TECHNOLOGY MARKETING PLAN FOR LABORATORY SERVICES TO SUSTAIN A TRANSLATIONAL RESEARCH CENTRE

by

Chris H. Sterzinger

B.Sc. (Chemistry) The University of British Columbia, 1989

PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF BUSINESS ADMINISTRATION

In the
Faculty
of
Business Administration

(Management of Technology Program)

SIMON FRASER UNIVERSITY

Fall 2006

APPROVAL

Name: **Chris H. Sterzinger**

Degree: **Master of Business Administration**

Title of Project: **TECHNOLOGY MARKETING PLAN FOR LABORATORY SERVICES TO SUSTAIN A TRANSLATIONAL RESEARCH CENTRE**

Supervisory Committee:

Dr. Sudheer Gupta
Senior Supervisor
Assistant Professor
Faculty of Business Administration
Simon Fraser University

Dr. Jill Shepherd
Second Reader
Adjunct Professor
Faculty of Business Administration
Simon Fraser University

Date Approved: December 11, 2006

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ABSTRACT

Translational laboratories provide leading edge life science research by utilizing the latest equipment and top technical talent. The high cost of maintaining this techno-structure creates a sustainability challenge.

This study was completed for the iCAPTURE Centre at St. Paul's Hospital. In 2005, the centre raised $ 282,000 in service revenues but needed to recover $ 755,000 for equipment upkeep costs. iCAPTURE requires a formalized market marketing plan to increase service revenues from biotechnology, pharmaceutical, and academic markets.

External analysis of iCAPTURE's industry and internal analysis were performed. Analytical frameworks were used to formulate a strategic marketing plan. Considering iCAPTURE's limited marketing resources, short-term and long-term target market segments were identified.

Recommendations were made for the implementation of short-term and long-term actions. The systematic framework resulted in rationalized planning designed to achieve cost recovery goals by using a differentiation focused niche strategy. This plan requires financial support and additional organizational infrastructure.

Keywords: sustainability; marketing plan; iCAPTURE, translational research laboratory; biotechnology

EXECUTIVE SUMMARY

iCAPTURE is a dynamic and progressive cardiopulmonary translational research laboratory facing a financial challenge that may jeopardize the centre's long-term sustainability. Service and warranty costs for the laboratory equipment are estimated to be approximately $ 755,000 in 2006, while revenue generated by this equipment was only $ 282,000 for FY 2005. The iCAPTURE laboratory cores have approximately 20 to 25% excess throughput capacity that could be marketed and turned into fee for service revenues. A technology marketing plan is required to achieve the 270% revenue increase required to break-even in the current year and to sustain high levels of fee for service revenues in future years.

External Factors

The external analysis confirmed that the translational laboratory industry will be faced with sustainability challenges unless these facilities undergo organizational transformations and become market facing. Uniquely differentiated laboratory services are an excellent fit for both the drug discovery industry and for academic researchers external to iCAPTURE. Both of these potential markets have historic and predicted factors indicating that they will grow and be strong.

The centre is not currently effectively marketing their core laboratory services to different target markets. This is reflected by 86% of the core laboratory revenues from FY 2005 coming from internal iCAPTURE Principal Investigators (PIs). The proposed target markets are highly segmented and competitive. They are, however, massive in size. For iCAPTURE to realize their financial cost recovery goals, they will need to capture only a small market share of the outsourced drug discovery market, which was $ 84.1 US billion in 2005.

A Porter's 5 Forces analysis was conducted to determine the attractiveness of translational laboratory services to the drug discovery market. This framework emphasised that suppliers in this industry had high levels of power and that the economic microenvironment close to iCAPTURE was conducive to doing profitable business with customers seeking outsourced drug development. Six key success factors were identified that will help iCAPTURE compete successfully in the fee for service translational research laboratory industry.

Motivations and expectations of customers were also examined. The three most important service factors for customers in industry were quality, confidentiality, and timeliness. Cost was rated sixth in importance amongst customers. This supports iCAPTURE pursuing a generic niche strategy with a differentiation focus and not a cost focus.

Internal Factors

Since iCAPTURE is a hybrid academic organization and not commercial company, the centre has a modest financial position and different financing constraints than industrial counterparts. Personnel at iCAPTURE are the centre's key value added resource. Two infrastructure components are absent from making the centre market facing. These are a CRM portal and a new department to look after business development, sales, and marketing.

Local biotechnology companies, non-local biotechnology and pharmaceutical companies, and academic customers external to UBC represent lucrative and untapped sources of revenues. Internal and external analysis suggests that the short-term market focus should be on local biotechnology companies and local academics. In the long-term iCAPTURE should expand target market segments to include non-local biotechnology and pharmaceutical companies.

Short-Term Marketing Strategy

The short-term strategy will focus on biotechnology companies and academics in close geographic proximity to iCAPTURE. Four short-term action plan groups will be implemented to transform iCAPTURE into an active market facing organization by the end of 2007.

Organization, Brand, and Policy Development actions are punctuated by installing a new Director, developing a new brand image, creating business development and CRM portal infrastructures, as well as shoring up polices related to the marketing of iCAPTURE services.

Services, Pricing, and Promotion actions include the development of processes to manage business from new market segments, revision of pricing to competitor indices, and preparation of promotional materials. As new initiatives, iCAPTURE will be marketing their services at the prominent BioPartnering North America trade show in 2007 and developing a publicity plan.

Market Growth in Target Segments will be aimed at two distinct market segments. Local biotechnology companies and academic researchers that are geographically nearby will be

evaluated and identified as potential customers. Each market segment will be marketed differently based on the unique value proposition that iCAPTURE services can deliver to them.

Personnel Development and Cost Containment were identified by the Porter's 5 Forces analysis as contributors of high supplier power that needed to be managed. Personnel within the centre need to assist with the implementation of actions detailed in the marketing plan. Equipment service suppliers with high power need to be engaged in cost containment exercises.

Long-Term Marketing Strategy

As marketing competences are developed at iCAPTURE, the targeted market segments will be expanded to include non-local biotechnology and pharmaceutical companies. In addition to the core laboratory business planning activities, annual marketing planning must be undertaken. Over the long-term, iCAPTURE has the opportunity to expand their customer base by putting capacity control policies in place. When this has been achieved other public organizations that are now threats to control iCAPTURE's capacity could be approached as potential customers. This particular long-term strategy is supported by the SWOT analysis.

iCAPTURE also has the potential to become more involved with broader stages of drug development extending beyond drug discovery. This would require the establishment of additional regulatory processes for select services in the core laboratories.

Final Considerations

To execute the recommended technology marketing plan, iCAPTURE will require approximately $ 59,500 in 2007 and $ 87,500 in 2008. The centre will also need to hire at least two individuals to start in January 2007. These new hires will establish a missing piece of organizational infrastructure that will take responsibility for iCAPTURE's business development, marketing, and sales.

The carefully considered actions recommended in this plan will result in a differentiation focused niche strategy, whereby iCAPTURE will be able to gain sustainable competitive advantage. This will be achieved by marketing the centre's highly differentiated core laboratory services at target niche markets.

Special thanks

to my mother whose care and loving interested me in the life sciences

and to my father who demonstrated to me the values

of entrepreneurship and lifelong learning.

ACKNOWLEDGEMENTS

I would like to acknowledge Melanie Hanson, from iCAPTURE, for allowing me to work on this project and for graciously providing information to support this body of work. The recommendations contained within this plan are mine and may or may not reflect the views of iCAPTURE. The mission of the iCAPTURE Centre is a noble one for society and hopefully this technology marketing plan will better enable the centre to sustain itself.

I also wish to acknowledge Jerry Porter from MDS Nordion, who supported the undertaking of this project. Jerry provided me with insight and guidance for the analysis based on his years of successful experience in pharmaceutical business development.

Finally, I am indebted to the fine teaching and administrative staff at Simon Fraser University's MOT MBA program for being patient, supportive and excellent educators.

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GLOSSARY

AMC	Academic medical centre and teaching hospital that conducts drug contract research.
Central Laboratory	A laboratory analytical service company that provides services to support the drug development process.
Cluster	A competitive cluster is a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular industry. Clusters increase the productivity with which companies can compete.
CRM	Software that plans, controls, and schedules pre- and post-sale activities. This software allows better management of customers and customer relationships.
CRO	A Contract Research Organization is an organization that offers clients drug development research services. CROs may specialize in a particular stage or stages of drug development from drug discovery to market approval.
GLP	Good Laboratory Practice refers to a system of controls for laboratories and research organisations to ensure the consistency and reliability of results as outlined in ICH Guidelines.
GxP	The term GxP is a generalization of quality guidelines, predominantly used in the drug development industry. GxPs encompass Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP), and Good Clinical Practice (GCP). The term GxP is used to abstract from the actual set of quality guidelines.
iCAPTURE	iCAPTURE or iCAPTUR^{4}E is an acronym used to describe the cardiopulmonary translational research laboratory at St. Paul's hospital. The acronym stands for Imaging, Cell Analysis and Phenotyping toward Understanding Reparative, Responsive, Remodelling Recombinant Events.
IP	Intellectual property.
ICT	Information and communications technology.
ISO	The International Organization for Standardization (ISO) is an international standard-setting body that produces global industrial and commercial quality standards.

PI	A principal investigator (PI) is the lead scientist for a particular well-defined science research project or laboratory study. The PI is the person who takes direct responsibility for completion of a funded project, directing the research and reporting to the funding agency.
SCA	Sustainable Competitive Advantage is the competitive edge that a firm has which will allow it to satisfy customer needs while maintaining an advantage over its rivals. In terms of strategy, the SCA is due to the uniqueness of its products/services or its lower production or marketing costs.
SMO	Site management organizations are firms that organize and manage clinical trials for drug development companies.
SR & ED	SR & ED stands for Scientific Research and Experimental Development. All industries that involve technology are eligible for SR & ED tax credits. The SR & ED program is a Canadian federal and provincial government incentive program that gives eligible companies cash refunds or tax credits.
Translational Research Laboratory	A translational research transforms scientific discoveries arising from laboratory research, clinical research, or population studies into clinical applications to reduce disease incidence, morbidity, and mortality.
UILO	The UILO at UBC is the University Industry Liaison Office. This office facilitates collaborative research, screens and assesses technology, protects intellectual property, licenses technology, and creates UBC spin-off companies.

1 INTRODUCTION

1.1 The Sustainability Challenge Faced by iCAPTURE

Over the past five years the James Hogg iCAPTURE Centre (iCAPTURE) has been utilizing grants to build the research infrastructure to become one of the worlds leading cardiopulmonary translational research laboratories. To enable a strategy of finding truly innovative solutions to heart, lung and blood vessel diseases, iCAPTURE has complemented their skilled researchers with emerging technologies that allow the beginning stages of disease states to be well characterized and understood. Most large universities with teaching hospitals have translational laboratories which contain technology sub-grouped into functionally based organizational structures called core laboratories. One of the differentiators of iCAPTURE is that the researchers there study the heart, lungs and blood vessels. Most university related core laboratories in North America do not have expertise surrounding their technology from all three of these areas of study. iCAPTURE has not assembled a unique set of capabilities, as there are other comparative translational laboratories that have cardiopulmonary research expertise. Some of the facilities most comparable to iCAPTURE are the Davis Heart and Lung Research Institute at Ohio State University, the Cardiovascular Research Institute at the University of California, San Francisco, the Cardiovascular Research Center at the University of Virginia and the non-profit Cardiovascular Research Foundation in New York, New York.

iCAPTURE's state of the art laboratory equipment and instruments were purchased over the past six years with $ 17.6 million of infrastructure grants. Additionally, St. Paul's Hospital of Providence Health Care has committed laboratory space, office / educational space and $1.5 million per year to pay for ongoing personnel costs at iCAPTURE. An important omission to the

current funding structure is the equipment maintenance and service contracts required by the technology as it comes off of warranty. For 2006, over $ 755,000 will be required to maintain these service contracts.

Realizing this conundrum, iCAPTURE has managed to generate some fee for service revenues with excess capacity that is available on their instruments. For the 2005 financial year, iCAPTURE generated over $ 282,000 in fee for service revenues with a somewhat passive marketing plan. In the last financial year, 86% of fee for service revenues were billed to iCAPTURE internal investigators while the remaining 14% came from other researchers from the University of British Columbia (UBC). Being that the core competence of iCAPTURE is top notch cardiopulmonary research, the current technology marketing strategy will benefit from further analysis and a plan that focuses on identifying and targeting key market segments. The goal of iCAPTURE management is to have a marketing plan in place that would be able to, at a minimum, recover equipment service contract costs for the upcoming financial year. Meeting this goal would allow the centre to achieve a state of financial organizational sustainability.

The value propositions that iCAPTURE is able to offer customers differ by market segment. Industrial customers such as pharmaceutical and biotechnology firms can access iCAPTURE's state of the art instrumentation and derive added value from the knowledge possessed by the highly trained researchers and technical experts at the centre. These customers can utilize these services for outsourced drug discovery work without having to make large in-house infrastructure investments. The second market segment is comprised of academic life sciences researchers. These customers are able to research and publish more prolifically if they have access to the leading edge services provided by the core laboratories at iCAPTURE.

1.2 iCAPTURE Centre Description

The James Hogg iCAPTURE Centre was created in 2000 at the McDonald Research Laboratory of St. Paul's Hospital in Vancouver, British Columbia. iCAPTURE evolved from a cardiopulmonary research laboratory founded by Dr. James Hogg in 1977. A $ 17.6 million infrastructure grant from the Canadian Foundation for Innovation (CFI) and its partners provided the capital required to establish this unique world class research centre. Currently there are over 30 principal investigators (PIs) and 250 personnel that support research into heart, lung and blood vessel diseases (iCAPTURE, 2006).

In order to support the iCAPTURE research mandate, the centre has assembled a unique combination of the best available technology to image and measure changes to diseased molecules, cells, tissues, organs and organisms. Within this bundle of technology, there are over 25 instruments or offering a wide variety of analytical techniques used by the iCAPTURE investigators. These technologies are grouped into eight core laboratories that currently have excess capacity beyond the demand from internal iCAPTURE PIs. Over the past several years, this additional capacity has been used to generate fee for service revenues from researchers at St. Paul's Hospital that do not belong to iCAPTURE and from biotechnology companies. The iCAPTURE operational management estimates that the existing resources and infrastructure could accommodate an additional throughput of 20% to 25% more samples on the laboratory test equipment. The revenues that could be generated by utilizing this excess capacity would be greatly welcomed by the leadership of iCAPTURE as they would offset equipment maintenance and service contracts which are not being funded by grant money.

A second CFI grant of $ 4.6 million was awarded in 2004 to fund a genetically engineered model (GEM) animal facility that was opened in February of 2006. The lesson learned by iCAPTURE was to request part of the award for operating funds. For the GEM

facility, operating funds of approximately $ 90,000 a year were awarded to subsidize the first five years of operation.

1.2.1 Ownership and Control

The University of British Columbia (UBC) has formal ownership of iCAPTURE. The UBC senate approved the establishment of the iCAPTURE Centre. Research at the iCAPTURE Centre is in alignment with faculty's main research themes at the UBC Department of Medicine. The iCAPTURE Centre is located at St. Paul's Hospital of Providence Health Care, which is one of four teaching hospitals in Vancouver. iCAPTURE occupies 50,000 square feet at SPH, of which approximately 35,000 square feet is allocated to laboratory space.

Control and management of iCAPTURE is assigned to an executive committee made up from accomplished members of the centre. The individual with the most authority in the committee is the Director who is appointed for a five-year term. The Director establishes a strategic direction for the centre for the duration of the term. Strategic input is sought from the Co-Director and four Assistant Directors. The Assistant Directors are PIs who are elected for two-year terms. Assistant Directors play a critical role in strategy decisions, challenging the Director and Co-Director, resolving problems, making hard decisions, and setting precedents within the centre. The Scientific Affairs Manager and Operations leader occupies the remaining position in the executive committee. This last non-voting position is responsible for enabling the executive committee by facilitating meetings, providing historical context to discussions and anticipating problems that the committee may encounter. The executive committee resolves operational challenges encountered by the PIs and their supporting personnel.

The Director has two primary goals. First they must utilize the iCAPTURE infrastructure and personnel to support the leading cardiopulmonary translational research conducted by the centre's PIs and their collaborators. Secondly, the Director must constantly evolve the

infrastructure and human resources at iCAPTURE to provide sustainability and growth for the centre. A critical success factor in the ability to sustain iCAPTURE is being able to source adequate funding for personnel, infrastructure and operating costs that are not funded by grants. Clearly the Director, with support of the iCAPTURE executive committee, controls the strategic direction, operational management, and future survivability of the centre.

1.2.2 Corporate Scope

Most of the work that iCAPTURE researchers perform is at cellular, molecular, and genetic levels. The primary output of iCAPTURE is translational research that allows for an in-depth understanding of the beginnings of heart, lung, and blood vessel diseases and how they can be prevented. In order for this research to translate to living patients, the iCAPTURE Centre is enabled by a unique tissue registry, which contains a diverse variety of samples with various heart, lung, and blood vessel diseases. The key components and technologies that provide the foundation for iCAPTURE are operationally divided into the following eight core laboratory technology groupings:

1. **The BioBank** - is a multi-institutional computerized catalogue of patient data complemented by banked diseased tissue samples that can be used for molecular and pathobiological studies. The BioBank also has operational components that deal with histology and issues related to patient privacy.

2. **Molecular Phenotyping** - characterizes DNA variation as well as RNA and protein expression in tissues and cells. This allows researchers to distinguish disease states from non-disease states at a molecular and cellular level.

3. **Genotyping** - allows for the genetic variation in a specific patient to be correlated with their environmental factors to determine the individual's susceptibility to common complex diseases.

4. **Imaging in Cells Organs and In Vivo Models** - Ultrastructural Imaging allows cells to be visualized at high magnifications and provide extremely detailed visual images of structural features of damaged heart and lung specimens. Organ Pathophysiology and Imaging assesses whole organ structure and function using computer tomography (CT) and magnetic resonance imaging (MRI) units.

5. **Biochemistry and Biophysics** - provide understanding of the metabolic processes in cells and in tissues. This allows researchers to better understand how healthy and diseased organs differ in terms of function and metabolite production. This technology group also provides insight into gene function, signalling networks and disease mechanisms.

6. **Genetically Engineered Models (GEM) Facility** - allows for the use of transgenic animal models in the validation of disease mechanisms or preventive strategies.

7. **Computational Biology** – capabilities are being set up to aid in the analysis of genomic, proteomic and clinical data generated by the researchers. As the heart and lung disease data bank grows, researchers will be able to mine this data to discover knowledge related to genes and disease pathways.

8. **Technology Development** - involves development of rapid microarray genotyping that will facilitate urgent clinical diagnosis for patients with conditions like sepsis or those undergoing organ transplants.

As with the ownership and control of iCAPTURE, the competitive strategy of the iCAPTURE core laboratories revolves around the themes of research and sustainability. The PIs who do research at iCAPTURE are primarily interested in publishing, developing collaborations, securing grants and having access to more leading edge technology. This may create some tensions within the centre as the research driven goals of the PIs are not in alignment with the overarching sustainability goal of the Director and executive committee.

In order to sustain iCAPTURE, the Director and executive committee must be able to generate operating revenues to cover the equipment maintenance and service contracts. This revenue is essential to the ongoing operation of iCAPTURE and can not be sourced from grant monies. The subsequent analysis will focus on utilizing excess capacity in the eight core laboratories to generate revenues through fee for service transactions.

2 EXTERNAL ANALYSIS

Being a translational research facility, iCAPTURE is faced with a unique financial challenge. Even though the centre is an extension of academia, the funding agencies create a strain by placing the onus on iCAPTURE to achieve a substantial level of sustainability funding from within. This force, combined with the more than competent management at iCAPTURE is responsible for the centre running like a very agile small life sciences firm rather than a slow bureaucratic organization.

A key part of this external analysis will be to assess the attractiveness of the external environment as relates to the life sciences, medical, and cardiopulmonary research market spaces. The context of this assessment will be to look at the current and future states of growth and profitability within these external environments. Two key forces stand out when focusing on demand for iCAPTURE service outputs. The first factor is the growth of the biotechnology and pharmaceutical industry who may wish to access the leading edge iCAPTURE equipment and services instead of developing these services in-house with large infrastructure investments. This industry growth applies to both the small local biotechnology cluster as well as other non-local biotechnology firms of any size. The core laboratories in translational research facilities, like iCAPTURE, provide extensive drug discovery capabilities that can be accessed by these firms.

The second force to be considered is that life sciences researchers face enormous pressures to publish prolifically. If the iCAPTURE technologies act as an enabler to these researchers, a substantial demand could be created for access to excess iCAPTURE service capacity.

2.1 Current Situation - Macro-Environment

The macro-environment that translational research laboratories, like iCAPTURE, exist in affects the strategy and performance of these organizations. A PESTEL framework will be utilized to categorize environmental influences into six types of factors: political, economic, social, technological, environmental and legal. Particular attention will be paid to assess the future impact of PESTEL factors that may differ from those impacts seen in the past.

Table 1: PESTEL Analysis of the Translational Research Laboratory Environment

	Major Factors	Future Trends
Political	• Government support provides substantial funding for infrastructure but not for operations. • Deals with commercial customers are encouraged by providing the customers with R&D tax credits.	• National Systems of Innovation around the globe will continue to put pressures on governments to increase subsidies for R&D.
Economic	• Technology infrastructure and knowledge base is highly subsidized at translational labs. • Vancouver based translational labs are not currently supported by deals with a mature life sciences cluster. • There is no local pharmaceutical industry to support Vancouver based translational labs.	• Globally, pharmaceutical and biotechnology companies are increasing their percentage and dollar amount of outsourced drug discovery work. • Translational labs in Vancouver have the potential to get a lot of business from the local emerging biotechnology cluster, which has lots of growth potential.
Socio-Cultural	• Population demographics act as a driver for better healthcare and more drug discovery. • The internet has caused patients to become much better informed. This creates a demand for better treatments and more drug discovery.	• By placing increased emphasis on drug discovery, the stakeholders of the healthcare system will be able to better control costs. Winners and losers are sorted out early in the drug development value chain.

	Major Factors	Future Trends
Technological	• Research labs are much better suited to high rates of technological obsolescence than are commercial CROs. • Technology is subsidized and personnel are early adopters of new technology.	• New life sciences lab technology continues to be produced at a rapid rate. • Drug development business model is moving from producing therapeutics to the specialization of translational labs; understanding and curing disease.
Environmental	• Translational research labs specialize in understanding the interaction between the environment, genetics and the disease.	• The future direction of the life sciences industry is towards personalized medicine. This trend is rooted in the understanding of how environment and genetics cause disease.
Legal	• Owners and competitors of translational labs are not currently concerned about academically rooted research labs doing business in the drug discovery market space. • Customer confidentiality issues and issues surrounding services and technologies must be evaluated as part of every deal.	• Internally developed platform technologies that are not fee for service testing must be identified early on in the translational labs. • These platform technologies must be protected as intellectual property and developed through partnerships or licensing.

2.1.1 Political Factors

Currently grant funded core laboratories at translational research centres are expected to provide sources of internal funding to sustain infrastructure service and maintenance shortly after establishment. If government policy changes to provide a higher level of funding, the urgent need to raise fee for service revenues will diminish. Alternatively, if government funding agencies reduce life sciences funding translational research laboratories will be faced with the nearly insurmountable challenge of generating high levels of operational revenue.

In either scenario, it is clear that the future operations of translational laboratories have high levels of variability related to their performance and growth due to their dependence on grant based funding. It is in the best interest of these laboratories to diversify their sources of

funding in order to better preserve organizational sustainability when faced with changing political factors that determine their level of grant funding.

To provide an incentive for local and US biotechnology companies, drug discovery research labs would be well advised to promote and educate customers about tax credits involved in providing these services. In British Columbia, federal and provincial Scientific Research and Experimental Development (SR & ED) tax credits provide customers a 30% credit. Customers from the United States can realize a 20% credit.

Development of national innovation systems in Canada, the United States and many other developed countries has been conducted in order to achieve economic development and expansion (OECD, 1997). These systems implement policy that is intended to promote international flows of knowledge and encourage technology diffusion. National innovation systems provide both financial support as well as policy that promote increasing commercial interactions between companies contracting out drug discovery and suppliers of core laboratory services.

2.1.2 Economic Factors

Translational laboratories benefit greatly from having their core laboratory technology infrastructure highly subsidized by government grants. Even though the infrastructure was implemented for research purposes, excess service capacity has very low overhead costs associated with it when contrasted with a comparable green field commercial competitor. Such potential competitors in Vancouver may find it difficult to justify a business plan to compete with translational laboratories due to the costs of the highly specialized laboratory equipment and technically proficient personnel. Competitors must also face uncertainties related to the new technologies that are adopted at an early stage in translational research facilities.

Fee for service laboratories in Vancouver have to deal with being in an emerging biotechnology cluster. Other clusters like the San Francisco Bay Area, Boston, or New Jersey have booming and mature biotechnology or pharmaceutical industries. This creates local conditions where there is a large and well funded group of local customers for the translational laboratory services. The Vancouver cluster has no significant pharmaceutical industry presence and has a biotechnology industry that lacks high levels of monetary backing. It is however possible for research laboratories to generate business from geographic areas other than Vancouver. In the future, the Vancouver cluster may prove to be a good location for a thriving biotechnology business cycle. The Vancouver biotechnology cluster is growing and is currently ranked as the seventh largest cluster in North America (BC Biotech, 2005). If the cluster gets a foothold and starts to mature, many of the drug discovery R&D requirements from the young biotechnology cluster will create demand for core research laboratory services.

Pharmaceutical and biotechnology firms are outsourcing a substantial portion of their R&D. In 2006, 57% of surveyed large pharmaceutical and biotechnology companies indicated that they would outsource 20% of their R&D operations. By utilizing outsourced research laboratories, these firms benefit from being able to utilize external expertise, focus on their own core competences, improve cost productivity, improve quality, and improve speed to market. The large pharmaceutical and biotechnology firms have substantial amounts of cash and strong balance sheets to back their demand for the services offered by translational research laboratories.

2.1.3 Socio-Cultural Factors

Population demographics in the developed world increase the requirement for better understanding of diseases as well as novel diagnoses and therapies for these medical conditions (Sinclair, 1998). Per capita healthcare spending is increasing in developed countries as is life expectancy. As the developing world industrializes, the demand for better medicines and

healthcare will increase in future years. Successful translational laboratories will provide products and services that aid in the understanding, diagnosis, and treatment of disease. This in turn will reduce the financial burden on the overall healthcare system.

The earlier on in the drug development process that a target drug can either be validated or rejected, the smaller the cost is to the healthcare system. Modern drug development and commercialization for a single product may cost upwards of $ 900 million US including capitalization and opportunity cost as well as takes approximately 13 years. Technologically savvy research laboratories are able to provide customers this information relatively quickly. The ability of being able to help the customers make a stage gate decision early on in the drug development process provides an excellent value proposition to do business with the translational laboratory. The ability to kill a bad drug discovery early on in the development process reduces healthcare system costs (DiMasi, Hansen, & Grabowski, 2003).

In the United States, the population over the age of 65 is expected to increase from 35 million people in 2000 to 71 million people by 2030. Similarly, on a worldwide basis the population over 65 will increase from 420 million people to 973 million people over the same time frame (Goulding, 2003). This increase in the ageing population worldwide will be a strong future driver to develop target markets for new medicines.

With the ubiquitous deployment of the internet, patients have an increased level of information accessibility and empowerment with regards to healthcare. This acts as another strong driver for the development of new medicines and further understanding of diseases. The overall shift in population demographics to an older population that is wealthier, is better informed, and desires a better quality of longevity creates strong demand for increased drug development.

2.1.4 Technological Factors

Core laboratories in translational research centres occupy a technologically contrarian position to commercial drug discovery competitors. New technology infrastructure is funded by grants at research laboratories and highly sought after by the PIs at these facilities. Research laboratories tend to be early adopters of new technology and benefit from fast rates of obsolescence. When laboratory test equipment has a high rate of obsolescence, the ongoing operational and maintenance costs become less of an issue since these instruments are covered by their initial warranty service plans. Instruments that go obsolete quickly do not accrue large amounts of service plan costs prior to their retirement. By contrast, commercial drug discovery laboratories have to justify large infrastructure investments and steep learning curves each time new technologies are contemplated.

The growth of new laboratory analytical technology acts as a driver for new drug discovery technology and obsolescence of existing technology. The global laboratory analytical instrumentation market is expected to approximately grow 40% from 2004 to 2011 (Chu, 2005). This represents an increase in market size from $ 7.78 billion US to $ 10.86 billion US over the 7 year time frame.

The researchers at translational laboratories tend to be leaders at making new discoveries. These researchers are proponents of new technology and for the development of new test methodologies. The nature of their research makes them adept at being agile at technology transfer. Translational research laboratories establish leading trends in biotechnology. These trends include a focus on genomics, diagnostics and personalized medicine. Facilities like iCAPTURE are able to provide the state of the art services required for new innovative biotechnology companies to develop differentiated treatments and personalized medicine. This enables the new biotechnology companies to pose a strategic threat to existing established drug companies.

Ultimately, players in the drug development and drug discovery markets are moving towards a personalized medicine approach to the drug development process. By being able to provide molecular based diagnostics and therapeutics, patients will be given individual diagnostics and therapy regimes. The advantages to the patients and healthcare system are that patients will be more likely to benefit from the treatments and far less likely to experience adverse side effects (Ng, 2004). The core competences of translational laboratories support drug discovery customers who want to validate and develop superior targets. The services provided by core laboratories in these translational facilities enable new and existing drug discovery firms to implement personalized medicine drug development strategies.

2.1.5 Environmental Factors

Discoveries in science and medicine have categorized the root cause of disease states as a combination of genetic and environmental factors. The genetic and environmental factors are not mutually exclusive and in most cases there is a high level of interdependency in determining cause and effect of a disease. Leading translational laboratories tend to have competences that focus on both factors. In addition to being able to provide the service and technology platforms to study disease states, many of these centres have personnel with broad knowledge and deep areas understanding of the impact of relevant environmental factors.

The environment as a whole is not homogeneous or in a steady state. Some translational research laboratories have a core laboratory with tissue archiving facilities. These facilities allow for retrospective assessment of environmental factors captured at the time of the tissue storage. Many aspects of our environment pose increasing threats to the health and well being of mankind. Examples of this include poorer air quality in urban areas, more additives and toxins in foods, higher UV light exposure, as well as long term effects of drugs. As new technology is implemented in translational research core laboratories, parameters related to the past and

presented environment can be evaluated and trended. Insight into future changes in the environment, as they relate to disease states, can be gleaned from this data.

2.1.6 Legal Factors

Intellectual property must be an important focus for core laboratories service providers. When entering into service contracts with biotechnology customers or other researchers, research laboratories must be vigilant and not give away intellectual property to customers. If a customer gains intellectual property rights from a translational research centre, they have acquired a barrier to entry to prevent further research without their consent. Translational laboratories must have clarity on which services are within the domain of public knowledge and which others contain proprietary methods. When engaging in fee for service laboratory testing, core laboratories are least encumbered by intellectual property. The fee for service tests are differentiated by the specialized test equipment and expertise required rather than competitive insulation provided by intellectual property rights.

Both corporate biotechnology customers and researchers from other academic institutions who use the services of translational laboratories will demand the non-negotiable prerequisite of having the confidentiality of their work protected from disclosure and access by competitors. Successful research laboratories will have administrative and operational systems that ensure that the privacy of the customer is upheld. More forward looking research laboratories will implement systems to control access by regulatory bodies to the work they are performing for customer. Having a system in place to manage the scope of regulatory inspections mitigates potential risks for customers and acts as an incentive to do business with the translational laboratory.

Some core laboratories at the centre that have well known and characterized test methods such as phenotyping, imaging, and histology are easy areas to conduct fee for service work in

without intensive review of intellectual property protection. Other types of testing in different core laboratories, such as custom developed diagnostic genetic screening kits, require more intensive intellectual property scrutiny. In the case of a screening kit platform technology, the fee for service paradigm does not fit well. A more formal type of technology licensing deal that is reviewed by intellectual property lawyers would provide a better fit.

Research laboratories must be wary when entering technology licensing deals with some developing countries. Some Asian countries provide no legal protection for infringement on intellectual property (Borrell, 2005). This may lead to a loss of market share or barriers to entry for the originator of the technology.

Government funded research laboratories must be vigilant of how they compete in the drug discovery research market. Competitors may contend that the translational research laboratories may be engaging in unfair competitive practices by utilizing public funding to create the infrastructure backbones of their companies. This issue may be especially contentious in the hypercompetitive contract research industry where profit margins are narrow. Translational laboratory competitors have not voiced their objections, to date, about these research facilities providing testing services to the drug discovery market.

2.1.7 PESTEL Summary

The PESTEL analysis indicates that the translational research laboratory industry faces internal threats related to sustainability because the operations and maintenance of the large amounts of technology used in these research laboratories is not adequately funded. These research laboratories are forced to find a commercial market space that will allow them to utilize excess capacity in order to cover operating and maintenance costs.

Two market spaces provide the best fit for the competences of the translational laboratories. The first market is serving the needs of drug discovery. Secondly, the research needs of similar academic researchers external to the translational laboratory could provide additional business. Macro-environmental drivers to develop national innovation, reduce costs to healthcare, and outsource corporate drug discovery R&D create a large overall demand for research laboratories offering specialized knowledge and services. The primary research goals at translational laboratories make them well suited to adopt new technologies.

The translational laboratories must be vigilant of the increasingly complex issues related to customer confidentiality and intellectual property protection. Research laboratories that devise a targeted marketing plan and solid intellectual property management strategy will be well positioned to succeed in achieving their financial sustainability goals. The overall market that translational laboratories currently exist in demonstrates a good level of demand for their specialty services. The future trends towards increased drug discovery outsourcing and personalized medicine provide future growth in the areas that translational laboratories have their core competences. Successful translational laboratories will enable customers to adopt new drug development strategies such as personalized medicine.

2.2 Current Situation - Market Analysis

2.2.1 Industry Definition

The primary industry that iCAPTURE operates in is that of leading university medical school research centres. Two primary differentiators distinguish the centre from competing academic institutes. First, the focus of iCAPTURE research is on cardiopulmonary research. Many of the competing institutions concentrate their research specialty on either cardiology or respiratory diseases but not both. Secondly, iCAPTURE utilizes leading edge technology in areas such as genomics and imaging in order to produce innovative research of the highest quality.

The Cardiovascular Research Institute (CVRI) at the University of California, San Francisco (UCSF) is one comparable model as a sustainable translational research laboratory. The Office of Sponsored Research (OSR) at UCSF provides a primary point of contact and negotiation for biotechnology companies to interface with the CVRI. CVRI benefits from being in the largest biotechnology cluster in North America. Through the efforts of the OSR, UCSF life science research centres generated over $ 180 million dollars from 1996 to 2003 through deals with over 350 companies (Dinglasan, 2004).

The excess service capacity that iCAPTURE has could be utilized to service other customers who are doing medical research or drug discovery. In this case, iCAPTURE is operating in the market space of contract research laboratories. Because iCAPTURE is not a Good Laboratory Practice (GLP) facility, it can not perform services for pre-clinical or clinical customers.

The Service-Customer Matrix in Table 2 confirms that iCAPTURE is currently not marketing their services to the differentiated target market segments that could benefit from them. Of the revenues generated for core laboratory services, 86% of them come from the work of iCAPTURE PIs and their collaborators. Only 14% comes from other UBC researchers. During the financial year that Table 2 spans, iCAPTURE has performed service work for some of the largest biotechnology companies in Vancouver and for some of the world's top biotechnology firms. This fee for service work has been booked as collaborative work with the PIs acting as the customers. The services at iCAPTURE can clearly benefit researchers from other universities as well as biotechnology and pharmaceutical companies performing drug discovery work. These last three market segments mentioned are clearly within the markets that iCAPTURE's industry serves and present new areas for revenue growth opportunities.

Table 2: Service-Customer Matrix for iCAPTURE Service Revenues FY 2005 to 2006

Services	Customer Segment Revenue							
	iCAPTURE PIs (Internal)	Other UBC Researchers	Vancouver Biotech Companies	Researchers From Other Universities	Non-Local Biotech	Total Revenue	Operating Supplies and Costs	Revenue Less Equipment Maintenance
Biobank	$1,500	$0	$0	$0	$0	$1,507	$2,858	$(1,351)
Molecular Phenotyping	$45,661	$17,376	$0	$0	$0	$65,474	$46,217	$19,257
Imaging - Ultrastructural	$26,068	$4,723	$0	$0	$0	$31,513	$4,825	$26,687
Imaging - Dynamic Cellular	$18,227	$135	$0	$0	$0	$18,214	$13,523	$4,691
Histology	$44,724	$5,256	$0	$0	$0	$51,025	$32,471	$18,554
Biochemistry and Biophysics	$0	$0	$0	$0	$0	$0	$0	0-
Genetically Engineered Models	$0	$0	$0	$0	$0	$(76)	$95,721	$(95,797)
Imaging	$27,117	$10,847	$0	$0	$0	$37,964	$9,965	$27,999
Database (Programming)	$42,500	$0	$0	$0	$0	$42,500	$25,846	$16,654
Computing (IT)	$34,758	$0	$0	$0	$0	$34,758	$10,334	$24,424
Computational Biology	$0	$0	$0	$0	$0	$0	$0	$0
Technology Development	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$240,556**	**$38,337**	$0	$0	$0	**$282,879**	**$241,760**	**$41,119**
% of Revenue from Segment	**86%**	**14%**	**0%**	**0%**	**0%**		-	

2.2.2 Market Size and Trends

In context of additional service revenues, iCAPTURE functions as a laboratory service provider for the drug discovery market. The primary customers for this market are pharmaceutical and biotechnology companies of all sizes. Appendix 1 illustrates the drug discovery and development process. iCAPTURE currently is able to serve the non-GxP discovery stage of this industry value chain. Globally in 2005, pharmaceutical and biopharmaceutical companies spent approximately $ 27 billion US on drug discovery research. Total global outsourced drug discovery was $ 4.1 billion US in 2005 and is anticipated to grow to over $ 7.2 billion US by 2009 (Kalorama Information, 2006). In terms of global R&D spending, approximately 80% of it originates from United States companies and 1% from Canadian companies (Pharmaceutical Research and Manufacturers of America, 2006). The iCAPTURE sustainability goal of approximately $ 700,000 US, represents a market share of approximately 0.02% of the 2005 global outsourced drug discovery R&D market. Even though the drug discovery market is hypercompetitive, it is massive enough of a market space for iCAPTURE to carve a differentiated niche out to satisfy their revenue goals.

The laboratory services offered by iCAPTURE are not exclusive to cardiopulmonary research. These services can be used by any research specialty that utilizes pathophysiological studies. An example of this would be nephrology researchers utilizing some of iCAPTURE's molecular phenotyping services to advance their studies of renal diseases. The overarching knowledge base shared by iCAPTURE researchers is in the field of cardiopulmonary diseases. This is particularly important since this is an area where drug discovery customers may find added value at iCAPTURE. A 2006 US pharmaceutical industry profile article indicated that there were 2,407 drugs undergoing development at the preclinical stage and beyond (Pharmaceutical Research and Manufacturers of America, 2006). Of these drugs, 363 of these

were for cardiovascular or pulmonary diseases. The knowledgeable researchers at iCAPTURE have expertise that directly relates to approximately 15% of the current drug development market. For every drug that is in the preclinical part of the development process or beyond, there are approximately 20 to 40 drugs undergoing drug discovery R&D. This conservatively extrapolates to an estimated 7,200 drugs for cardiovascular or pulmonary diseases that are currently undergoing drug discovery.

The second potential market for iCAPTURE services are academics other than the PIs at iCAPTURE. These potential customers would be medical researchers from other universities in Canada and the United States. Over the 15 year period from 1984 to 1999 total United States university research expenditures increased dramatically from $ 8.56 billion US to $ 23.05 billion US (Snyder, Johns, Mongan, & Utaski, 2003). The segment with the largest increase over this time period was biological and medical sciences which nearly tripled over the 15 years from $ 4.73 billion US to $ 12.77 billion US. Academic research projects in biological and medical sciences increased 19% from 27,623 to 32,852 while the number of principal investigators grew 21% to 8,956 by 1999. While the percentage of academic research services that are outsourced is not clearly defined, the growth of the life sciences academic research market is a very positive indicator that PIs at other institutions should have demand for iCAPTURE's innovative core laboratory services to advance their work.

2.2.3 Market Segmentation

The global outsourced drug discovery market was a $ 3.2 billion US in 2002 and had grown to $ 4.1 billion US by 2005. In 2002, the top 10 drug discovery suppliers were companies in the biotechnology industry who shared $ 837 million US or just over 25% of the market (Heffner, 2003). Customers of these top 10 firms are interested on doing business with them

because of the quality of content in their screening and not because of high throughput drug screening capacity.

There are currently approximately 45 commercial firms that are competing as Contract Research Organizations (CROs) in the drug discovery portion of the drug development process value chain. Of the $ 4.1 billion US outsourced drug discovery market in 2005, the 45 commercial CROs shared a 71% market share which was approximately $ 2.9 billion US (Heffner, 2004). The high number of commercial CROs fighting for market share has created a hypercompetitive market space. The CRO business generally has less competitive insulation than other businesses involved in the drug development value chain. This is particularly relevant for fee for service testing provided by these firms for early stage work like drug discovery research. To engage in fee for service testing for drug discovery research, a new CRO does not have to be particularly concerned with IP related to the testing methodologies as they are not proprietary. Additionally, the expertise required for established mainstream testing does not require a scarce skill set. The new firm only has to identify a profitable market and acquire the relevant laboratory equipment to compete. The relatively low barriers to entry for the CRO industry combined with high level of outsourced drug discovery over the last two decades resulted in the current hypercompetitive CRO market. Firms competing in the CRO market differentiate their services by targeting different parts of the drug development value chain and by competing on price.

From the $ 1.2 billion US share of the market that did not get outsourced to CROs, 90% or $ 1.1 billion US went to Academic Medical Centres and Teaching Hospitals like iCAPTURE. The remaining $ 120 million US share of the market is split up amongst Site Management Organizations, Laboratory Analytical Services and Niche Service Providers. These major competitive segments of the outsourced drug development market are illustrated in Appendix 2.

2.2.4 Competitors Strengths and Weaknesses

The strategic groups that participate in the fee for service research industry are plotted in Figure 1. This representation is intended to demonstrate that the competitors in the fee for service marketplace do not have intense overlap with translational laboratories like iCAPTURE. The lack of overlap indicates that the different strategic groups have strategies and characteristics which are different from translational laboratories. Consequently, the translational laboratories will be able to pursue their key success factors with less intense direct competition. Translational laboratories are differentiated because their research services are state of the art and utilize the latest innovate technologies. Since the primary mission of translational laboratories is to serve academic researchers, the level of regulatory compliance at these facilities makes their services applicable to only early stage drug development activities such as drug discovery. Non-life sciences universities do not possess the technologies required to compete directly with translational laboratories.

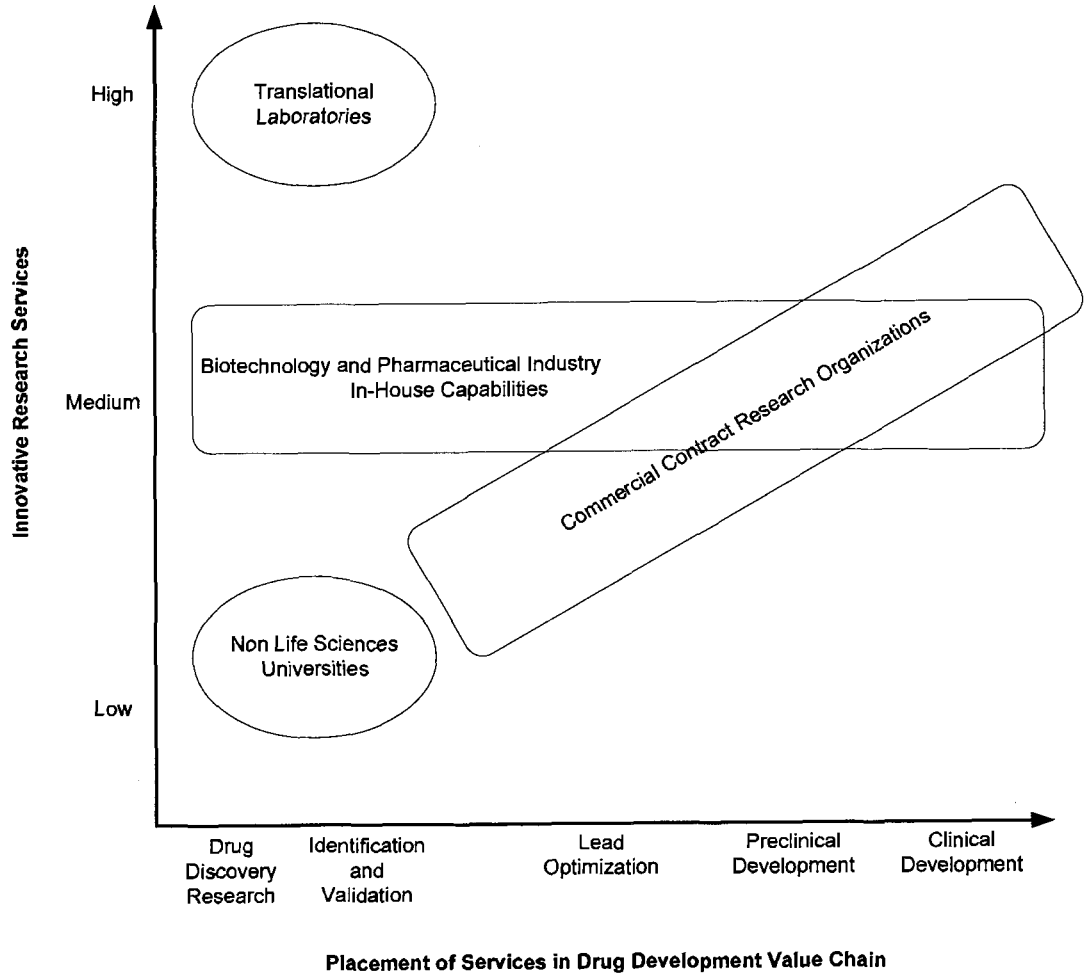
Biotechnology and Pharmaceutical firms usually have a certain level of in-house drug development capability that spans the entire drug development value chain. Smaller biotechnology firms have limited resources and may be financially constrained from acquiring a highly innovative technology infrastructure due to the high cost. Larger biotechnology and pharmaceutical firms choose to outsource much of their innovative research efforts because of the prohibitive economics of building these capabilities in-house.

The main competition for translational laboratories in the fee for service drug discovery research market are CROs. The key strengths of the CROs lies in their ability deliver to their customers demanding timelines and have systems in place to meet regulatory GxPs. Many of the CROs also have the ability to be able to move the drug development along to continued stages beyond drug discovery. Commercial CROs do not possess the same state of the art technology infrastructure that is found in translational laboratories. The technology infrastructure at a CRO

is determined by the ability of the laboratory equipment mix to generate rents. In a translational laboratory, equipment will be purchased based on its capability to produce innovative research as opposed to its ability to generate profit.

The high level of competition amongst CROs results in lower profit margins, limiting the growth potential and strategic choices of these competitors. Currently, most CROs are located where the biotechnology and pharmaceutical industries are more mature. In these geographic locales, their prospects for profitability are greater. Since Vancouver is an emerging biotechnology cluster, none of the major CROs specializing in drug discovery are located here. A weakness that the CRO industry has is that it is not a channel driver for the drug discovery industry. Rather, the drug discovery CRO firms will wait for the market to develop, locate there, and fight over the business. When compared to translational laboratories, another weakness is that CROs have is that their business models and strategies are targeted to industry and not to academia.

Figure 1: Comparison of Strategic Groups competing in the Fee for Service Drug Development Industry



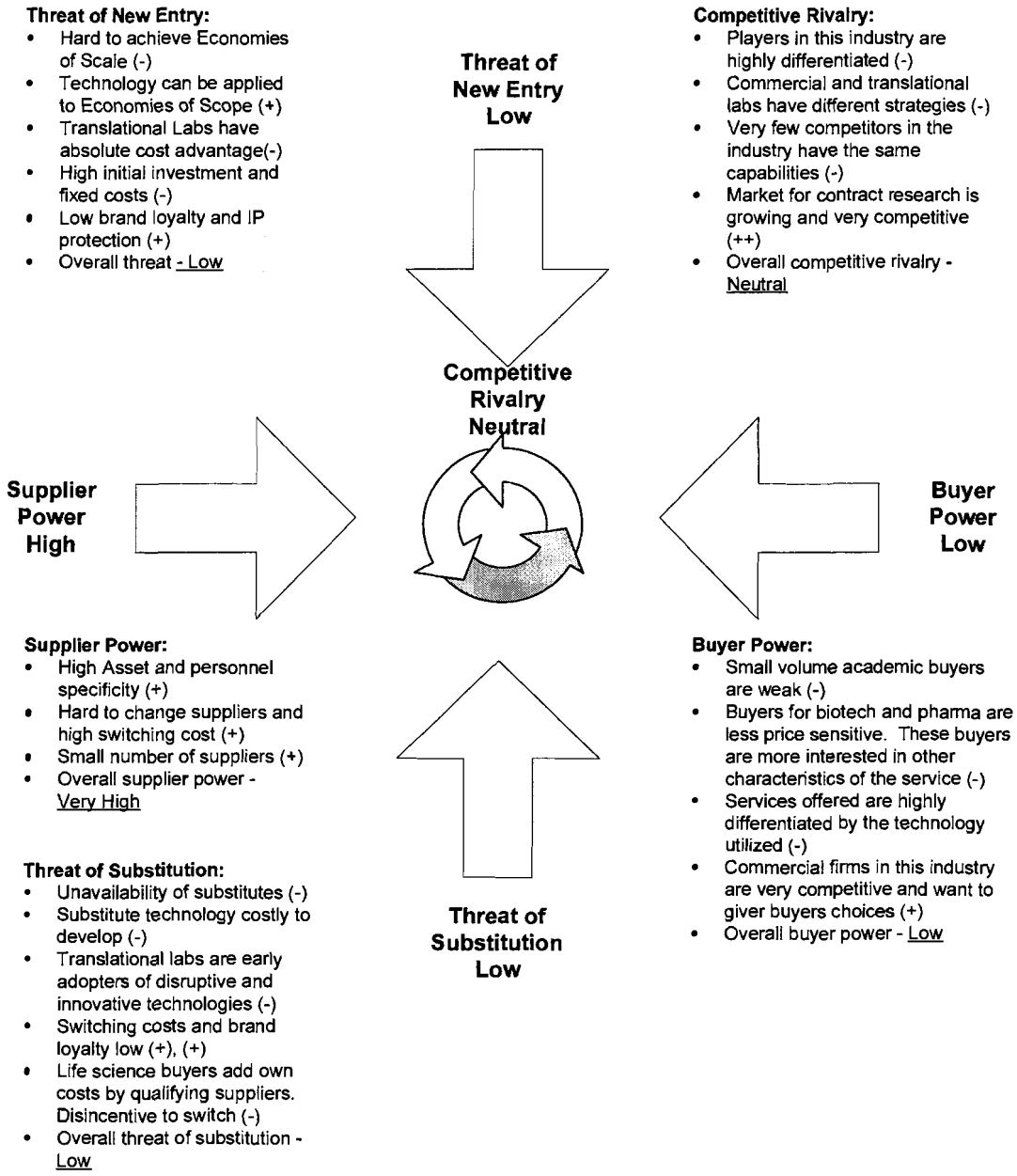
Based on (Boardman & Vining, 1996)

2.2.5 Porter's 5 Forces Analysis

This analytical tool is used to understand the current and future competitive situation of the fee for service research industry that translational laboratories, like iCAPTURE, participate in. Five important forces that affect competitive power in this industry will be assessed. These forces are Supplier Power, Buyer Power, Competitive Rivalry, Threat of Substitution, and Threat of New Entry. By analyzing these forces in the fee for service research industry, the intensity of competition can be determined. This will give insight into the potential profitability and

attractiveness of the industry. Based on the characteristics of the industry, a competitive strategy can be formulated for iCAPTURE to achieve sustained profits. Key success factors will be elucidated from the 5 Forces Analysis that will shed insight into how iCAPTURE can utilize the particular characteristics of their industry to build into a position of strength in the future. Figure 2 outlines the current state of competitive forces in the fee for service drug discovery R&D industry.

Figure 2: Porter's 5 Forces for the Fee for Service Drug Discovery R&D Industry



Based on (Porter, 1980)

2.2.5.1 Supplier Power

Supplier power is extremely high in this industry. This compromises potential profitability because it is easy for suppliers to drive up the prices of key inputs.

The asset specificity of this industry is high. The key inputs of the fee for service research industry revolve heavily around the leading edge laboratory equipment and specially trained personnel that are involved with the testing services. Suppliers of the instruments have instrument specific maintenance parts, consumables, and service expertise. These suppliers use lock-in type differentiation to limit alternatives of inputs related to the equipment.

If a research laboratory is able to find a comparable equipment platform and decides to switch to the alternative, there are high switching costs related to this migration. The costs are not only related to the capital required to implement the new equipment. Additional costs are incurred for training and lost opportunity during the change over. The supply of qualified technical experts to productively and effectively operate the equipment is scarce.

This situation of high supplier power puts pressure on research laboratories to pay high prices for the inputs of laboratory equipment testing. In the cases of both the equipment suppliers and scare supply of highly trained technicians, pressure is put on the potential profits that research laboratories are able to earn. This constraint in turn limits the number of strategic choices that these laboratories have when trying to compete successfully in the industry.

2.2.5.2 Buyer Power

Buyers from academia are more likely to try to push down prices for contract research at translational laboratories than are buyers from the biotechnology or pharmaceutical industries. Academic buyers would tend to purchase smaller amounts of R&D services for their projects and are constrained by the amount of funding that they have for their research. The small academic buyer market is unlikely to be able to push prices down. The biotechnology or pharmaceutical industry customers have enough buyer power to push prices down; however these buyers place more emphasis on quality, confidentiality, timeliness, and ability to provide work compliant with appropriate regulatory requirements (Roth, 2006). Relatively high margins in biotechnology and

pharmaceuticals tend to make these customers less price sensitive when they are trying to acquire a service that they deem is critical to them. While the powerful biotechnology and pharmaceuticals buyers may not focus on price, they will be able to dictate many contract terms regarding contracting out parameters that are of high importance to them.

Both groups of buyers desire to utilize the highly specific laboratory services offered by the core laboratories of particular translational research centre. Searching costs are relatively high to find the type of technology that the buyer is looking for since many of the core laboratory service offerings are uncommon. Even though switching costs are low for buyers to move from one supplier of drug discovery R&D to another, there are few substitutes available. The high asset cost and unknown frequency of use of specific laboratory test equipment acts as a deterrent for buyers to attempt to backwards integrate into the highly specialized and differentiated industry that the translational laboratories occupy.

Fee for service laboratory testing for drug discovery operates in a hypercompetitive marketplace that is differentiated by many different types of new technology. The ability of academic buyers to reduce prices is low because of the small orders from each potential customer and the small amount of customers. The potential of biotechnology and pharmaceutical buyers to reduce translational laboratory margins in also low, since these buyers have high margins and little economic incentive to backward integrate these services. Overall the buyer power is weak in this industry.

2.2.5.3 Competitive Rivalry

There is a relatively low concentration of translational laboratories offering fee for service research. Most of these laboratories are part of a university and tend to be research focused as opposed to market facing. Translational laboratories have infrastructure and personnel that is non-standardized. The unique make up of each laboratory differentiates them and

decreases the amount of competitive rivalry. CROs operate at a higher price point in the fee for service research market. There are many commercial competitors but few of them would have the leading technological capabilities of research laboratories. The strength of the commercial CROs lies in their ability to engage in activities that span many steps of the drug development process and apply GxPs to meet regulatory requirements. Relatively low barriers to entry have resulted in many commercial firms competing as CROs in the fee for service drug discovery market. Commercial drug discovery firms are numerous and offer mainstream drug discovery technology that tends to be less innovative than the more differentiated testing services found in translational laboratories.

Other translational research laboratories that specialize in cardiopulmonary research will most likely have a similar suite of technologies to that of iCAPTURE. These institutions would have the capability to offer suppliers and buyers opportunities and services that are equally attractive. On the other hand, if these similarly subsidized research laboratories preferred to focus their efforts on pure research endeavours and academic collaborations, the competitive rivalry would decrease substantially. Since the customers of drug discovery service firms are looking for unique fee for service testing bundles for each project a high level of communication and flexibility is required for each project. These intense communication and feedback requirements favour the customers and the suppliers of these services being in close geographic proximity to each other until reliable procedures and systems have been set up that can manage the communications reliably over distance.

The competitive rivalry is benign for the fee for service research industry. Commercial firms are very competitive in this industry and there is a trend towards consolidation amongst drug development outsourcing companies (Martorelli, 2006). In the Vancouver cluster there are very few CRO firms, however CANTEST is expanding by consolidating several small local testing laboratories and providing local CRO services for life science companies.

Amongst translational research laboratories, there are relatively few facilities providing fee based laboratory services to the drug discovery market. The level of competition is far less than with commercial CROs since the primary mission of the translational laboratories is to serve academia rather than to exist to be a profitable private firm. Each of these R&D laboratories has fairly unique capabilities and a value added component, which makes it difficult for buyers to switch and go elsewhere. This is particularly relevant when a customer would consider switching to a CRO. If the translational laboratory has provided fee for service testing that involves very innovative equipment or methodology, the probability of finding a CRO with the same or substitute technology is low. Overall competition for translational laboratories is low because of their highly differentiated services. This contrasts with the more competitive commercial side of the fee for service testing equation which has technology and services with lower levels of differentiation.

2.2.5.4 Threat of Substitution

The overall threat of customers finding different ways of getting very specific drug discovery research testing done is low. Along with the specificity of the particular testing, acquiring technology and personnel required to perform the tests is very costly. The efforts required to develop incrementally innovated substitute technology would be resource intensive and costly.

What has occurred in life sciences technology is the emergence of disruptive technologies that cause dominant technologies in the marketplace to become obsolete. Usually, disruptive technologies will be adopted early on by translational laboratories who want to access them for their research potential. If new technologies for specific testing emerge in another industry, the switching costs to the buyer are very low. This low cost of switching makes substitution easy.

Life sciences buyers put emphasis on service parameters such as quality, confidentiality, and timeliness. These buyers like to qualify their external service providers to their expected service standards and incur costs doing so. This qualification gives the buyers incentive not to switch to a substitute technology unless the emphasized service parameters, service costs, and fee for service laboratory qualification costs can be recovered by the new supplier.

2.2.5.5 Threat of New Entry

Since modern drug discovery research requires unique bundles of technologies for each research project, it is difficult for new competitors to enter the industry and find a large enough market to make their operations profitable. Economies of scope by contrast allow new entrants to apply their chosen technologies to many areas of life sciences research. For example, a new entrant may employ a suite of fee for service technologies targeted at cardiopulmonary, nephrology, and arthritis research markets.

For existing fee for service laboratories, economies of learning create a large barrier to entry since the knowledge competences that the scientists and technicians at those facilities have amassed are valuable intangible assets. These assets are very hard to imitate for new entrants. As well, since highly qualified technicians are scare, new entrants will have to be able to identify talent and pay a premium to attract these resources. Translational research laboratories have competitive insulation in that their technology infrastructure and highly trained personnel are subsidized by grant money. New commercial entrants do not have this level of subsidization and must enter the industry based on a compelling and profitable business plan. The high sunk costs required to get into the industry combined with the absolute cost advantage that subsidized translational laboratories have serves as a strong barrier to entry for new incumbents.

In the drug discovery services industry, brand loyalty takes a long time to build and can be eroded very rapidly through poor service or bad publicity. Customers will easily abandon a

laboratory service provider that starts to develop a trend of poor performance or is stigmatized by bad publicity. Fee for service testing does not have a high level of intellectual property protection associated with it. Low brand loyalty and the lack of intellectual property protection surrounding fee for service testing increases the threat of new entrants.

2.2.5.6 Porter's 5 Forces Summary

Translational laboratories conducting fee for service work should be very concerned about the power that their suppliers have. Having a small number of equipment suppliers that offer specific equipment with high operational and maintenance costs limits the potential profits that these research laboratories can earn. Similarly, the scarcity of highly trained technicians to operate this equipment makes their cost as a resource input high.

While translational laboratories are not very competitive, commercial laboratories that conduct fee for service drug development testing are highly competitive. If a particular type of differentiated service offered at a translational laboratory develops a high demand, commercial competitors will step in quickly to compete for the business.

Even though the power of buyers is currently low, translational laboratories must be vigilant of this competitive force. The academic buyers represent the first market segment. Their power is weak primarily because they are small volume customers. The second market segment is comprised of biotechnology and pharmaceutical industry buyers. This second set of buyers currently prioritizes aspects of the service offering other than price. The buyer power could quickly move from low to high if the academic buyers' volume of service purchases increased substantially. A similarly swift increase in buyer power could be realized if biotechnology and pharmaceutical buyers become price sensitive or if the sought after test technology becomes more main stream in the fee for service research industry.

Threat of substitution is always present with the rapid evolution of life sciences technology observed over the past two decades. Translational laboratories are at a distinct advantage over their commercial competitors in this industry for two reasons. First, their primary research driven goals lead translational laboratories to be early adopters of substitute technologies. Secondly, substitute technology infrastructure implementation is subsidized at translational laboratories so they do not have to make a solid business case to be on the leading edge of laboratory technology. Looking forward, the leadership of a translational laboratory has to scan the changing technology landscape of their industry and implement potentially disruptive technologies proactively. This is in alignment with the goals of such facilities where innovation is a priority and the PIs like to perform their research with the latest technology.

Threat of new entrants into the industry, which is currently highly differentiated by many specialized technologies, is low. The commercial side of the industry is highly competitive and undergoing consolidation as well as forward integration into later stages of drug development. Being subsidized, translational laboratories have an absolute cost advantage. If there is a drop in the high fixed costs required to enter the industry, more entrants may be seen in the future. If more translational laboratories place an emphasis on becoming market facing, the market would become more competitive.

2.3 Current Situation – Customer Analysis

Currently 86% of iCAPTURE revenues are coming from PIs and their collaborators. The balance of fee for service revenues comes from other UBC researchers. iCAPTURE needs to grow their fee for service revenue base by 270% in the upcoming year. Three untapped market segments present an opportunity for iCAPTURE to grow market share. These segments are represented by local biotechnology companies, larger non-local biotechnology and pharmaceutical companies, and life sciences researchers in the immediate geographic proximity.

From the two potential market segments that are from industry, 28% of these customers indicated that their amount of outsourced drug development spending will increase in the upcoming year (Roth, 2006).

2.3.1 Participants and Nature of the Buying Decision

Currently, most buyers become aware of iCAPTURE's capabilities through inadvertent promotion through iCAPTURE's PIs or through word of mouth in life sciences networks. Interested customers will either contact iCAPTURE directly or be referred there by the UBC UILO. The entity wishing to engage iCAPTURE in fee for service work will enter into discussion with operations management at iCAPTURE and scope out a mutually agreed upon proposal for the work. The proposal includes issues such as pricing, volume of services, details of the services, and timelines.

Once completed, these proposals are forwarded to the UBC UILO for IP review and approval. The UILO draws up a service agreement that becomes the contract. Both the customer and iCAPTURE management sign off on the final contract. Fee for service contracts are for either a discrete amount of work or for an open service contract for a defined period of time. Since the contract is for well known testing processes, seldom does IP become an issue. It is important that the customers be made aware that their IP is not in jeopardy just because they are dealing with a university affiliate. Not being clear about issues related to confidentiality and IP may cause potential buyers to be hesitant about engaging in business with a translational laboratory like iCAPTURE. To clarify issues related to customer IP, iCAPTURE's agent, the UBC UILO, puts service contracts in place for testing or analytical services. These contracts clearly indicate that the customer retains all rights to IP involved.

In the event that a contract is more complicated and involves iCAPTURE adding value in the form of IP to what the customer has provided, the UBC UILO officers will proactively draw

up a contract to define joint-IP rights prior to commencing work. The great majority of the fee for service work contemplated in this marketing plan falls into the camp of routine testing where the customer retains all IP rights. All work performed by iCAPTURE for external customers will involve a written contract that defines the scope of the work and deals with IP issues.

2.3.2 Buyer Motivation and Expectations

The two largest categories of outsourcing in drug development are for analytical and testing services and for R&D (Roth, 2006). These are the two categories in which iCAPTURE's core laboratories perform their services. Emerging biotechnology companies, like the ones that dominate the local Vancouver cluster, outsource drug development work as part of their business strategy. It is important for both biotechnology and pharmaceutical customers to consider their relationship with the contract service provider as a partnership.

The main drivers for emerging biotechnology buyers to outsource are that the firms are virtual companies or that they are constrained and must focus on their core competences. As these companies grow, they still outsource to focus on core competencies but also outsource due to temporary lack of capacity. The motivation for large pharmaceutical firms to outsource is due to temporary lack of capacity and focus on core competencies.

Emerging biotechnology firms, mid-tier biotechnology firms, and large pharmaceutical firms have a preference to utilize preferred vendors. This preference is particularly strong amongst the mid-tier biotechnology firms. Across these three types of companies approximately 60% of outsourced revenues go to preferred vendors. This makes it extremely important for laboratories like iCAPTURE to put mechanisms in place in order to make it easy for customers to turn them into a preferred vendor. Table 3 provides the top three and bottom three factors that influence the decisions of buyers from the three types of companies discussed previously.

Table 3: Factors Affecting Buyer Expectations When Outsourcing Testing and R&D

	Emerging Biotech	Mid-Tier Biotech	Large Pharma	Industry Total
Most Important #1	Quality	Quality	Quality	Quality
Most Important #2	Confidentiality	Regulatory Capabilities	Confidentiality	Confidentiality
Most Important #3	Timeliness	Confidentiality	Timeliness	Timeliness
Least Important #1	Geographic Proximity	Size of Provider	Geographic Proximity	Size of Provider
Least Important #2	Size of Provider	Geographic Proximity	Size of Provider	Geographic Proximity
Least Important #3	One Stop Setup	One Stop Setup	One Stop Setup	One Stop Setup

Based on (Roth, 2006)

Out of the 14 outsourcing decision factors surveyed, cost ranked sixth overall. This indicates that are many other elements involved in shaping buyer motivations and expectations before price sensitivity becomes an issue.

2.4 Summary of Key Success Factors

The industry characteristics that surround translational laboratories revolve around investments in leading innovative technology and highly trained technicians. Customers wish to have access to these key assets without building the technology infrastructure themselves. The demand in this industry is for services to support drug discovery research. The majority of the buyers of these services have products in the embryonic stage of their product life cycles and this leads to bumpy demand for the services. A high level trend of growth in life sciences and health care over the past two decades drives demand upwards for the services of translational laboratories. The catalyst for this sustained growth relates to demographic forces which represent older populations wanting better quality health care and longer lives.

Six key success factors have been identified to help translational laboratories compete successfully in the fee for service research industry.

1. Ability to sustain innovation by correctly identifying and implementing new innovative technologies.

2. Acquire and retain knowledge workers, who are critical intangible assets.

3. Identify and target the best customer segments. Promote different tailored value propositions to each of these segments.

4. Communicate clearly to target segments that IP issues related to service offerings are relatively minor and will not act as an obstacle in doing business with a laboratory that has its roots in academia.

5. Find out what aspects of the service other than cost are important to particular customers. If practical, emphasize these dimensions to provide added value to the customers.

6. Become an approved or qualified supplier for the customer to try to achieve lock-in and increase switching costs. When dealing with biotechnology or pharmaceutical industry customers, try to lock-in through the use of more broadly based service contracts.

The following chapter will rationalize how iCAPTURE can best select which market segments to target and leverage its key success factors in. All of iCAPTURE's potential market segments are described in Table 4. Although Table 3 lists geographic proximity as a factor that buyers do not consider to be extremely important, it is a consideration that is noted in Table 4. The primary reason for this is that as a supplier of fee for service testing, iCAPTURE has not

routinized offerings for customers. Service bundles offered by translational laboratories have a high level of job to job customization that requires a high level of communication and flexibility. Until iCAPTURE has developed a history and solid track record of being able to meet the expectations of a variety of customers, it would benefit from a customer base in close geographic proximity to facilitate communication and alteration of services.

Table 4: Potential Markets for Translational Laboratory Services at iCAPTURE

Market Segment	Market Size	Services Sought	Alternative Service Suppliers
Academic Institutions in close geographic proximity.	Approximately 10 life sciences universities and 10 smaller academic institutions with research needs.	State of the art analytical services to support research such as flow cytometry or ultrastructural imaging.	Commercial firms or core laboratories at other universities.
Other Academic Institutions affiliated with US teaching hospitals.	Approximately 1,200 institutions.	Innovative analytical services related to the cutting edge cardiopulmonary research specialty of the centre. New methodologies are useful in advancing research.	In-house capabilities or collaboration with other academic institutions.
Local Biotechnology Firms	Approximately 90 firms with a market capital of $ 4.3 billion and R&D expenditures of $ 370 million in 2003.	Access to a variety of testing service bundles that can be performed with the laboratory equipment at the centre. Technology infrastructure is very useful for moving drug discovery programs forward.	CROs, other academic institutions, or building in-house capabilities which is cost prohibitive.
North American Biotechnology Firms	1,473 firms at the end of 2003 spending $ 17.9 billion US on R&D.	Access to innovative cardiopulmonary disease expertise that is relevant to drug discovery programs.	Other academic institutions or building costly in-house capabilities.
Large Pharmaceutical Firms	About 35 global firms spending $ 9.6 billion US on outsourced R&D.	Access to innovative cardiopulmonary disease expertise that is relevant to drug discovery programs.	Other academic institutions or building costly in-house capabilities.

3 INTERNAL ANALYSIS

3.1 iCAPTURE Objectives

3.1.1 Vision and Mission Statements

The vision statement of iCAPTURE is "To be the world leader in understanding and eliminating heart, lung, and blood vessel diseases." The Mission statement is "We discover and implement solutions for heart, lung, and blood vessel diseases. We attract and support the best people (iCAPTURE, 2006)."

Flowing from the vision and mission statements are six strategic objectives. These are Discover, translate, synergize, attract, communicate and sustain. The 'sustain' objective reads: "To link our knowledge and experience with responsible financial practices to create organizational sustainability." It is somewhat ironic that 'sustain' is the last objective in the list because sustaining the operational infrastructure is a huge concern for the leadership of iCAPTURE. Successful cost recovery underpins the ongoing success of iCAPTURE.

3.1.2 Financial Objectives

At a minimum, iCAPTURE needs to recover the operating and maintenance costs for the laboratory equipment in the core laboratories. For 2006, approximately $ 755,000 will be required to cover these costs. In FY 2005 to 2006 approximately $ 282,000 was recovered through fee for service testing. Based on these figures, fee for service would have to increase by approximately 270% to achieve break even cost recovery.

Planning, with core directors and managers, must be undertaken annually to prospectively budget the maintenance costs for the upcoming year or preferably three years.

As different equipment comes off of warranty plans, there will be variability in the budgeted maintenance costs year-to-year. Core directors and managers will also have to advise on the pricing structure and share responsibility to keep thee core laboratory financial objectives on track.

The mission of iCAPTURE is primarily to have its core laboratories to serve the needs of the centre's PIs. In order to fulfil the research commitments that iCAPTURE has made to its partners like Saint Paul's Hospital and the Canada Foundation for Innovation, the centre must focus on cost recovery based financial goals. The centre will lose the support of its partners if its mission drifts and the centre becomes primarily focused on generating profits from external service contracts.

3.1.3 Marketing Objectives

The financial goal of being able to recover maintenance costs for the upcoming year drives the marketing objectives. iCAPTURE currently has a very limited marketing plan in which no target market segments have been identified. The marketing objectives are relatively straight forward from this starting point. Target market segments must be identified and unique value propositions must be promoted to each segment. Organizational processes and a CRM portal have to be implemented in order to make it clear and easy for customers to use iCAPTURE's fee for service testing.

The pricing at iCAPTURE evolved without reference to competitor's pricing or perceived customer value in particular market segments. There is a desire by the management of iCAPTURE and the UBC UILO to apply a completely revamped pricing policy to services offered by the centre. The proposed methodology will determine a discretionary pricing range for each service that takes into account many factors that influence the pricing decision.

3.1.4 Long-term Objectives

Ideally, iCAPTURE would be best off if it became a market facing organization in which all members of the centre share some responsibility for marketing and sustainability. A key to success is to create a new part of the organization that looks after the overall responsibility for generating fee for service revenue. This part of the organization will most likely be small since iCAPTURE is not a commercial organization. It will be a cross-functional area that will take a leadership role in business development, marketing, and sales. The responsibilities for this new piece of iCAPTURE will include making customer segments aware of and desirous of iCAPTURE services, then selling the services to them.

At a high level, iCAPTURE would like to run the core laboratories like a well run business. The perfect situation would occur if they were able to utilize all of the spare capacity and generate profits above the maintenance costs without adversely affecting the research interests at the centre. iCAPTURE would then be able to turn around the profits and be able to acquire better equipment and attract more researchers. Core laboratory budgets would be under control and long-term planning could be conducted for these laboratories.

Operationally , some marketing responsibilities should be transcended to the directors and managers of the laboratory cores. As stakeholders in the sustainability of iCAPTURE, these individuals are able to evaluate the technical and market environments that their core laboratory interacts with. Profitability, promotion, and pricing aspects of services from these cores will involve a high level of engagement from the directors and managers of the laboratory cores.

3.2 Target Market Segments

Internal iCAPTURE PIs and work done for UBC researchers are the two existing market segments. After price points have been re-aligned, iCAPTURE should see modest growth in both of these markets.

The largest opportunity for market growth is in the Vancouver biotechnology cluster. Even though Table 3 indicated that geographic proximity is not of high importance to customers of drug discovery services, iCAPTURE will greatly benefit by building systems to take on fee for service work with customers that are easy to communicate with. This beachhead segment has not been formally targeted by iCAPTURE and represents a segment that spent $ 370 million on R&D in 2003. The Vancouver cluster has had some exposure to iCAPTURE through collaborative work with PIs but has not been targeted and sold services at industry rates. In addition to the Vancouver cluster, large biotechnology and pharmaceuticals, as well as geographically close academics have not been strategically marketed. All of these new segments present exciting opportunities, however it is very difficult to estimate market share growth rates as there is no existing business from these customers. Once systems have been put in place to meet the level of communication and expectations of local biotechnology and academic customers, iCAPTURE will be well positioned to satisfy the needs of non-local market segments.

To summarize, in the short-term iCAPTURE should focus on targeting the local biotechnology company and local academic research markets. This will allow the centre to build processes and systems that will be robust enough to deliver customized service bundles over distance. Once the expectations of local customers can be met, the non-local biotechnology and pharmaceutical market segments can be targeted in the longer-term.

3.3 Corporate Culture

The evolution of iCAPTURE has been driven by new science, technology, and researchers who are very interested in understanding the root causes of disease and the reparative process. Those involved in leading iCAPTURE are attuned to and concerned with the financial responsibilities related to sustaining and growing the centre. Even though these leaders are researchers by training, they are exhibiting an entrepreneurial worldview (Wexler, 2005, p15) that

emphasises competition and systems that will keep the centre in control and profitable. On the other hand, many of the PIs at iCAPTURE are highly stimulated by an innovative and flexible workplace. These researchers have tendencies that are more aligned with a network worldview. Such researchers are very difficult to persuade to become extremely concerned about the financial sustainability challenges of iCAPTURE. This creates tensions within iCAPTURE with regards to making everyone responsible for marketing.

In the current situation, the PIs play an important role in promoting iCAPTURE. Instances could arise, whereby fee for service work is proposed by another academic and this turns into a borderline collaborative effort. In this hypothetical scenario, a higher amount of revenue would have resulted if the collaboration had not taken place. If it is possible to communicate the importance of sustainability and marketing responsibility to all levels of the organization, perhaps more thought would get put into increasing fee for service revenues by all iCAPTURE internal stakeholders.

Another key to corporate culture, at an operational level, is to ensure that each laboratory core has a director and manager that are effective leaders. This is a challenging task, since many of the people in these positions embody technical excellence. In order to be ready for the substantial increases in fee for service work, core management must embrace the additional responsibility and orchestrate the execution of the increased workload. There are some core laboratory managers presently in place who are role models in terms of being fiscally responsible for their core and ensuring that morale is at a high level.

3.4 SWOT Analysis

A SWOT analysis is conducted for iCAPTURE in Table 5. The purpose of this analysis is to act as a snapshot of the current strategic situation at iCAPTURE with the perspective of what the next strategic direction should be for the centre. The analysis summarizes the strengths and

weaknesses of iCAPTURE's key assets and core capabilities as well as identifies opportunities and threats in the centre's external environment. Use of this tool will help iCAPTURE identify niche markets and craft a marketing strategy to differentiate the centre from competitors in the market.

Table 5: SWOT Analysis of iCAPTURE

Internal Strengths
Organizational 1. Senior management has built an organization and infrastructure that has grown rapidly over the past six years. 2. Vision statement includes strategic objectives of continuing to attract top talent and to create organizational sustainability. 3. Senior management has a track record of accomplishment as top medical researchers in the cardiopulmonary field and are some of the top professors of medicine at UBC. 4. PIs are networked with similar researchers at universities and companies all over the world. *Human Resources* 5. Access to leading subject matter experts. a. PIs with advanced degrees. b. Highly specialized technical experts. *Technology* 6. Constant influx of new technology infrastructure over the past six years. a. From 2000 to 2006, approximately $ 22 million dollars was spent at iCAPTURE developing core laboratory technology and infrastructure. b. Currently, a new series of grants are under review to add approximately $ 20 million dollars more of core laboratory technology and infrastructure to the existing facility. 7. The centre has in-house computational and image production infrastructure. *Financial* 8. The subsidization of laboratory space and technician salaries by Saint Paul's Hospital reduces the overall financial sustainability goals of iCAPTURE. *Image and Reputation* 9. iCAPTURE must continue to promote their centre's image and reputation. a. The centre has produced over 240 peer reviewed publications in 2004 and 2005. b. In 2005, approximately $ 7.7 million of iCAPTURE's $ 12.2 million funding came from peer reviewed sources (iCAPTURE, 2006). *Competitive Capabilities and Customer Focus* 10. Absolute cost advantage when compared to a CRO. 11. Located in North America's seventh largest biotechnology cluster. 12. Cardiopulmonary researchers at iCAPTURE can add value to the approximately 15% of drugs undergoing discovery for cardiopulmonary diseases.

Internal Weaknesses

Organizational

1. Current resources dedicated to business development, service marketing, and sales are very limited. No personnel have been formally assigned to these responsibilities.

Human Resources

2. Have to attract personnel who are adept at generating the type of fee for service business that iCAPTURE requires for their sustainability.
3. The front lines of a technology marketing plan will involve the PIs. The primary interest of many of these individuals is to further their research and collaborations. Getting all stakeholders at iCAPTURE to share some responsibility for the marketing plan will be a challenge.
4. All core laboratory managers may not currently have the skill sets to manage their labs with a market facing view. Transforming core laboratory leadership to support sustainability initiatives as well as provide technical expertise may be challenging.

Technology

5. The core laboratories at iCAPTURE have unique leading edge technology that would not be usually found at a CRO analytical laboratory. The technologies and services found at iCAPTURE are not accompanied by provisions of quality and regulatory systems such as GxPs or ISO. This limits iCAPTURE's potential drug development markets to early stage discovery only.

Financial

6. Generating fee for service revenues is critical for iCAPTURE. The inability to do so will slow growth at the centre and derail the mission/vision.
7. Current business model for revenue generation lacks adequate planning and detail.

Image and Reputation

8. iCAPTURE has branding problems.
    a. They are similar to other core laboratories but their services are currently at a lower price point. There is somewhat advantageous price differentiation. The current price points have been arrived at in a somewhat arbitrary manner.
    b. Brand identity is lacking at iCAPTURE. In 1977 name was the "Pulmonary Research Laboratory at St. Paul's Hospital". It changed to the "McDonald Research Laboratories (MRL)" in 1995. Most recently in 2000, the centre was named iCAPTURE. This constant change of laboratory names decreases image differentiation for the centre.

Competitive Capabilities and Customer Focus

9. Target customers and market niches have not been clearly defined.

External Opportunities

Market

1. Biotechnology and pharmaceutical markets requiring contract drug discovery services are exhibiting strong growth.
2. Research is being outsourced so that companies and academic institutions can operate in a more cost effective manner.
3. Core laboratories adopt specialized laboratory equipment much earlier than CROs and can offer innovative test services to markets much earlier on.
4. UBC and provincial initiatives such as the UBC Centre for Drug Research and Development and the Michael Smith Foundation Technology Platform Initiatives could provide new market segments for iCAPTURE services. This opportunity is contingent on the fee for service work being conducted at a profit as opposed to at cost in the form of a collaborative effort.

Industry Structure

5. Biotechnology and pharmaceutical firms are contracting out drug discovery research.
    a. Traditional vertical integration of drug discovery in big pharmaceutical companies is becoming a thing of the past.
    b. Most biotechnology companies are "virtual" or contract out a great portion of their R&D work.
6. CROs are operating in hypercompetitive market segments and are currently focused on competition and consolidation. CROs are currently not competing with the leading edge technologies that are offered in translational core laboratories.

Image and Reputation

7. With the appointment of a new iCAPTURE Director pending, there is opportunity for the following:
    a. Redefining the brand name for the centre such that the new name will have staying power and a relevant meaning to the customers.
    b. Revamp the existing website to showcase the new brand and create a market facing customer relationship management portal.
    c. Promote the new brand with target market customers and at trade shows that iCAPTURE PIs attend.

Competition

8. Other university related translational core laboratories seem to have similar sustainability issues and wish to resolve them with fee for service customers. Most of their attempts at marketing lack coherence and focus on target customers. There is an opportunity for iCAPTURE to implement a plan so that they can establish a leading position amongst their direct competition.

External Threats
Market 1. High level of competition in adjacent mainstream CRO R&D market has caused price competition. This has lowered the price ceiling for all providers of fee for service drug discovery testing. 2. If the business model and marketing plan for iCAPTURE is particularly effective, it can be imitated by core laboratories at other universities. 3. UBC and provincial initiatives such as the UBC Centre for Drug Development and Research and the Michael Smith Foundation Technology Platform Initiatives could become a threat for iCAPTURE services. This would occur if the fee for service work was conducted at cost and would absorb iCAPTURE's excess capacity. *Industry Structure* 4. If technologies used at iCAPTURE are particularly effective, they will be quickly assimilated and integrated by CROs, biotechnology companies, and pharmaceutical companies. 5. iCAPTURE must be wary of having management of their technology integrated into technology or methodology platforms that are managed externally. 6. Other core laboratories may implement GxPs and forward integrate their services into later stages of the drug development value chain. This may lure customers away by providing more potential value added to competing services. *Image and Reputation* 7. Continued brand changes will confuse customers and act as an obstacle to image differentiation. 8. If more of the personnel at iCAPTURE do not take some responsibility for marketing the sustainability initiatives, the marketing plan will be at a competitive disadvantage. In particular, the PIs and core laboratory managers are in key positions to influence and interact with external customers. *Competition* 9. If iCAPTURE is too slow in implementing and effective technology marketing plan, other core laboratories could achieve first mover advantage. 10. Competitive or disruptive technology is likely to emerge for some of the technologies that iCAPTURE is trying to market.

3.4.1 Matching Internal and External Factors

Strategic insight can be derived from the SWOT analysis by matching internal factors which iCAPTURE has control over with uncontrollable factors from the external environment (Weihrich, 1982). The following examples of strategic insight have been derived from such matching of the factors from Table 5.

1. **Maxi-Maxi (Strengths/Opportunities)** – iCAPTURE may be able to leverage existing strengths to realize opportunities by utilizing existing in-house computational talent and a new Director to establish a strong new brand then become a market leader amongst core laboratory service providers.

2. **Maxi-Mini (Strengths/Threats)** – The strong leadership at iCAPTURE can minimize the external threat of excess capacity being utilized at collaborative or cost rates by other UBC entities. This could be accomplished proactively by establishing pricing schedules and policies that would allow iCAPTURE to unilaterally decide on the pricing rates and control of internal resources.

3. **Mini- Maxi (Weaknesses/Opportunities)** - The management at iCAPTURE needs to build a new part of their organizational infrastructure that is market facing. In order to reap the rewards of a new brand and implementation of a targeted marketing plan, individuals responsible for business development, service marketing, and sales must be added to the organization.

4. **Mini- Mini (Weaknesses/Threats)** - The ongoing evolution of the iCAPTURE brand causes confusion and does not allow customers to associate with the differentiation provided by the brand. Management at the centre need to put and end to this quickly and establish a brand with some staying power that they can roll out to target market segments. Making this a priority in short order is a defensive strategy that will allow iCAPTURE to start realizing added value from their brand in a perpetual manner.

3.4.2 Sustainable Competitive Advantage

For the strategic marketing plan a sustainable competitive advantage (SCA) is an advantage that a firm has that is distinctive and difficult to replicate (Porter, 1996). In order to build SCA, iCAPTURE needs to focus on three sets of key assets.

1. **Organizational and Managerial Processes** – The personnel at iCAPTURE already embody a high level of organizational learning and have the ability to continuously reconfigure and transform. Work needs to be done in order to improve the amount of coordination and integration across teams at the centre in order to create additional value.

2. **Key Assets** – iCAPTURE has established a very strong position with technological assets by building core laboratory technology and infrastructure worth $ 22 million dollars over the last six years. The centre is poised to expand their technology position with a similar level of grants pending.

   Even though iCAPTURE operates at an absolute cost advantage, it is a not for profit firm and does not have deep pockets. Establishing cost recovery will be a priority to sustain the centre.

   Building an enduring brand that customers can associate with will provide needed reputational assets. The PIs and management at iCAPTURE have published at a productive rate and management has secured over $ 7.7 million of peer reviewed funding in 2005. These actions enhanced iCAPTURE's reputational assets.

   Change is currently sweeping iCAPTURE in a manner that is redefining the centre's structural assets. In order to fully develop these assets, the new Director has to be in place and deliver a new name and brand for the centre. Along with this, the organizational structure and leadership of the laboratory cores is also under transformation. When all of these changes have taken place, the organizational infrastructure of the centre will be able to influence routines, procedures, and corporate culture more effectively.

3. **Paths** – The evolutionary path of the entity that is now iCAPTURE has embodied the traits of flexibility and adaptability. This organization has developed far more competencies than rigidities and can easily undergo organizational development. By positioning itself at the leading edge of technology, iCAPTURE is well positioned to recognize SCA built on events related to converging technologies.

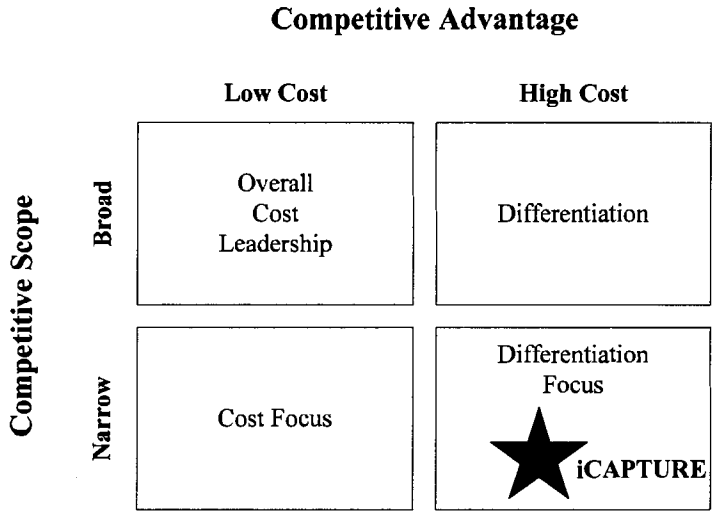
Subsidized technology and operating overhead gives core laboratories, like iCAPTURE, an absolute cost advantage over CROs. While this scenario provides an absolute cost advantage, iCAPTURE would be wise to develop their SCA based on a differentiation focus instead of low cost focus.

4 MARKETING STRATEGY PLANNING

4.1 Generic Strategy

Based on evaluating the competitive environment of the firm, Porter defined three generic strategies to achieving sustainable competitive advantage (Porter, 1990). Porter's generic strategies are cost leadership, differentiation, and focus. The focus strategy is a niche strategy where competitive advantage is aimed at a market segment based on either a low cost focus or a differentiation focus. The proposed marketing strategy for iCAPTURE will support the differentiation focus generic strategy plotted in Figure 3.

Figure 3: Generic Strategy for iCAPTURE



Adapted from (Porter, 1990, p39)

Several factors preclude iCAPTURE from adopting a generic strategy of cost leadership where they are marketing low cost services to very broad markets. The amount of specialization required for each customer's job is not conducive to shaving costs off each step in the

iCAPTURE service value chain. Furthermore, iCAPTURE's current capacity and difficult to reproduce business model does not accommodate the type of simplified throughput that is needed to satisfy broad markets. The scope of a broad market size also excludes iCAPTURE from adopting a strategy of pure differentiation.

Since iCAPTURE is relatively small and can not afford a broad competitive scope cost leadership or a pure differentiation strategy, a niche strategy is much more suited to the centre. iCAPTURE possesses a high level of value added expertise and unique equipment so it is well matched to a differentiation focus generic strategy. The Porter's 5 Forces model for this industry and the analysis of buyer motivations and expectations in Table 3 showed that customers for iCAPTURE's services are not particularly price sensitive. This leads to the conclusion that there would be very little sustainable competitive advantage in the centre following a cost focus generic strategy where they are trying to be the lowest cost service producer in each of their niche markets.

4.2 Policy Elements

iCAPTURE operates in a non-profit academic external environment in which many of the non-managing stakeholders may wish to take an interest in managing the operations of the centre to further the interests of their adjacent organizations. The centre must act strategically in a proactive manner to ensure that its ability to generate rents by utilizing excess core laboratory throughput is not usurped by another nearby entity with interest in this resource.

4.2.1 Excess Capacity

As with many other health care providing organizations, iCAPTURE does not operate at capacity. The research demand placed on the core laboratories by the primary customers, the PIs, is variable and not near the throughput capacity of the laboratories. Once the technology

infrastructure has been paid for by grants and the technician salaries have been paid by iCAPTURE's partner Saint Paul's Hospital, excess capacity is built into the system.

Even though the centre is publicly funded and has a research mission, there are adjacent agencies within public research or academia that could benefit by controlling iCAPTURE's capacity or pricing.

4.2.2 Public Interests Competing for iCAPTURE Control

iCAPTURE has a strategic need to establish a high level of control over management of its own capacity and pricing. This need stems from the potential that adjacent research entities could benefit by controlling these factors. The adjacent publicly funded entities could represent institutional, provincial, or national generic technology platform programs. If one of these related programs secured rights to the excess capacity at iCAPTURE, the ability of the centre to generate operating revenues from this resource would be compromised.

4.3 The Marketing Mix

The process of crafting and implementing iCAPTURE's marketing strategy will be based on the variables of service, price, promotion, and placement. In order to construct a marketing mix model based on blending of these variables, the wants and need of the target markets must be considered. Based on the internal analysis, in the short-term, iCAPTURE should target local biotechnology firms as their primary segment and academic customers in close geographic proximity as their secondary market. Two market segments will be initially focused on since iCAPTURE is a relatively small organization with limited marketing resources and expertise.

The marketing mix will also take into consideration a longer-term view. If iCAPTURE has a success at marketing to the local industry and academic target market segments, the

subsequent future segment to focus on will be non-local biotechnology and pharmaceutical firms in the US market.

4.3.1 Service Mix

Core laboratory services offered at iCAPTURE can be defined as intangible, non-storable, consumed at point of production in the laboratory, customized to each client, requiring a high level of buyer involvement, labour intensive, and difficult to forecast demand for. These key attributes describe iCAPTURE's offerings as almost pure services on the service-goods continuum. The fee for service tests offered in iCAPTURE's eight core laboratories are listed in Appendix 3. An essential component to sustain a successful marketing plan will be to establish defined lists describing each core laboratory, the services they are offering, and at least one example of how each service could be used to assist a researcher or a company performing drug discovery R&D.

Since customers will be seeking custom configurations of services to suit the needs of their R&D, some of the core laboratories and test equipment will have high levels of demand and revenue generation while others may languish due to lack of demand. As the technology base at iCAPTURE is continuously growing, new service offerings must be added to the list of services contemporaneously. Similarly, modifications and deletions of service offerings must also be maintained. As targeted market segments expand beyond the local target segments, a CRM becomes a scalable resource that enables fee for service transactions to transcend geographic distances. This service mix can be standardized in a web-based CRM module during the next website roll out.

Essential components have been identified in Table 6 for the successful development of a CRM portal for the next website upgrade. The information in the table is not exhaustive but it does highlight salient features required for customer management. When designing the new

website and CRM portal, a consultant with design expertise in CRMs should be utilized to ensure that this portal functions effectively, is easy to use by customers, and is easy to maintain by iCAPTURE personnel.

Table 6: Essential Components for the Next iCAPTURE CRM Module

Component	Description
Home Page	• Has general promotional statement indicating how the core laboratories can add value to the customer by stretching their research capabilities with leading edge equipment and world class expertise adding value. • Has a general statement indicating importance of customer service and links to a separate page that addresses the issues of quality, confidentiality, and timeliness from the customer's perspective. • Has links to all other components of the CRMs and highlights the core laboratories at the iCAPTURE facility.
Individual Core Laboratory Pages	• These pages have a description of the high level function of the core laboratory and a current list of each type of testing or major piece of instrumentation linked. • A clear message should be included on this page indicating to the customer: "To do business with iCAPTURE click on the following link." This customer contact message should have an e-mail link as well as phone and fax numbers for an iCAPTURE customer service manager who will be responsible for interfacing between the customer and the lab managers to set up the jobs. • Bottom of the page will also include relevant information directing customers to a page regarding the transport of samples to iCAPTURE. • Contains link to "Fees and Charges" page for each Core laboratory which can be updated on an annual basis. A disclaimer should be made that fees and charges are listed at commercial rates however discounts apply for UBC researchers.
Core Laboratory Tests	• These links should break out to pages indicating the types of testing or instruments available for services. • An example should be given for a common commercial type of test that each piece of equipment can perform. • Pictures of the equipment or scan images may enhance presentation of these pages. • Equipment constraints or value added services should be highlighted on these pages.

Component	Description
Fees and Charges Pages	• These pages should be broken down by each core laboratory and list commercial rates only. Items that should be listed by line item are cost of the analysis, cost of personnel (if optional), cost of additional data analysis and reporting as well as training costs (if applicable). The basis of each cost should also be listed. • There should be a statement indicating that total fees and charges will be quoted on by the customer service manager and a link should direct back to this manager's contact page. • Academic and industry rates should be listed on the internet site. Internal iCAPTURE rates should be listed through the centre's intranet.
Core Laboratory Policies and Procedures Page	• This page provides potential customers information about how they can use the core facilities. • Issues related to themes of cost recovery, facility mission statements, scheduling of services, and categories of users will be dealt with here.
Quality, Confidentiality and Timeliness Page	• Quality component clearly describes that the facility is for pure research or drug discovery research and GxPs are not being followed. Quality aspects may highlight how the testing services are surrounded by leading researchers and technical experts who are utilizing their results in leading medical publications. • Confidentiality components must emphasize that iCAPTURE is operating this service purely as contract testing. The customers will not be risking the ownership or confidentiality of their intellectual property by having their testing performed at a core laboratory. • The timeliness section of this page will recognize the importance of timeliness to the customer and indicate that timeliness of the customer projects will be a bilaterally agreed upon term in project proposal that the customer and the customer service manager agree upon. Examples of turnaround times for different types of analysis may be listed.
Promotional Page for Each Market Segment	• Promotional page for industry will emphasise SR & ED tax incentives.
Customer Service Manager Page	• This page should have full contact information for the customer service manager and a simple contact form for a customer to initiate a quote or proposal. • Appropriate links should be in place for service inquiries related to work in progress or tracking of test materials.

4.3.2 Service Life Cycle and New Service Development

Service life cycles are determined by the demand for the services by the iCAPTURE PIs and the customers. New services may develop several ways. New services could develop when

an existing piece of test equipment extends its life cycle by finding new end markets or new tests that can be run on it. Alternatively new laboratory infrastructure creates new service offerings.

Currently, iCAPTURE has excess equipment and human resource capacity so it can absorb external fee for service throughput. The watch out for iCAPTURE management will be in the future when external business utilizes more than the excess capacity of the core laboratories. Hard decisions will have to be considered at this point in time to either expand capacity or turn away business. The inherent difficulty in demand forecasting for services makes this task even more challenging.

4.3.3 Brand Image and Brand Equity

In order to succeed at getting customers from target market segments, iCAPTURE has to be able to differentiate their centre from other core laboratories. Ideally iCAPTURE should be able to create positive sentiments in their target markets about the quality, confidentiality, and timeliness of their services. This goal describes an important differentiator called brand recognition.

As a university translational laboratory, iCAPTURE has been plagued by changing identities since 1977. With a new Director about to take the reigns at iCAPTURE, developing a brand image is an urgent priority. The new brand image is intended to convey to potential customers information and expectations related to the services of iCAPTURE. The brand will be intended to differentiate iCAPTURE services by demonstrating the special qualities that are associated with them. The brand name that iCAPTURE selects moving forward would benefit from conveying a simple message about what the centre does as opposed to the current cryptic acronym. A successful brand name will identify the services of iCAPTURE and provide SCA if chosen correctly (McDonald & Keegan, 2002, p100).

iCAPTURE can not start to build up brand equity until an enduring and relevant brand name is selected. Switching brands confuses the customer base and detracts from differentiation. Prior to the roll out of the new website, iCAPTURE should establish a new brand image with the expectation that it will be enduring and a source of brand equity. By focusing initially on local market segments, iCAPTURE can mitigate risks detrimental to developing brand equity by managing the scope of their marketing plan. Once the local kernel of brand equity has been established it can be leveraged and build upon in the future when US biotechnology and pharmaceutical markets are subsequently targeted.

4.4 Price

4.4.1 Pricing Objectives

Pricing objectives must consider four main factors. First, the overall strategic marketing plan of iCAPTURE revolves around having a level of profitability for the core laboratories that will, at a minimum, recover the cost for equipment maintenance and service contracts. These costs can be determined prospectively by going through a budgeting exercise with the core laboratory managers and accountants at the centre. These costs will have high year-to-year variability due to equipment coming off initial service contracts and new equipment constantly being added to the laboratories. The second consideration relates to the objectives of the service and brand. iCAPTURE needs to develop a new brand identity and then needs to try to utilize this in the marketplace to gain brand recognition and market share.

Thirdly, consumer price elasticity and the price points for the services need review. The current pricing has evolved quite arbitrarily and has not been set using an established methodology. Since promotional messages about iCAPTURE services have not been communicated to target market segments, current price elasticity can not be evaluated. Current pricing has three price points which again have evolved in an arbitrary manner.

For laboratory equipment use, the iCAPTURE PIs pay base rates established by the iCAPTURE management. Academic researchers, outside of iCAPTURE but affiliated with UBC, pay a 15% price premium. All other researchers must pay a 30% price premium for services.

Finally, the available resources factor into the pricing objectives. With current resource levels, iCAPTURE has the capacity to take on 20% to 25% additional throughput in the form of fee for service work. The human resources and equipment in the core laboratories have already been paid for by grants and subsidies, so the only costs related to additional business will be marginal and related to consumables. Once excess capacity has been consumed by fee for service testing or through increased utilization by iCAPTURE investigators, additional analysis, of the marginal cost per test will have to be performed to ensure that the price levels are above these limits.

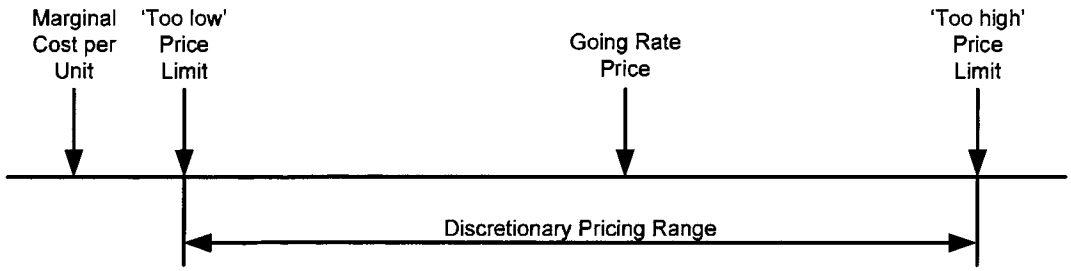
The main pricing objectives at iCAPTURE are threefold. First, iCAPTURE must implement a pricing plan that will allow for maximization of long-term profits. This translates into making as much profit as possible with excess capacity in order to recover the service contract and maintenance costs of the equipment in the core laboratories. Secondly, the pricing must be at a level that allows iCAPTURE to increase their market share in the target market segments that utilize fee for service testing. The pricing of iCAPTURE's services must be below that of their higher priced competitors. Lastly, the pricing should be used to develop the image of the iCAPTURE brand. iCAPTURE pricing will be in a band above the marginal cost for the service and below high priced competitors. Pricing should be selected across the iCAPTURE brand to provide the customers value for the quality of services that they receive.

4.4.2 Pricing Method

As a short-term starting point, iCAPTURE should consider competitor indexing with the other core laboratories that are offering fee for service testing. The advantage of this method is

that it is easy to use and provides information on the going rate price and 'too high' price limit shown in Figure 4. Since existing excess capacity has already, in effect, been paid for, the marginal cost of the services is of less relevance in the near future.

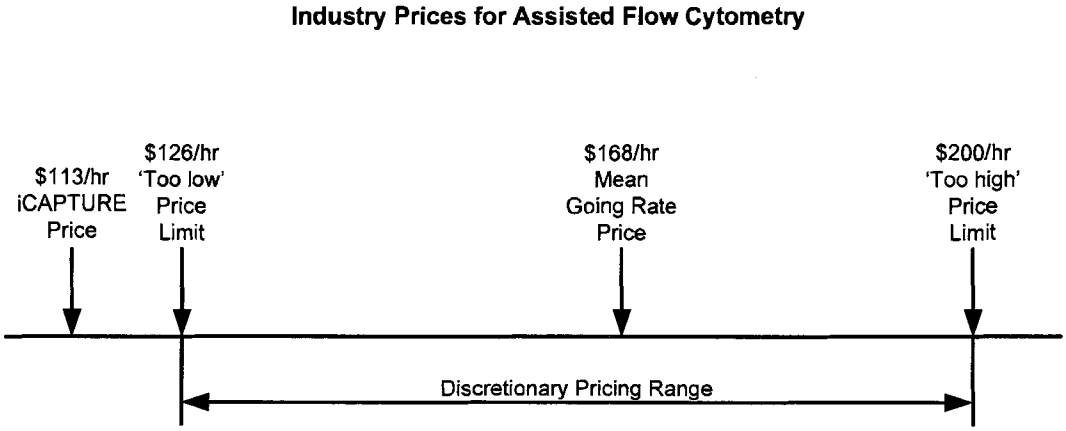
Figure 4: Pricing Alternatives for iCAPTURE Services



Based on (McDonald & Keegan, 2002, p183)

Competitor indexing price information is readily available from similar core laboratories in North America. To analyze current pricing, three core laboratory tests were selected for pricing comparison with similar medical core laboratories at Rutgers University, Ohio State University, University of Texas at San Antonio, University of Massachusetts, and University of Michigan. Detailed analysis of this pricing comparison is laid out in Appendix 4. Most of the revenue growth to support iCAPTURE's sustainability goals is likely to come from the local biotechnology company primary target segment. Competitor indexing should be done for this primary market segment as well as the secondary target market segment of local academia. Based on the information in Appendix 4, Figures 5, 6 and 7 show how iCAPTURE's pricing currently compares to the competitor index. Prices referred to in these figures are in US dollars.

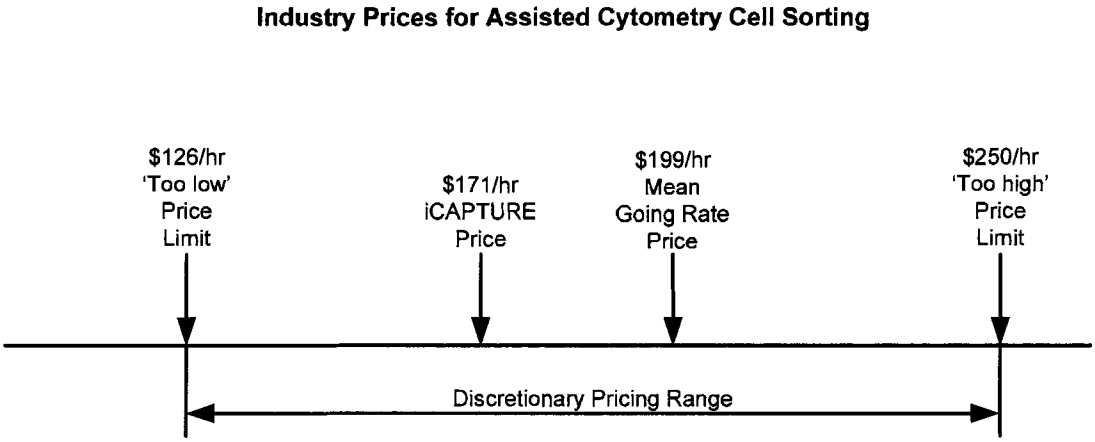
Figure 5: Current iCAPTURE Pricing for Flow Cytometry Compared to Competitive Index for Industry Customers



The current price for assisted flow cytometry has been set below the discretionary price range for the industry. This pricing should be increased to near the mean going rate price of competing universities core laboratories offering flow cytometry services. In order to achieve the mean going rate price, iCAPTURE could increase their current price by up to 48% to match the competitors mean.

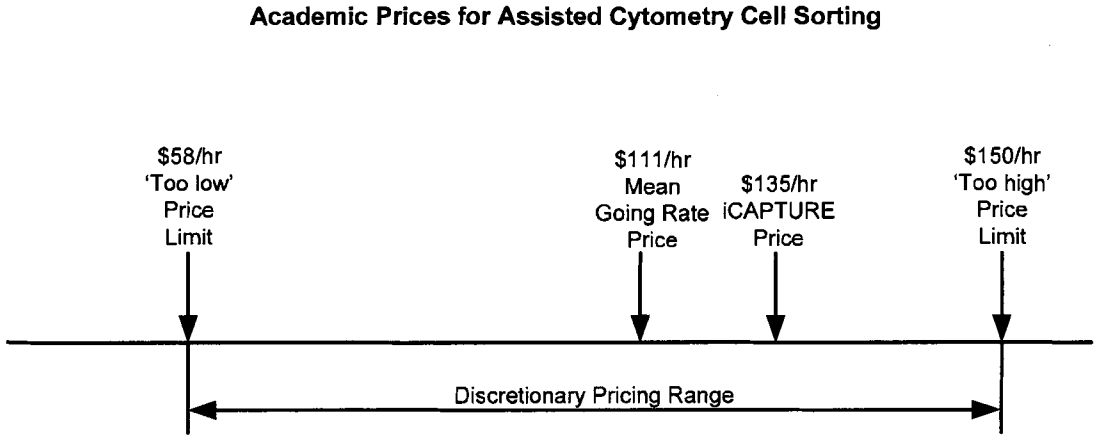
Pricing should be examined for each target market segment. Figures 6 and 7 shows how iCAPTURE's assisted cytometry cell sorting pricing for industry and external academic customers compares with competitor indexes.

Figure 6: Current iCAPTURE Pricing for Cytometry Cell Sorting Compared to Competitive Index for Industry



The current price for assisted cytometry cell sorting is within the discretionary price range for the industry but is below the average competitive price. The current iCAPTURE price could be increased by 16% to match the mean of the competitive index. Increasing this price point would result in increased revenues and profits without losing market share due to price competition.

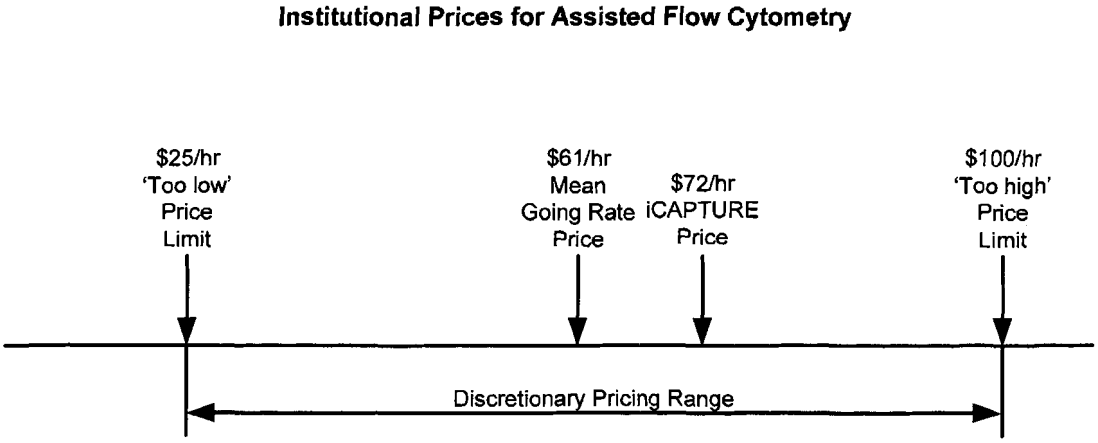
Figure 7: Current iCAPTURE Pricing for Cytometry Cell Sorting Compared to Competitive Index for Academia



The current price for assisted cytometry cell sorting is within the discretionary price range for the academia but is above the average competitive price. iCAPTURE price may wish to consider decreasing this price point by 18% to match the mean of the competitive index. This reduction may stimulate additional market share from the local academic segment.

Using the same methodology, iCAPTURE may wish to re-evaluate the rates that they charge their internal PIs based on comparative university core laboratories. This comparison for institutional rates for assisted flow cytometry is evaluated in Figure 8.

Figure 8: Current iCAPTURE Pricing for Flow Cytometry Compared to Competitive Index for Institutional Customers (PIs)



As new revenues start to flow in from the local biotechnology industry market and the local academic market, iCAPTURE may wish to consider decreasing the PIs institutional price point by 15% to match the mean of the competitive index. This reduction may stimulate attraction and retention of high quality PIs who are intellectual assets to the centre.

Similar exercises should be performed with all iCAPTURE services where core laboratory competitor information is available. By using a large number of comparators iCAPTURE will be able to establish a more reliable competitive index. The overall comparison in Appendix 4 highlights that internal iCAPTURE and academic cytometry customers were paying higher than average prices, while the industry price was substantially below the average competitive price. iCAPTURE's confocal microscopy rates were below the average competitive price for all three user segments.

As iCAPTURE gains market share and starts to run out of spare service capacity, their management will have to go through exercise of determining the marginal cost per service for

each of the tests offered at iCAPTURE. This exercise will determine the lower boundary of pricing for each service.

4.4.3 Pricing Strategy

Moving forward, the recommended pricing strategy for iCAPTURE is to still use first degree price discrimination for internal customers, academic customers, and external customers. The academic customer segment should be broadened to incorporate customers from all academic institutions, not just UBC.

Prices for all services for internal customers, academic market segments, and industry market segments should be reset to new levels using the pricing method listed in the previous section. Base prices for iCAPTURE services should be adjusted to the mean going rate of the competitor index. In order to increase market share and create goodwill amongst new customers, a pricing penetration discount of 10% is recommended for the industry pricing segment. In future years, when external fee for service revenues are at iCAPTURE's target levels, the centre can do away with the pricing penetration discount.

Pricing for the industry segment should be made available through the CRM interface of the website. These prices have to be updated annually by the lab managers or by a business development manager. These managers would benefit if an iCAPTURE business development manager was to develop and grow a competitor indexing database for annual price revision purposes.

The pricing list is just intended to give the customer a ball park idea of iCAPTURE pricing levels. Each substantial job that comes into the centre will require a proposal and quote. The customer service managers and laboratory managers at iCAPTURE should be cognizant of additional work related to each job and add these tasks on to the quote as additional line items.

These would be tasks such as set-up time, cost of consumables, consultation time, custom reports, and similar items that extend beyond the scope of the analysis service itself. Penalty clauses for rush samples, last minute cancellations, or changes in schedule that are caused purely by the customer should be clearly spelled out in the pricing schedules and contracts. An example of this would be if an analysis were cancelled with less than two working days notice then one half hour of the analysis cost would be charged for the cancellation.

4.4.4 Pricing Discounts or Allowance

Large industrial contracts, for example histology service contracts, may be subject to pricing discounts based on second degree price discrimination. Managers responsible for customer service at iCAPTURE need to evaluate these large contracts on a case by case basis. While still keeping prices in the discretionary range for a particular service, the customer service manager may implement special pricing discounts for bulk purchases of a particular service or for long-term contract commitments.

4.5 Promotion

4.5.1 Promotional Goals

Currently, iCAPTURE's promotion is highly based on word of mouth or through customer interests sparked by the centre's PIs when they are presenting their research or attending conferences.

In order to disseminate information about the iCAPTURE brand and services offered in the core laboratories, several aspects of promotion need to be addressed for targeted market segments. For academics, iCAPTURE information must be communicated not only to UBC but also to life science researchers at institutions in nearby geographic proximity.

Similarly, a message about iCAPTURE's capabilities needs to be communicated to the local biotechnology cluster. The local cluster's close proximity to the centre allows for personal selling to be used on this customer segment. Well crafted personal selling presentations will allow iCAPTURE to understand potential customer needs, find a way to fulfil them, and turn them into repeat customers.

In the longer-term, when non-local biotechnology and pharmaceutical companies become a future target market, iCAPTURE should try to leverage the human resource expertise it has in promotional materials. This value added component is likely to gather the most interest from the non-local market segment.

In 2005 iCAPTURE generated just over $ 282,000 from iCAPTURE PIs (86 %) and other UBC Researchers (14%). To come closer to meeting the 2006 maintenance and service contract goal of $ 755,000, iCAPTURE must successfully promote their services to local biotechnology companies and academic research institutions within close geographic proximity in the near term. The overall goal of the promotional program is to effectively communicate and disseminate information about iCAPTURE's service offerings to the new market segments and increase fee for service revenues by about 270% over current levels, thereby generating enough revenue to cover maintenance and service costs.

4.5.2 Promotional Mix

Building a web-based CRM for all customers to interact with is an essential part of the promotional mix. Essential components of this CRM have been described in Table 6. The key role of this portal is to offer content pertinent to iCAPTURE's services in an environment that is not complicated for the customer.

Once iCAPTURE has decided upon a new brand and rolled out a new website containing a CRM, a new promotional pamphlet needs to be assembled and sent out to all new target market segment customers as well as existing ones. This mailer will showcase the new market facing features of iCAPTURE and direct the recipients to the CRM website.

For local biotechnology companies, a personal selling presentation must be prepared. Looking longer-term to the large biotechnology and pharmaceutical company segment, a specific letter promoting value added by the researchers surrounding the technology needs to be crafted. Personal selling via telephone should be considered for drug discovery V.P.s at these large companies.

Trade shows present a unique opportunity for iCAPTURE to promote their service offerings to several target market segments that have congregated in one location. The annual BioPartnering in North America event is held in Vancouver. iCAPTURE could prepare a promotional booth for this event in February 2007 and gain exposure to many of the potential life sciences customers in the local cluster. Similarly, iCAPTURE personnel would have access to non-local biotechnology and pharmaceutical customers by planning to attend May Bio 2008 or 2009 conferences. The costs of setting up a promotional booth at the Bio trade show could be reduced if iCAPTURE went as part of the BC Biotech contingent.

4.5.3 Advertising

The market segments and potential applications for iCAPTURE's services are quite diverse. Since iCAPTURE is not a commercial firm, advertising in research related journals is not currently recommended. In the future, if a substantial amount of business does seem to come from a more narrowly defined niche, advertising in specific trade or technical science journals should be considered. Some of the main objectives contained in this type of advertising would be to create desires in the target niche and give them reasons to buy the services.

Advertising will take the form of mailers sent to targeted market segment customers. These mailers will direct the customers to the iCAPTURE CRM which will act as the main means to convey information about the centre's fee for service offerings, provide channels to establish connections, and generate inquiries. Advertising through the BC Biotech website is a valuable way to expose the local biotechnology community to the capabilities that iCAPTURE can offer and this practice should be continued.

4.5.4 Sales Force

The sales force at iCAPTURE needs to increase dramatically if the centre wishes to realize their ambitious revenue growth goals. To connect with customers in the target market segments, iCAPTURE needs to employ personal selling. For fee for service contracts of any substance, a reasonable amount of customization and two way communications will be required. Personal selling also allows the sales message and contract terms to be more flexible.

The workload of the sales force is comprised of communicating with customers, travel, and administrative functions. To service the new industrial and academic market segments, at least two new hires must be added to iCAPTURE to take responsibility for the business development, marketing and sales roles for the centre. Currently sales and marketing is being addressed through the part time allocation of resources of iCAPTURE operations management and through resources provided by UBC UILO.

4.5.5 Sales Promotion

A big part of the sales promotion should be to promote aspects of iCAPTURE services to market segments that would enhance the image of iCAPTURE and give them reasons to buy the services. For small local biotechnology companies, promoting SR & ED tax breaks will act as a promotional incentive. For larger non-local industry users, sample turnaround time and the

ability for iCAPTURE to become qualified as a preferred vendor should be promoted. These tactical marketing functions are designed to help boost market share in the targeted segments.

4.5.6 Publicity and Public Relations

iCAPTURE has the opportunity to utilize the BC Biotech website to manage the centre's image to the local biotechnology community. As the strategic marketing plan takes form, other local opportunities such as an article in Business in Vancouver magazine or Bio Business Magazine could help enhance the image of iCAPTURE's marketing foray. Planned efforts must be conducted to orchestrate buzz about iCAPTURE's new market facing services.

PIs from iCAPTURE should be given promotional brochures and business cards with a link to the CRM website so that they can generate market facing publicity when they are presenting abroad.

4.5.7 Electronic Promotion

Through affiliation with the UBC UILO, iCAPTURE services can be promoted at no cost through UBC's online marketing tool called Flintbox. The main customers of Flintbox are academic or industrial researchers and the web platform is supported by advertising. To further emphasise promotion in the local biotechnology market segment, iCAPTURE should continue to establish their image on BC Biotech website.

The most significant form of electronic promotion will be the new CRM portal. This is the most important place to advertise iCAPTURE services. Design of the CRM should convey information, alter attitudes, create desires, establish connections, direct actions, provide reassurance remind, give reasons for buying, demonstrate, and generate inquiries (McDonald & Keegan, 2002, p155). This form of electronic promotion should be up to date and engage potential customers. It should not contain links that carry customers away from the CRM portal.

Additional dedicated resources may be required to ensure that this critical customer interface is continuously updated and functioning effectively.

4.6 Placement

4.6.1 Geographic Coverage

The geographic coverage of iCAPTURE's target markets varies by segment. The market with the most potential is represented by the Vancouver Biotechnology cluster. This cluster is located primarily in the Lower Mainland of British Columbia and hosts approximately 75 firms. iCAPTURE will be able to use personal selling methods to this segment.

The geographic coverage of non-local biotechnology and pharmaceutical firms for iCAPTURE services is global but the most significant sub-segment of the market lies in North America. Long-term marketing efforts will be targeted at leading scientific officers of drug discovery and drug development divisions of the top ten companies in each segment. Emphasis will be placed the marketing efforts given to big firms with cardiac or respiratory franchises. Also in the longer-term, smaller US based biotechnology companies with cardiac or respiratory franchises should also be targeted.

In addition to UBC, iCAPTURE services should be promoted to all academic institutions capable of life science research in British Columbia, Alberta, and Washington State. Offices of research services at these institutions need to be contacted and receive promotional materials.

4.6.2 Placement Channels

Due to the high level of customization of each job, iCAPTURE should use direct placement channels with customers. This will enable a high level of communication that will allow iCAPTURE to have a high level of control over their marketing.

Limited indirect placement channels, like UBC's research referral website Flintbox, may be used to redirect customers to iCAPTURE's contacts.

4.6.3 Logistics

Logistics have already been established with current fee for service contracts. Transportation of biological samples is relatively easy to do with modern courier services. Further value could be given to customers if additional logistics features were added to iCAPTURE's service offerings. Items such as checklists for sample transportation and the ability for customers to electronically track the progress of their work in progress would be valued by customers in all market segments.

5 IMPLEMENTATION AND CONTROL OF THE MARKETING PLAN

5.1 iCAPTURE Resources

5.1.1 Financial

iCAPTURE has the financial resources necessary to implement an effective technology marketing campaign. Provided that a cost-benefit analysis has been performed showing the potential benefit of such a marketing plan and detailing the risk, funding will be accessible. In-house human resources have enough spare capacity to develop value propositions at the core laboratory level. These ideas can be formed into rough draft promotional materials using the in-house imaging group. Financial resources are required to use of external design firms to ensure that the right message is in the promotional materials. External print firms would also be engaged.

To develop an internet based customer relationship management (CRM) portal, a combination of internal information communication technology (ICT) resources and an external web-design firm would be utilized. The costs of implementing this ICT infrastructure would be diluted as it would coincide with a much needed green field rebuild of the entire iCAPTURE website.

All current staff positions at iCAPTURE are covered by funding from SPH. The financial demands from the marketing plan come from purchases of external products and promotional costs. This assumes that existing personnel have some spare time to contribute to the development and execution of the marketing plan.

5.1.2 People and Skills

At the core laboratory management level, overall leadership competences are good. There will be a certain level of variability encountered when attempting to transform all eight of the business unit teams to a more market facing position. The senior management of iCAPTURE are cognizant of issues related to the situational leadership styles within the business units and have been proactive with change management of core laboratory leaders.

The core competences of iCAPTURE's people are in performing leading cardiopulmonary research and building the techno-structure required to do this. The business development, marketing, and sales parts of the organization are clearly missing. Of the PIs at iCAPTURE, approximately 40% are MDs, 15% are MDs and PhDs, and the remainder are PhDs. As iCAPTURE is driven to emphasize sustainability, the requirement for this piece has come to the attention of leadership at iCAPTURE. A proposal to expand iCAPTURE resources and build this capability was submitted to Saint Paul's Hospital and is currently under review.

The people at iCAPTURE are currently experiencing uncertainty related to change in their workplace. The process of establishing a new Director for the centre goes hand in hand with personnel funding commitments for the next five years. There is a drop off in productivity as this process is currently ongoing. A new Director with strategic initiatives will provide more certainty at iCAPTURE. This in turn should allow productivity to increase and make change management to a market facing stance easier.

5.1.3 Time and Capacity

Based on current staffing levels, it is estimated that core laboratory personnel could absorb a 20% to 25% increase in workload without adversely affecting the research performed at iCAPTURE. This personnel capacity could be diverted in to market development activities at first and then take the form of additional testing throughput from new fee for service contracts.

A severe time bottleneck is anticipated at the senior operations management level when the additional new business arrives. It is critical to implement streamlined customer management processes.

The timing to implement a new web-based CRM portal for several targeted customer segments is dependant on the total reconstruction of the iCAPTURE website. Preliminary target dates for completion of this activity is Q1 2007. Several other time related milestones will affect effective implementation of the marketing plan. As mentioned earlier, appointment of the new iCAPTURE Director will be a pivotal point. After the appointment, the executive at iCAPTURE plan to rename and re-brand centre with a more identifiable name and image. This new name is intended to present a straightforward image of what the centre does and is also intended to have a level of simplicity that will let it become an enduring brand that customers can associate with.

5.2 Action Plan

The proposed action plan is derived from the marketing strategy elucidated through internal and external analysis of iCAPTURE and the industry it competes in. The proposed actions are intended to fulfil both short-term and long-term objectives that will ensure that iCAPTURE increases fee for service revenues to recover equipment maintenance costs thus moving the centre to a fiscally sustainable position. Short-term objectives will focus on the targeted market segments of local biotechnology companies and academic institutions in close geographic proximity. Long-term objectives will focus on the targeted market segments of non-local biotechnology and pharmaceutical companies.

The five action plan groupings identified through the analysis are:

1. Organizational, Brand, and Policy Development,
2. Services, Pricing and Promotion,
3. Market Growth in Targeted Segments,
4. Personnel Involvement and Cost Containment, and
5. Other Long-Term Considerations.

These actions will be described with respect to the goals that they aspire to achieve. Responsibilities, timing, and estimated resource requirements will be detailed for the actions. Control mechanisms will also be detailed. The control mechanisms will address performance analysis of the actions, review intervals, and adjustment mechanisms. The implementation and control of the marketing plan segment will conclude by referencing a Gantt chart that ties together the implementation of all facets of the marketing plan.

5.2.1 Organizational, Brand, and Policy Development

5.2.1.1 New Director and Brand Development

Action:

In order to proceed with organizational development, come up with a new brand, and develop internal policies that support iCAPTURE, the centre needs to get over current change management challenges and implement a new Director. This implementation could happen as soon as Q4 2006. One of the items to be prioritized by the new iCAPTURE Director and executive committee is to finalize the development of a new brand name and brand image for the centre. Some work has been performed towards completion of this task by the existing executive

committee, so finalizing this action should be achievable by the end of Q4 2006. The majority of brand development resources will be supplied by the iCAPTURE executive with help from in-house imaging group. An additional $ 5,000 should be budgeted to hire a private firm for final refinement of the brand image.

Control:

The newly installed Director and executive committee should commit to having the brand issue resolved by the end of Q4 2006. The Acting Operations Leader or other designate appointed by the executive committee should obtain the services of a brand consulting firm before the end of November 2006. The executive committee should have the final details about the new centre name and brand image finalized by the end of 2006. Progress toward this goal should be reviewed at least bi-weekly at the executive committee meetings.

5.2.1.2 Establish New Business Development Department

Action:

Organizational architecture needs to be developed to make iCAPTURE more market facing. The executive committee and director need to emphatically negotiate with Saint Paul's Hospital to get financial resources to hire at least two new individuals to start up a business development, marketing and sales department. The annual salary and benefit costs for these individuals are likely to be in the order of $ 80,000 to $ 100,000 each. If iCAPTURE successfully negotiates with Saint Paul's Hospital to cover these salaries, there will be no net cost to the centre. Ideally, both of these hires will be in place at the start of 2007.

Saint Paul's Hospital has committed laboratory floor space and $ 1.5 million per year to iCAPTURE for personnel support. Saint Paul's Hospital can be described as a good supportive landlord that lays no claim to revenues generated by iCAPTURE. Both Saint Paul's Hospital and

the main grantor, the Canada Foundation for Innovation, have grantor restriction policies in place that ensure that the primary use of iCAPTURE technology infrastructure is for innovative research. iCAPTURE is not prohibited from utilizing excess capacity to generate revenues, however if the centre turns the core laboratories into primarily a profitable commercial venture, subsidization will be reviewed and discontinued. The partners of iCAPTURE take a position where they do support a certain level of commercial sustainability. Funding grants are primarily focused on technology infrastructure and not ongoing operating funding. Saint Paul's Hospital must also exercise cost control for iCAPTURE operating expenses as the centre grows. Even though Saint Paul's Hospital has no stake in the revenues or profits generated by iCAPTURE, it may be in the interests of the hospital to fund the new business development positions in order to increase iCAPTURE cost recovery thereby controlling the operating costs that the hospital subsidizes.

The new business development resources will be immediately tasked with understanding the CRM processes and then establishing new business processes to efficiently market, sell, and take orders for iCAPTURE services. This new organizational structure must also ensure that customers are paying the correct prices for their services. They must develop sales and promotion guidelines and policies. In addition to other selling tasks related to their jobs, the new business development resources should have these processes and policies completed by the end of Q2 2007.

Control:

The iCAPTURE executive committee should work hard to negotiate with Saint Paul's Hospital to push for funding for the new hires by the start of 2007. This item should be prioritized and revisited every two weeks at the executive committee meetings. Without this additional piece of organizational infrastructure in place, drastic increases in fee for service

revenues are unlikely. The Director or designate should try to get a commitment from Saint Paul's Hospital for the new positions by the end of November 2006 and then delegate appropriate iCAPTURE personnel to conduct interviews for the positions with the intentions of the jobs starting in January 2007.

Appropriate reporting should be established for the new business development office at iCAPTURE. The actions prescribed for the new employees should be part of their goals and objectives and performance management plan. Because of the criticality of this new function, the manager that the new business development hires report to should review progress towards actions stated in the plan at least every two weeks. This manager should keep the executive committee continuously updated and should have the authority to refocus the plan at any time. If the executive committee determines that additional personnel would help the profitability of iCAPTURE, they should make a strong case to Saint Paul's Hospital to show the benefit of increasing the size of the business development department.

5.2.1.3 Develop New CRM IT Infrastructure

Action:

A key missing component of the promotional aspect of the marketing mix at iCAPTURE is a CRM portal. The goal of this portal is communicate information about iCAPTURE service offerings to all customer segments and provide a centralized means for customers to communicate with and interact with customer service managers at iCAPTURE. Ultimately, this IT infrastructure tool is a lynch pin in increasing fee for service revenues. The centre is planning to utilize in-house resources and external web design consultants to roll out a new website for the re-branded iCAPTURE at the end of Q1 2007.

The CRM portal is intended to be an add-on to this web redesign that will add approximately $ 15,000 to the estimated design cost. The total estimated cost for the CRM portal

includes web design, development, training for use and training for maintenance. The recommended CRM, in its simplified form, is intended to facilitate service promotion and communication. A system that interfaces with ERPs and conducts web commerce is not currently recommended because of the relatively small size of iCAPTURE and its target markets. The iCAPTURE executive committee should make it the responsibility of one of the iCAPTURE managers to define the needs of the CRM portal and solicit quotes from vendors. Design elements of the CRM can be imitated from the competitors' websites like the University of Texas Health Science Centre at San Antonio (http://www.uthscsa.edu/research/cores.asp), or the Ohio State University College of Medicine Dorothy M. Davis Heart and Lung Institute core laboratory site (https://heartlung.osu.edu/2290.cfm). The consultant should also add sample tracking features to add value to the various customer segments.

The executive committee should appoint a manager to be in charge of the CRM portal initiative. This manager has to select and engage a vendor to design the site. The manager must also be responsible to get core laboratories managers and personnel to contribute to building and maintaining content pages in the CRM that relate to core laboratory equipment and services. Core laboratory personnel resources for this task can be taken from excess personnel capacity that is already in place and not generate additional costs. Completion of the functional CRM portal should be targeted for the end of Q1 2007.

Control:

The executive committee should try to appropriate funds for the CRM add-on by November 2006 and identify an iCAPTURE project manager to oversee this critical initiative. The web design firm should be identified and start design work by December 2006. Involvement from core laboratory personnel should be initiated in December 2006. The project manager should meet, at a minimum, every two weeks with the external design firm and contributing core

laboratory support team to ensure that the project milestones are on track and the budget is being kept. This manager should update the executive committee every two weeks on the progress of the CRM portal development.

5.2.1.4 iCAPTURE Policy Development

Action:

The situational analysis of iCAPTURE indicated that several policies are required to both provide iCAPTURE with competitive insulation and enhance their value proposition to industry. This policy development should be delegated from the iCAPTURE executive committee and be completed by the end of Q1 2007. In-house capacity and capabilities exist to draft and formalize these policies so no cost should be associated with this action.

Three major policies need to be implemented. The first is a policy that clearly describes how iCAPTURE has unilateral authority to manage its own excess service capacity and set prices for this. Having this policy in place would allow iCAPTURE to do business with the UBC Centre for Drug Research and Development and with the Michael Smith Foundation Technology Network Platform Initiatives while still making a profit. Secondly, iCAPTURE needs to develop policies and procedures that would establish the centre as a preferred services vendor for industry customers. This decreases customers switching to substitute service providers or competitors. Finally, the new business development group needs to establish updated pricing policies that capture all detailed costs that the various customized jobs may require. These pricing policies should include guidance related to flexibility of terms, discounts, and penalties.

Control:

Management of the progress of the policy development should be monitored fairly easily by the iCAPTURE executive at meetings every two weeks. As the policies are nearing

completion, expert review from the UBC UILO should be sought out to determine if any adjustments are required prior to finalization.

5.2.2 Services, Pricing, and Promotion

5.2.2.1 Operational Management of Services

Action:

Several processes need to be developed to manage the new market segments and increased fee for service throughput at iCAPTURE. The Acting Operations Manager should continue with the concept of core laboratory business plans that has been in effect for several years. Annual meetings involving the Acting Operations Manager, iCAPTURE accounting, and the core laboratory managers should be conducted to forecast maintenance budgets one year and three years out. In 2007, when the marketing plan is in effect, revenue targets for individual laboratory services should be implemented by the same budgeting group.

Services with low market demand should be scrutinized by operations management and laboratory core management to see if these services can be reconfigured and offered to high growth main stream life sciences markets.

Control:

To manage the individual core laboratory business plans, the budget management team must meet quarterly to update progress against financial goals and make rolling adjustments to targets. Low demand services will also be reviewed by the team at these quarterly meetings. Significant disparities between the actual results against the financial targets will be communicated to the iCAPTURE executive management team on a quarterly basis by the Acting Operations Manager.

5.2.2.2 Resetting Pricing Levels for Industry, Academia, and Internal Services

Action:

Prior to the end of 2007, iCAPTURE core laboratory managers should go through exercise of resetting all three price levels for their services using the competitor indexing method described earlier in the marketing strategy section. Once the mean going rate price has been determined for all services, the prices should be set 10% below this amount to increase market share via price penetration. Annually, over the next three years, pricing levels should be reviewed. If it is determined that iCAPTURE has captured adequate market share to meet their sustainability needs, the price penetration discount may be removed to increase profitability of the fee for service offerings.

In the longer-term, perhaps in 2009, iCAPTURE operations and core laboratory management should go through the exercise of calculating the marginal cost per service unit and ensure that the pricing is above this level. Calculation of the marginal cost is not an urgent item since the facility has excess throughput capacity that has already been paid for.

Control:

The pricing exercises can be delegated to operations and core laboratory management as part of their goals and objectives. Due dates for each action can be included in the performance management measures of the management involved. The team involved with resetting pricing levels should report to the iCAPTURE executive management team on updated pricing levels at an executive meeting shortly after the task is due.

5.2.2.3 Development of Promotional Materials and Publicity

Action:

After the centre has attained a new Director and brand image, a mailer brochure with an overview of iCAPTURE services needs to be prepared. The Acting Operations Manager already has this task scheduled and budgeted. An additional $ 2,500 should be added to the budget for this mailer to allow for review and revisions by an independent promotional firm. This mailer should be a high priority item that is completed and ready for distribution by the end of January 2007. When the brochure is ready, it should be distributed to PIs who can use it to promote iCAPTURE when they are travelling to conferences. The brochure should contain a conspicuous message which refers readers to the web address of the CRM portal for further detail.

Once core laboratory promotion pages for the CRM site have been completed, the CRM development team leader needs to liaise with officers from the UBC UILO. The promotional core laboratory pages will be linked to the UBC Flintbox platform to further market iCAPTURE service offerings to researchers. There is no cost related to the use of Flintbox.

The executive committee should plan to have a promotional booth and materials prepared for the BioPartnering North America 2007 conference in Vancouver and the Bio 2008 conference in San Diego. The centre should register as a presenter for BioPartnering North America and attend Bio 2008 as part of the BC Biotech contingent in order to control costs. iCAPTURE should plan to initially have a rotation of 3 individuals attend these trade shows. The recommended attendees include two of the hires from the new business development department and another iCAPTURE manager appointed by the executive committee. To gain high visibility at these two shows $ 20,000 per show needs to be budgeted annually to cover promotional costs and travel. The iCAPTURE executive must determine if adequate finances exist for this type of trade show promotion and allocate a budget prior to the end of December 2006.

A manager needs to be appointed to work with a promotional firm that deals with trade show booths and BC Biotech in order to finalize all preparations by mid-January 2007 since the BioPartnering North America trade show starts on February 4, 2007.

To address ongoing publicity, iCAPTURE operations management and the new business development department have to put together a campaign to create publicity buzz about the new market face of the iCAPTURE brand. This effort must regularly highlight promotional efforts undertaken by the centre to increase their market profile. The managers involved should have a plan that opens channels of communication with BC Biotech and UBC Reports for regular press releases about the expansion of service offerings and dealings with new market segments. Additionally, Canadian magazines such as Business in Vancouver and Bio-Business Magazine should be contacted and persuaded to write feature articles on the progress of iCAPTURE's market growth and sustainability initiatives as they successfully unfold.

Control:

The promotional mailer and linking of the completed CRM pages to the Flintbox site are tasks that can be delegated to a manager by the executive committee. Monthly updates should be given to the committee regarding budget and timelines.

Attendance of trade shows is new to iCAPTURE and the executive must give careful consideration to this effort as it requires a substantial commitment of financial and human resources. The executive committee should request a more detailed version of budget and timelines related to having promotional booths at the two events and decide on their level of commitment after reviewing this. After two years of attending the two trade shows, the executive committee should evaluate the ongoing benefit to the centre's marketing initiatives of continuing to attend these events.

By the end of March 2007, the new business development personnel should assemble a project plan outline for issuing regular marketing publicity for iCAPTURE. The executive committee should be updated quarterly on progress and adjustments to this plan.

5.2.3 Market Growth in Targeted Segments

5.2.3.1 Growth of the British Columbia Biotechnology Company Customer Base

Action:

The business development department should take advantage of the close physical proximity of this market segment and utilize personal selling. This will involve preparation of a targeted 20 minute presentation with accompanying PowerPoint slides. The company contact for the presentation will ideally be the Chief Scientific Officer or another individual in a similar technical role. The business development department can utilize BC Biotech to try to determine which companies are suitable to approach. A list of ten local biotechnology companies that have good financial backing and are involved with drug development is included in Appendix 5. These companies provide a good starting place for iCAPTURE to start local personal marketing.

The business development department at iCAPTURE should have a personal selling presentation complete by the end of March 2007 and attempt to present to at least two local biotechnology companies per month. An important part of the presentation is to educate the customers on the use of SR & ED tax credits which will allow them to recover approximately 30% of the their costs of using iCAPTURE services.

Control:

Through performance management, the iCAPTURE shall ensure that the personal selling presentations are completed and that the appropriate numbers of customers are marketed each month. A year after the implementation of the personal selling program, the business

development department shall prepare a summary report for the executive committee evaluating the effectiveness of the program in increasing local biotechnology market share.

5.2.3.2 Growth of the Non-local Biotechnology and Pharmaceutical Customer Base

Action:

Starting in October 2007, the business development department will review trade journals such as Contract Pharma and make up a top ten list of companies to market. Efforts may be made to approach and meet with target customers in this segment at the Bio 2008 meeting. Additional attempts to contact senior management in charge of drug discovery could yield valuable business. Personal meetings or correspondence with senior VPs could solidify lucrative relationships with these big companies. Items that must be emphasized for this market segment are the human resource talent at the centre, willingness to undertake actions to become preferred suppliers, and the 20% SR & ED tax credit for foreign firms. This longer-term business development activity may also focus on targeting smaller US based biotechnology firms with cardiovascular or pulmonary franchises. The scope of expanding target markets in the longer-term will dependant on resource levels at iCAPTURE.

Control:

Control of marketing this segment will be administered in a similar manner to the local biotechnology market. Updates on all targeted marketing efforts should be given to the executive committee from the business development department on a monthly basis.

5.2.3.3 Growth of the Academic Customer Base

Action:

By June 2007, the business development department shall utilize input from the executive committee PIs to generate a target list of new academic customers. These customers shall initially be from the close geographic proximity of British Columbia, Alberta, and Washington State. After establishing the list, the business development personnel should market customers recommended by the PIs and the offices of research services at each institution. The emphasised value proposition for this customer segment is access to leading edge technology to foster more prolific research and publication.

5.2.4 Personnel Involvement and Cost Containment

Action:

In order to share marketing responsibilities with all personnel at iCAPTURE, managers should put some of these responsibilities in the goals and objectives of employees each year. When financial targets towards sustainability are met, the iCAPTURE executive committee should acknowledge efforts at the working level. This could take the form of a celebratory lunch for a laboratory core.

Incentives could also be utilized with the PIs. In the event that a PI is accredited with bringing in new business, a credit could be applied to their own laboratory charges. In the long-term, the business development department could put together a training module related to marketing for the PIs that are on the road presenting.

For cost containment, core laboratory managers and iCAPTURE purchasing should try to work with suppliers to ensure that they are getting the best academic pricing for all equipment servicing, consumables, and maintenance contracts.

Control:

If the executive committee decides to utilize incentives, there should be a mechanism to set aside three or four percent of new cost recovery revenues for funding these incentives. The executive must also be aware of misaligned incentives causing fighting over ownership of incentives. Such an incentive program could be phased in during 2007.

The executive committee should charge the Acting Operations Manager with coordinating the task of conducting a cost containment review starting in January 2007. This would involve a team that includes laboratory core managers and purchasing. A report on reducing the costs from suppliers could be issued to the executive committee by the operations manager by June 2007.

5.2.5 Other Long-Term Considerations

After iCAPTURE has put effective policies in place to ensure unilateral control over allocation and pricing of excess fee for service capacity, two new academic customers should be marketed. These customers are the recently founded UBC Centre for Drug Research and Development and the Michael Smith Foundation Technology Platform Initiatives. This marketing effort could take place at the in the middle of 2008.

In order to ensure that iCAPTURE is on the right track with their marketing initiatives, after two years they may wish to survey customers about their service and what attributes the customers value or dislike. In 2009, a survey could be designed and distributed.

If iCAPTURE wishes to expand to market segments in drug development beyond drug discovery, they may wish to implement GxPs related to some of their service offerings. In effect this would expand their markets through the development of regulatory capabilities. This initiative could be considered in 2008.

Implementing a technology marketing plan is not a one time project. The marketing management process not only involves planning and implementation of the marketing activities but also controlling the marketing plans and program (Shapiro, 2002, pp30-31). This control will result in adjustment of the plans as required or new plans. As iCAPTURE progresses in developing their market share to increase fee for service revenues, the centre should develop capabilities and competences that enable them to perpetuate and regularly update their marketing plans.

5.2.6 Financial Requirements

Many of the financial requirements related to the implementation of the proposed technology marketing plan have already been budgeted for or exist in the form of excess throughput capacity which has been paid for. Table 7 lists the significant financial requirements for implementation of the marketing plan.

If the assumption is made that the salaries for the business development hires will be taken on by St. Paul's Hospital, the cost of implementing the proposed strategic marketing plan is estimated to be approximately $ 42,500 for 2007 and $ 62,500 for 2007. For the amount of marketing plan actions, this cost estimate is quite reasonable as it benefits from existing human resource capacity being in place to support many of the tasks required by the plan. Since iCAPTURE is very new to marketing their services, a large contingency of 40% should be added to this estimate. This yields a total financial commitment of $ 59,500 to execute the proposed plan between in 2007 and $ 87,500 in 2008.

Table 7: Significant Financial Elements of the iCAPTURE Marketing Plan

Dates	Amount	Item
Dec. 2006	$ 5,000	• External firm to help with the development of brand image.
Jan. 2007 in perpetuity	$ 180,000 or $ 0 if paid for by St. Paul's Hospital	• Two new hires to form an iCAPTURE business development department.
Dec. 2006 to Mar. 2007	$ 15,000	• Cost for CRM portal to be added to new website roll out.
Dec. 2006 to Jan. 2007	$ 2,500	• Addition to existing promotional brochure budget to account for new brand.
Dec. 2006 to Mar. 2007	$ 20,000	• Booth and iCAPTURE service promotion for BioPartnering North America 2007.
2008	$ 40,000	• Funds to attend BioPartnering North America 2008 and Bio 2008 in San Diego

5.2.7 Project Plan for Marketing Plan Implementation

The short-term elements of the marketing plan are laid out in the Gantt chart in Figure 9. The period that this short-term plan spans is from November 2006 until the end of December 2007. Long-term elements of the technology marketing plan implementation are shown in the Gantt chart in Figure 10.

Figure 9: Short-term Marketing Gantt Chart for iCAPTURE

ID	Task Name
1	**Organization, Brand & Policy Dev.**
2	New Director
3	New Brand Name & Image
4	Add 2 Person BD Dept.
5	New BD Hires Start
6	BD & Marketing Policies
7	Develop CRM Portal
8	Add Core Lab Marketing to Flintbox
9	Develop 3 Marketing Polices
10	**Services, Pricing, & Promotion**
11	Reset all Service Prices
12	New Promotional Brochure
13	BioPartnering NA Conference
14	Publicity Campaign Plan
15	**Market Growth in Target Segments**
16	**Local Industry Segment**
17	Personal Selling Presentation
18	Present to 16 Local Biotechs
19	**Academic Segment**
20	Develop Academic Target List
21	Market Academics & University ORS
22	**Personnel Involvement & Cost Containment**
23	**Personnel Involvement**
24	Evaluate Market Facing Incentives
25	Phase in Incentive Programs
26	**Cost Containment**
27	Supplier Cost Review Process
28	Cost Review Report for Executive

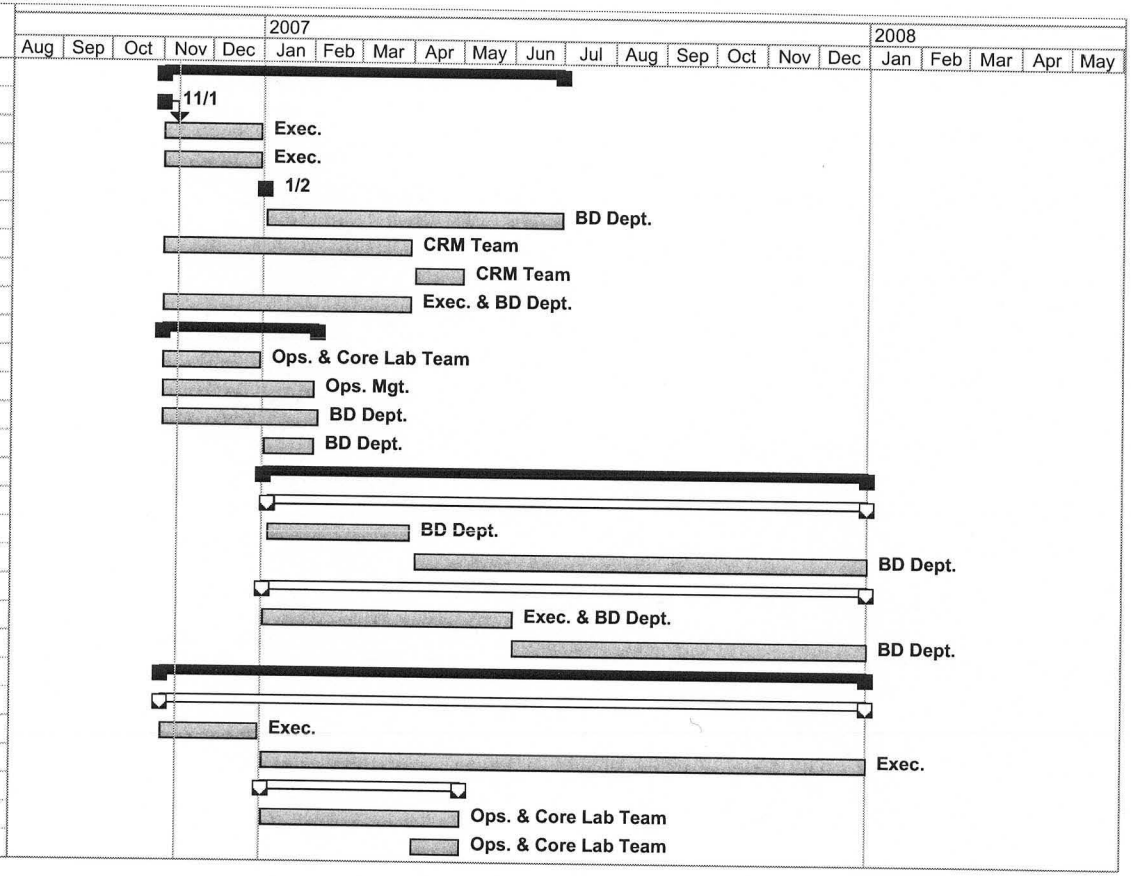
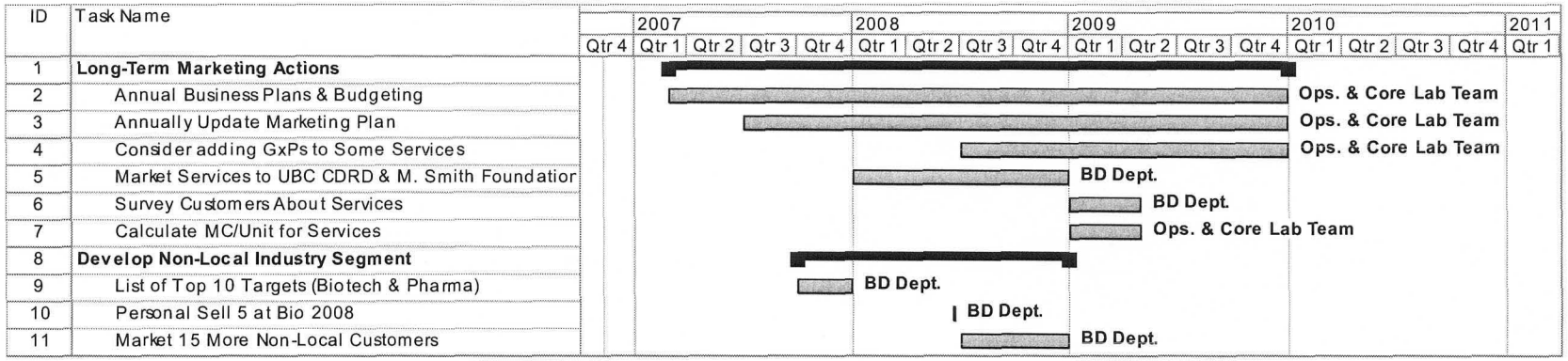


Figure 10: Long-term Marketing Gantt Chart for iCAPTURE



6 CONCLUSIONS

The iCAPTURE Centre has developed into a world class research facility that pushes the boundaries of understanding heart and lung diseases through the use of leading edge technology and creative personnel. As a university owned research laboratory, iCAPTURE is facing huge financial challenges and has to grow fee for service research revenue by approximately 270% in order to recover equipment maintenance and warranty costs.

This project offers iCAPTURE a recommended technology marketing plan that suggests that the centre should adopt a generic niche strategy that is differentiation focused. The marketing plan is a result of external analysis, internal analysis, and marketing strategy planning. The external analysis determined key factors related to iCAPTURE's external environments by utilizing a PESTEL analysis and a Porter's 5 Forces analysis. The internal analysis contains a SWOT analysis of iCAPTURE.

The outputs of the external and internal analyses act as inputs for the marketing strategy. Considering iCAPTURE's limited marketing resources and experience, the external and internal analyses suggest that the centre focus on local biotechnology companies and academic customers in close geographic proximity in the short-term. For the longer-term the marketing strategy will expand to target non-local biotechnology and pharmaceutical industry customer segments. In the marketing strategy section, key strategic determinants stratified by service, price, promotion, and placement are identified.

The marketing plan offers four short-term action groupings that are intended to be completed by the end of 2007. These action groupings are:

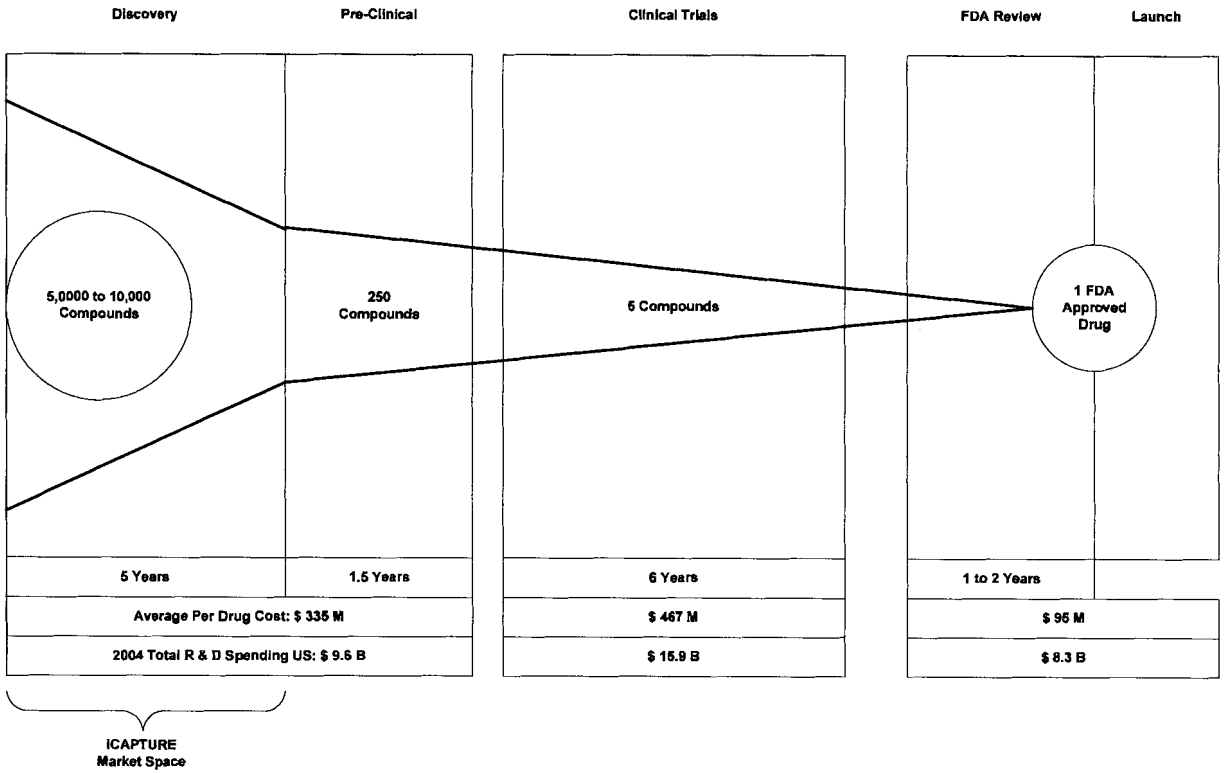
1. Organizational, Brand, and Policy Development,
2. Services, Pricing and Promotion,
3. Market Growth in Targeted Segments and
4. Personnel Involvement and Cost Containment.

A further long-term action plan is detailed to sustain the cost recovery efforts of the new market facing iCAPTURE. This plan will consider expanding target markets to non-local segments as soon as 2008. Responsibilities, controls, and timelines are also detailed in the action plan.

Substantial commitments must be made for the successful implementation of the proposed action plan. A two person business development department needs to be added to iCAPTURE in 2007. In addition to these human resources, $ 59,500 is required to fund activities proposed by the marketing plan in 2007 and $ 87,500 is required for 2008. In order to grow fee for service revenues by 270%, differentiated niche markets need to be targeted with a technology marketing plan that has a medium to high level of formalization. The proposed plan will give iCAPTURE an excellent opportunity to achieve their financial cost recover goals and move forward profitably with sustainable competitive advantage.

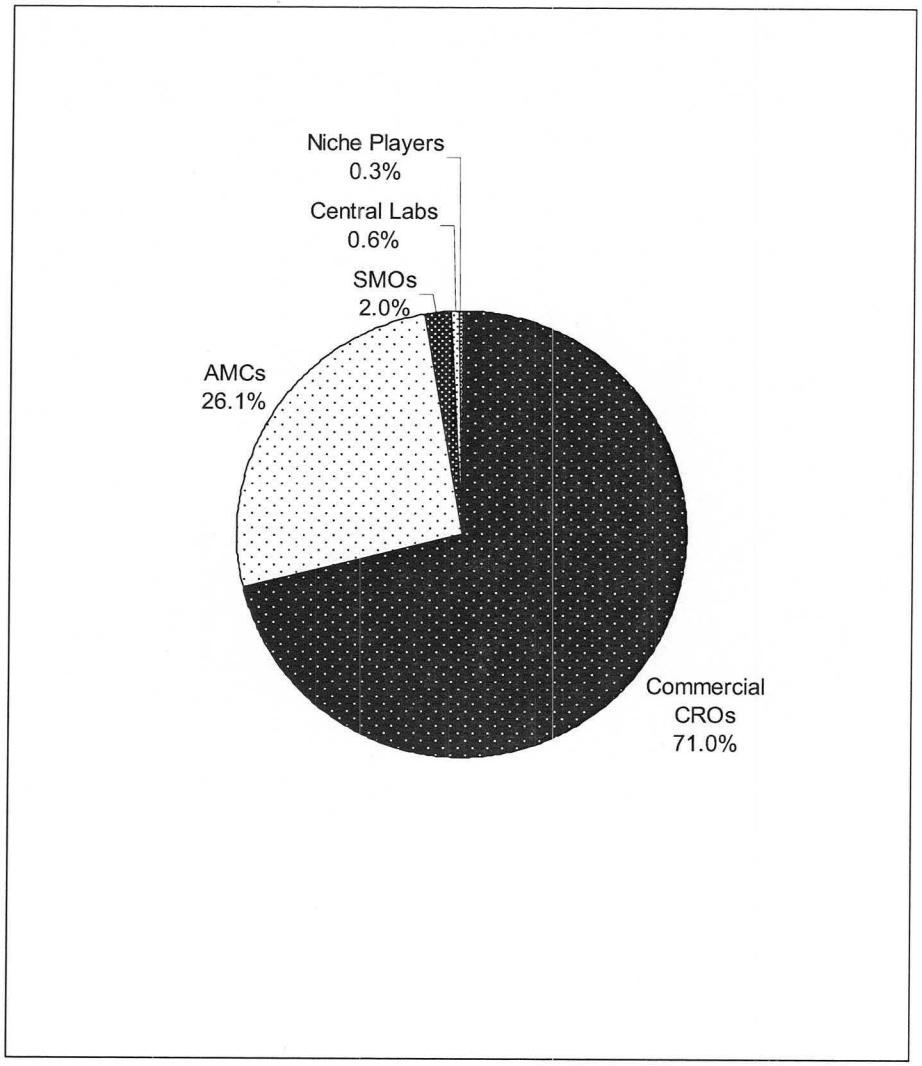
APPENDICES

Appendix 1: Drug Discovery and Development Process



Based on (Pharmaceutical Research and Manufacturers of America, 2006)

Appendix 2: Major Competitive Segments for Outsourced Drug Development Market, 2003



Based on (Heffner, 2004)

Appendix 3: iCAPTURE Equipment and Services by Core Laboratory

Core Laboratory	Equipment	Use
Molecular Phenotyping	DNA Microarrays	Scans for gene expression and SNP detection
	Real-Time PCR LightCycler	Quantification of DNA and RNA
	Real-Time PCR ABI Prism	TaqMan assays
	Liquid Handling Robot	Automated pipetting "cherry picking" samples
	SELDI-TOF Mass Spectrometry	Protein purification from biological mixtures
	Beckman Flow Cytometer	Quantitative measurements of properties of cells and particles
	MoFlo Cell Sorter	Separation from a complex mixture of cells into a defined single cell fraction that can be analyzed
	autoMACS	Magnetic cell sorting
	Cell-Dyn 3700	23 parameter hematology profile
	Luminex Flowmetric System	Sensitive multiplex bead based protein/gene assays
	Laser Capute Micro-dissection	Capture individual or groups of cells onto a membrane
Ultrastructural Imaging	Transmission Electron Microscope	Visualizing the inside of cells
	Atomic Force Microscope	Near atomic resolution for biological samples
	Biowave Microwave Processor	Makes TEM sample preparation about 25 times faster
Dynamic Cellular Imaging & Biophysics	Wide field Fluorescence Microscope	Measurement of intracellular ion concentration in isolated cells
	Confocal Laser Scanning Microscopes	Analysis of cellular function and imaging of biological samples
Organ Pathophysiology and Imaging	Siemens CT Scanner	CT scans of body imaging
	GE MRI Scanner	MRI scans tailored to cardiac and lung images
Histology	Morphological Services	Processing and embedding, sectioning, 29 types of staining, immunohistochemistry, ISH analysis, various bioprobes and sample photography

Core Laboratory	Equipment	Use
Imaging	Imaging	Digital imaging, photography, scanning and printing
	Publication	Images for publications and presentations
Registry	Tissue photography	Photographic imaging of tissues
	Microscopic photography	High magnification imaging of tissues
	Tissue dissection services	Tissue dissection
	-80 deg. C Freezers	Tissue archiving

Appendix 4: Competitive Indexing Price Analysis for Three Core Laboratory Services

Assisted Flow Cytometry ($ US per Hour)

	Institutional	Academic	Industry
Rutgers University	$ 75	$ 100	$ 175
Ohio State University	$ 55	$ 80	$ 160
University of Texas at San Antonio	$ 100	$ 110	$ 180
University of Massachusetts	$ 25	$ 32	$ 126
University of Michigan	$ 50	$ 100	$ 200
mean	**$ 61**	**$ 84**	**$ 168**
Average Premium per Segment	1.00	1.38	2.76
too low'	$ 25	$ 32	$ 126
too high'	$ 100	$ 110	$ 200
iCAPTURE in $ US	**$ 72**	**$ 90**	**$ 113**
iCAPTURE Premium per Segment	1.00	1.25	1.56
iCAPTURE rate / mean rate	1.18	1.07	0.67

Assisted Cytometry Cell Sorting ($ US per Hour)

	Institutional	Academic	Industry
Rutgers University	$ 100	$ 150	$ 250
Ohio State University	$ 65	$ 125	$ 230
University of Texas at San Antonio	$ 110	$ 120	$ 190
University of Massachusetts	$ 43	$ 58	$ 126
University of Michigan	$ 50	$ 100	$ 200
mean	**$ 74**	**$ 111**	**$ 199**
Average Premium per Segment	1.00	1.50	2.71
too low'	$ 43	$ 58	$ 126
too high'	$ 110	$ 150	$ 250
iCAPTURE in $ US	**$ 99**	**$ 135**	**$ 171**
iCAPTURE Premium per Segment	1.00	1.36	1.73
iCAPTURE rate / mean rate	1.35	1.22	0.86

Assisted Confocal Microscopy ($ US per Hour)

	Institutional	Academic	Industry
Rutgers University	$ 75	$ 100	$ 175
Ohio State University	$ 75	$ 115	$ 115
University of Texas at San Antonio	$ 70	$ 80	$ 140
University of Massachusetts	$ 65	$ 130	$ 130
University of Michigan	$ 110	$ 180	$ 180
mean	**$ 79**	**$ 121**	**$ 148**
Average Premium per Segment	1.00	1.53	1.87
too low'	$ 65	$ 80	$ 115
too high'	$ 110	$ 180	$ 180
iCAPTURE in $ US	**$ 41**	**$ 68**	**$ 126**
iCAPTURE Premium per Segment	1.00	1.67	3.11
iCAPTURE rate / mean rate	0.51	0.56	0.85

Appendix 5: List of Ten Local Biotechnology Companies to Approach with Personal Selling

	Name	Location	Product Focus
1	Angiotech Pharmaceuticals Inc.	Vancouver	Specialty Pharmaceutical and Medical Device (cardiology)
2	Neuromed Pharmaceuticals Ltd.	Vancouver	Calcium channel blocking. Pain, epilepsy, and cardiovascular diseases.
3	AnorMED Inc.	Langley	Stem cell transplant, HIV, and Oncology.
4	Xenon Pharmaceuticals Inc.	Burnaby	Clinical genetics-based drug discovery and development company. Small molecule therapies for select metabolic, neurological and cardiovascular diseases.
5	Amgen British Columbia Inc.	Burnaby	Human therapeutic antibodies and inflammatory diseases.
6	QLT Inc.	Vancouver	Eye diseases, dermatology, and drug delivery.
7	Aspreva Pharmaceuticals Corporation	Victoria	New indications for approved drugs.
8	Protiva Biotherapeutics Inc.	Burnaby	Targeted drug delivery lipids.
9	MDS Nordion, Inc.	Vancouver	Nuclear medicine and molecular imaging.
10	Cardiome Pharma Corp.	Vancouver	Cardiovascular drug development.

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