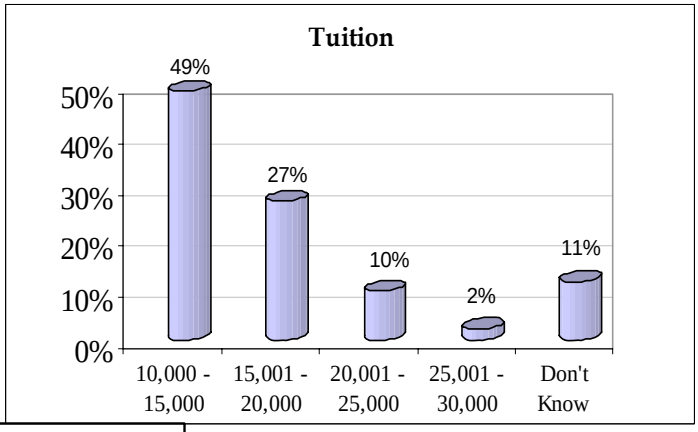
MMI vs. MBA



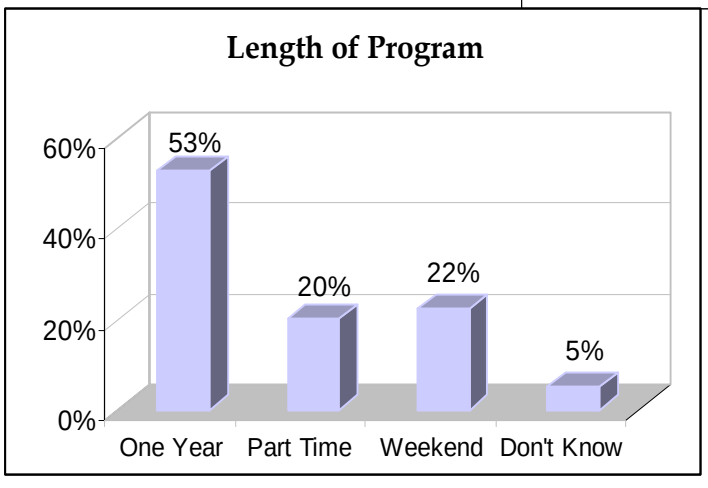
More than half of the students surveyed (53%) preferred the MMI program over the usual M.B.A. program. One rationale is the fact that the MMI is more focused and targets specific job sectors, where the M.B.A program is broader. Little over 25% would prefer the traditional M.B.A program, and 15% are unsure of which they would want to pursue.

Tuition Costs

Almost half of those surveyed are willing to pay between $10,000 and $15,000 for the MMI program. About 27% were willing to pay $15,000 to $20,000. Only 12% are willing to pay more than $20,000.



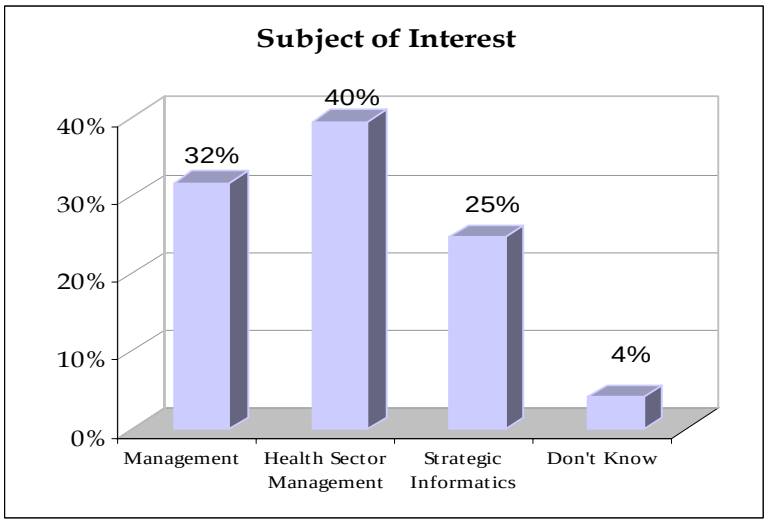
Duration of Program



Little over half of those surveyed preferred the one year full time program, 53%, compared to the 4 year part time program that runs two evenings a week, 20%, or a weekend program that runs on Friday and

Saturday over 2 years, 22%.

Subject of Interest



Of those surveyed, about 40% of the students are interested in the Health Management strain of the MMI program. About one third are interested in the Management strain, and nearly a quarter are interested in a third option in Strategic Informatics.

Health Care Industry Survey

To understand the target industry relating to technological innovation and R&D sectors it was ideal to survey imperative organizations in the industry this program is designed to target. The people contacted were all in senior management positions of very respectable research institutes and health institutes of Canada.

There were 15 people in total contacted; of these 10 people were from the Provincial Health Research Organizations across Canada. These people were very integral to our survey because they provided the input of highly-qualified individuals who were in the sector of technology innovation industry and were either Executive Director, CEO, Research Officer or President (i.e. had management positions).

All of the people were initially contacted by email. Through email they were provided detailed information about the program and the courses offered.

Afterwards, telephone interviews were conducted with all of them that were available to give time to this survey.

The responses to the MMI program were positive and encouragement was received in support of the program. The following details a few of the responses.

The feedback from many leading research institutes in Canada were positive. Almost everyone interviewed said that they would have preferred this management degree rather then M. A. Sc., M. Eng. or M. Sc. "This program develops the knowledge of product innovation, technology transfer and research and development processes thus enabling students and companies to gain competitive advantage through technology which was not present in such completeness in my master's degree," said Dr. Robert Walker who is the Acting Director General of Operations and Research at Defence Research Development of Canada.

The support of this program was re-enforced by the comment made by Laura Brown who is the Senior Research Officer of National Research Council at the Institute for Marine Biosciences when she said, "The MMI program provides the foundation necessary to equip the next generation of managers with the skills and knowledge they need to effectively lead corporate innovation efforts."

There were mixed responses when the question of considering enrollment in the MMI degree in the next five years. Almost all of the professionals that had been interviewed had gained a lot from their extensive work experience which helped to bridge the gap between research and development and management. However, there was interest among others that would be interested in enrolling in such a program if their career and personal commitments permitted which "would develop knowledge and understanding of the increasingly important area of technology management" as stated by Ms. Donna Murnaghan who is the Associate Director of Prince Edward Island Health Research Authority.

The reaction to the format of the program varied between one year full-time and part-time. Dr. Laura Brown said that the preference would depend on whether the potential student has just graduated from university or is currently working and whether or not work experience is required as a pre-requisite for enrollment. There was general consensus that it would be best to offer both options if possible to accommodate different needs of potential students but there was a slight majority for one year full-time program.

These interviews indicated strong support for programs like the MMI program because "presently companies base their commercial success on their management of the innovation process and on the adoption and production of new technologies which makes the management of innovation and technology central to their competitiveness," said Mr. Tim Murphy who is the Senior Vice President of Corporate Services and Programs at Michael Smith Foundation for Health Research.

Appendix B
Other Programs in Technology Management/Innovation Management

Similar or related graduate programs are offered in Europe, the U.S., and Canada. In what follows we outline a few of these programs and discuss how they are similar and how they differ from the program proposed at UofT.

University of Sussex

SPRU - Science and Technology Policy Research

MSc in Technology & Innovation Management (TIM)

The MSc TIM programme Structure and Assessment
In the first term five core courses help students to develop an understanding of how technological innovation works within the organisation and how it is shaped from the outside. Following an introduction to basic consultancy and research skills, initial steps are taken to organise the group-executed Technology Management Project. Students must complete all their coursework requirements satisfactorily before being permitted to proceed to the Technology Management Project and the dissertation.
The second term combines more in-depth treatment of the strategic issues in technology and innovation management through a choice of option courses. The main work on the Technology Management Project is also undertaken this term.
At the start of the third term students complete the Technology Management Project. Attention then shifts to the research dissertation, which offers the opportunity to pursue selected issues in greater depth, and to integrate these with broader theoretical and analytical work.

	Introduction to Science and Technology Studies
TERM 1 Autumn 2004	Technology and Innovation Systems Economic Perspectives on Innovation The Organisation of Innovation Tools for Innovation Management Managing Innovation Research Skills in Management
	Technology Management Project
	and
	two option courses from:
TERM 2 Spring 2005	Innovation for Sustainability The Management of Technological Risks Environmental Policy and Industrial Technology ICT Policy and Strategy The Political Economy of Science Policy Managing Innovation in Complex Products and Systems Competing in the Global Economy (joint course with Institute for Development Studies) *(Not every option may be available every year, depending on eg student demand, faculty availability)*

TERM 3	Statistical Research Methods Research Design, Planning and Management Dissertation (10,000 to 15,000 words)
Summer 2005	

This program has a similar structure to that being proposed. In terms of underlying discipline, it has more of a sociological focus and less emphasis is placed on economic analysis than that being proposed.

Massachusetts Institute of Technology

M.I.T. offers an executive program in the Management of Technology. This twelve-month, intensive program, offered jointly by the MIT School of Engineering and the MIT Sloan School of Management, leads to the degree Master of Science in the Management of Technology. Participants, about forty-five each year, are selected from both private and public sector organizations worldwide.

Formal studies include: the analysis of the theories, concepts, and practice of managing technology-based programs and projects; technology-based organizations; organizational integration of innovative design and production systems; and the management of technical professionals. Students write an original thesis in the area of technology or manufacturing management under faculty consultation. A one-week field trip is part of the program.

Selected Course Titles:

Strategic Management for Technology
Statistical Analysis for Technology Managers
Managing the Human Side of Technology
Managing Innovation and Technological Change
Marketing Management

The proposed program at UofT has a similar one year intensive format, is more focused on economic analysis, and includes more policy and health sector oriented courses

University of Waterloo offers a Masters in Technology Management program that is on-line. The courses are broader in scope. The program is a one year full-time in duration albeit the program is rather flexible in when the students can take the courses and consequently many students take much longer. The tuition fee is projected to be $26,000 in 2006. There are ten courses including management of Technology, Operations Research, Research Methods, Quality Control and a project course, among others. In contrast the proposed MMI program will be in-class and 12 months in duration and will be less Operations Research oriented.