

Best Practices Study of Museum CD-ROM Production

Printed in Canada

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Canadian Cataloguing in Publication Data

Main entry under title :

Best practices study of museum CD-ROM production : a report

Includes bibliographical references. Includes an index.

ISBN 0-660-17527-4

Cat. No. CH4-33/1998E

- 1. Museum publications -- Canada.**
 - 2. CD-ROM publishing -- Canada.**
 - 3. Museum publications.**
 - 4. CD-ROM publishing.**
- I. TCI Convergence Limited.**
II. Canadian Heritage Information Network. III. Title.

AM7.B47 1998 069'.52 C98-980261-2

Best Practices Study of Museum CD-ROM Production

A report from
TCI Convergence Limited
Management Consultants

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Glossary of Terms

AGB Alexander Graham Bell (Museum)

ARTIFICE *Archeological Research Terminal for Independent Cultural Explorations*

CD-ROM Compact Disk – Read Only Memory

CHIN Canadian Heritage Information Network

CMC Canadian Museum of Civilization

DCH Department of Canadian Heritage

McMichael McMichael Canadian Collection

OMSI Oregon Museum of Science and Industry

PTM Public Technologies Multimedia

ROI Return on investment

ROM Royal Ontario Museum

SPA Software Publishers Association

Executive Summary

Objectives

Since the early 1990s, Canadian museums have been engaged in the production of CD-ROMs for a wide variety of purposes. The purpose of this study is to provide an overview of the best practices of museums that have produced CD-ROMs. The primary focus of this study is the CD-ROM as a possible revenue generation instrument to museums. Accordingly, this project focuses on the business issues of CD-ROM production by museums. The study also addresses a range of other issues associated with the production, design and museological aspects of CD-ROMs, although these issues were a secondary focus.

The specific objectives of the study are as follows:

- to profile the practices of Canadian museums and CD-ROMs in terms of their markets and sales, price points, distribution and marketing, and development and production
- to provide an overview of the CD-ROM market for museums

Methodology

The study is based on a series of interviews with five Canadian museums and a selection of multimedia partners that have produced CD-ROMs or related products and one museum that is active in technology but has chosen not to produce CD-ROMs for commercial purposes. In addition, one US museum that produced a CD-ROM was interviewed. Other interviews were conducted with people knowledgeable about the US market. A survey of Canadian museums that have produced CD-ROMs supplemented the data on market size.

The Market

While the market for educational software in the US is large, one publisher knowledgeable about this market estimates that the share of CD-ROM sales accounted for by US museums is less than one percent of sales. The market has matured in recent years, but there is

little evidence that US museums or their publishers are very profitable in this market segment.

Since the early 1990s, Canadian museums have produced approximately 40 CD-ROM titles. Distribution has been roughly 80 000 units in total, although sales of each title can vary widely. Assuming an average retail price of approximately \$40, there has been approximately \$3 million of sales possible since CD-ROMs were first produced. Museums are estimated to have received close to \$500 000 in gross revenues from these sales, about 17 percent of retail sales. The majority of these revenues have come from a small number of titles.

Experience of Canadian Museums

Most museums do not recover the costs of CD-ROM production and development. Only a few museums have made modest returns on CD-ROM production. The experiences of these museums have formed the basis for many of the best practices addressed in this study. Generally, these institutions have been able to recover their costs or generate a small return. These particular institutions funded a large part of their development costs through government grants or corporate sponsorship. Corporations have sponsored the projects by placing an order for a specific quantity of the final product. One US museum, which had its costs mainly funded by the multimedia publisher, made a modest return. A wide variety of partnerships and revenue sharing structures have been developed and a few common practices exist. Yet it must be stated that some museums have had difficulty in recovering revenues to which they were entitled from their revenue sharing agreements.

All the museums believe strongly that they have produced a high-quality product that meets their museological objectives.

Recommendations

1. Most museums have not generated significant, if any, net revenues through the production of CD-ROMs. If net revenue was generated, it was likely a result of special circumstances. For example, the institution may have received a grant for production, a corporate sponsorship, or a large one-time purchase of product. Also, in many cases, the museum's overall cost does not account for the staff time contributed to the production. Moreover, when net

profits have been realized, the profits tended to be relatively small. **Accordingly, museums should be very cautious about developing CD-ROMs primarily to generate revenues. Even when CD-ROMs are developed for other purposes (e.g., for educational or marketing reasons), museums should carefully undertake a cost-benefit analysis of any such initiative (including the imputed costs of staff time).**

2. Notwithstanding the above, museums do have artifacts, collections and expertise that can be the basis for very interesting, educational and attractive CD-ROM offerings. As a rule, though, rather than attempting to develop CD-ROMs completely in-house (a strategy that can have a very steep learning curve unless the institution has in-house capability), **museums should consider a partnership with established commercial organizations in the development, marketing and distribution of titles.** Such an approach will help the museum share financial risk, as well as improve the quality of the final product. Production partners bring to the relationship expertise in the development, production, marketing and distribution of CD-ROMs, whereas the museum brings the content of the production. Both are critical elements of a successful CD-ROM.

3. **In the negotiations between the museum and the production house, museums should, where possible, negotiate the following:**

- **compensation for — or an upper limit to — the amount of time and expertise provided by museum staff**
- **involvement in decisions regarding the distribution of the CD-ROM**
- **percentage of sales**
- **prominent display of the museum branding — its name, image and logo on the packaging**

These principles should apply regardless of the scale of production.

4. In the current environment of rapidly changing technology and explosive growth in multimedia, **CD-ROMs should not be considered stand-alone initiatives. Rather, they should be thought of as a component in the museum's multimedia strategy.** This strategy, in turn, is likely to reinforce other institutional objectives such as marketing, programming, exhibit interpretation,

outreach, etc. The costs and benefits of producing a CD-ROM should be viewed relative to using other digital media such as the museum's web site, hybrid CD-ROM products containing, for example, embedded hyperlinks to the museum's web site, or the sites of other museums and relevant organizations. Alternatively, if a CD-ROM is being developed for the first time, it can be undertaken as an initial stage in the development of the museum's web site, or as a component of other multimedia and technological initiatives undertaken by the museum. The relative costs and benefits of each strategy are likely to change with time.

5. The following checklist of critical success factors should be considered by any museum planning to develop a CD-ROM in partnership with another organization.

Critical Success Factors in Working with Partners

- Take time to research potential partners prior to selecting one.
- Conduct reference checks with regard to all partners' technical and business successes in similar ventures.
- Be prepared to take the lead in managing your relationship with partners.
- Start with clearly defined goals and objectives for each party.
- Make sure you understand the risks and rewards inherent in different types of revenue sharing arrangements.
- Take your revenues from gross rather than net sales if possible.
- Design a system using a share of gross revenue model to ensure you obtain the revenue to which your institution is entitled if the partner does not recover its costs.
- Ensure you have a proper auditing mechanism to obtain agreement on revenue sharing calculations.
- Obtain qualified legal advice in developing a contract with partners.
- Review the Canadian Heritage Information Network publication entitled *Sample CD-ROM Licensing Agreement for Museums: Canadian Common Law Edition, 1997* (or *Quebec Civil Law Edition*) as a possible model for your agreement.
- Assign a value to the artifacts and their digitized images.

- Consider the associated rights in your collections when negotiating with private sector partners.
- Ensure that ownership of the multimedia product, related products and the rights are clarified and incorporated into the agreement, including the rights to use digitized images.
- Clarify which party holds the rights to use any spin-off technologies, products or intellectual property.
- If partners are in a subcontractor role, ensure deliverables are specified to your satisfaction.
- Retain control over the content and the use of museum branding at all stages.
- Ensure that you communicate regularly with your partners at all stages.
- Ensure that senior management in the management company is committed to your venture.
- Develop a project management system to which you and partners adhere.

Critical Success Factors for Project Conception, Development and Production

- Be as clear as possible in defining the objectives of the project at the outset.
- Be aware that the level of complexity and the costs increase considerably with the addition of multimedia elements such as video and sound clips.
- Develop a clear business case and convert it to a brief (6- to 12-page) business plan.
- Share your business plan with the other partners and revise it as necessary.
- Design a mechanism to retain the rights to any new material developed.
- Review the literature on the current costs of developing interactive multimedia (see Bibliography).
- Ensure that the product is appropriate to the technology platform most commonly used in the market.

- Consider purchasing high quality production equipment if resources allow it, since the equipment can reduce the development time significantly.
- Develop a project management plan that includes a Gantt chart and use it to monitor your progress over time and against your budget.
- Consider the use of a more detailed project plan on longer projects. This type of plan includes:
 - a statement of project requirements
 - a work breakdown structure (WBS)
 - a schedule of key milestones and activity duration for each work element
 - time-phased resource-loaded cost estimates for each element
 - descriptions of all outputs and deliverables

Critical Success Factors for Marketing, Distribution and Sales

- Develop a marketing plan as part of your business plan.
- Be as clear as possible in defining the target market and in positioning your product in that market.
- Develop a clear statement of the opportunity, outlining why your CD-ROM is necessary in the marketplace, or what needs you will fulfill with it.
- Describe the unique features and benefits of your product.
- Determine whether there may be opportunities to develop new types of products by working with other museums or other types of partners.
- Consider how you might extend the product life by the addition of follow-up version, product enhancements, or hybrid linkages to the Internet.
- Visualize your collection as an asset that can be managed and leveraged through the CD-ROM.
- Define the target market and key market segments for your products.

- Consider using brainstorming or focus groups of potential consumers at key points in the development process to test the concept or prototype, particularly when targeting the educational market.
- Research curricula when marketing to the educational market and design your product to enhance curriculum content.
- Include teaching guides such as lesson plans and tests in the CD-ROM product developed for the education market to determine absorption rates, etc.
- Consider using a hyperlink to an Internet site to keep the content and the teaching guides current and to provide a mechanism to obtain consumer feedback.
- Consider working with various educational publishers to penetrate the education market if appropriate.
- Conduct reference checks on possible marketing partners to determine their ability to conduct similar work.
- If the project has an Internet component, determine who will manage it and how it will be financed.
- Define the normal marketing channels and the possible untapped channels.
- Determine whether the use of the Internet or catalogue sales can help you market your product.
- Consider adding game features to your product to give it more appeal to the home segment.
- Leverage the resources of the other partners in your communications and marketing programs.
- Conduct a break-even or return on investment (ROI) analysis for different price points and volumes, and incorporate it into your business plan.
- Conduct a sensitivity analysis by changing the critical variables by 10% and determine the impacts on your bottom line to isolate the critical variables.
- Clarify and define how after-sales support, customer service and replacements will be handled.

1. Background and Introduction

1.1 Why Museums Produce CD-ROMs

In recent years, museums throughout Canada have been active in developing CD-ROMs for a variety of purposes. The CD-ROM is potentially a powerful interactive tool that can serve the museum's mandate and objectives in a number of ways:

- **Curatorial and Research** — From a curatorial perspective, the documentation of a museum's artifacts on CD-ROM provides other researchers and audiences with a way to find information easily about important artifacts in the museum's collection. At its most basic level, the CD-ROM can provide a means of cataloguing collections or developing an easily accessible database as an alternative to developing print catalogues. Digitization also provides a long term compact product which can be an invaluable reference and research tool.
- **Educational** — From an educational perspective, the CD-ROM provides a vehicle for museums to reach educational and home markets, across Canada and internationally. Many CD-ROMs are being developed specifically for the educational market. A large amount of literature is available now that points to the efficacy of computer-based learning relative to traditional methods.¹ Some French Immersion schools have even adopted CD-ROMs produced by Quebec museums as learning tools.
- **Canadian Content** — Most institutions have mandates that promote Canadian culture or regional culture within a Canadian context. The development of some CD-ROMs with distinctly Canadian or regional themes is perceived to be valuable for its own sake, as well as to develop much-needed Canadian content for educational purposes.
- **Outreach** — Museums are likely to view the CD-ROM as a way to achieve outreach objectives – most institutions have outreach related objectives in their mandates and view audiences, students and

¹ Industry Canada's *Study on New Media Learning Materials* showed multimedia learning applications produced cost savings potentially of 30:1 and reduced the time required for training by up to 50 percent.

researchers as being beyond the local community including provincial, national or international in scope. As younger audiences are comfortable with computer technology, the development of an interactive product may help to attract these audiences. ‘Outreach’ could suggest more than overcoming traditional geographic barriers.

- **Tourism and Economic Development** — Some institutions have developed CD-ROMs, in part, to support broader government objectives such as promotion of tourism and economic development. Clearly, museums are an important part of a region’s cultural tourism infrastructure, and the production of a CD-ROM may strengthen the infrastructure and underline the museum’s role in cultural tourism.
- **Technology, Exhibit Interpretation and Hybrid Uses** — Investment in the digitization of a collection provides the museum with the ability to support other hybrid technology products, such as digital catalogues, exhibition interpretation technologies, Internet-based content, and future products which may emerge, such as digital video disc technologies. Museums are interested in the use of new technologies as a way to enhance and interpret the visitor experience. Several CD-ROMs reviewed in this study evolved from exhibit interpretation technology.
- **Technology and the Information Highway** — Some institutions view themselves as playing a key role in the information highway and have received funding to this end. They have made investments in CD-ROMs and related technologies to support this objective.
- **Entertainment** — It is not clear how many museums consciously or explicitly seek to ‘entertain’ as part of their mandates, lest this objective seem less noble (or fundable) than loftier educational ones. However, the CD-ROM provides an opportunity to entertain through effective mediation of good stories and an engrossing multimedia experience.
- **Financial Return** — Museums are rich in content, but poor in earned revenue. The museum can view the CD-ROM as a means of generating additional income from the museum's collections and thus leveraging its asset base.

To date, Canadian museums have developed approximately 40 CD-ROMs and hybrid products. The scope, amount of information, level of interactivity, degree of complexity, and overall costs vary widely.

1.2 Objectives

Museums are likely to view their CD-ROMs as successful from a curatorial, educational or technical point of view. However, it is less clear to what extent CD-ROMs have been successful at generating revenues or an ROI for each institution, and to what degree this was envisioned by each institution when it decided to develop a CD-ROM. CD-ROMs are potentially very expensive to develop and it is not clear, given their costs, that museums can achieve an ROI.

There is a high level of interest in CD-ROM development in the museum community, especially interest in their perceived revenue generation potential. This study responds to this interest. The purpose of this project is to develop a profile of the best practices in CD-ROM production and to form recommendations for Canadian museums entering the CD-ROM market. Specific objectives include:

- to profile the practices of Canadian museums and CD-ROMs in terms of their markets and sales, price points, distribution and marketing, and development and production
- to provide an overview of the museum CD-ROM market

The intention of our research was to focus on the business case of CD-ROM production, rather than on the technical, design or museological aspects. This study addresses the potential for an ROI for those museums that are interested in producing CD-ROMs. It also presents the rationale of institutions that have elected not to produce CD-ROMs.

1.3 Study Methodology

The study methodology included the following elements:

- **Interviews with institutions and production partners** — The main component of the research was a series of interviews with key individuals responsible for the production of CD-ROMs at Canadian museums. The museums were selected in collaboration with CHIN staff who made the initial contact. Generally, at least one interview was conducted with a staff member involved in the CD-ROM

production at each institution. This information was supplemented by interviews with key multimedia partners. The selected museums were CHIN members who provided examples of the different types of CD-ROMs that have been produced. One organization, the Royal Ontario Museum (ROM), was interviewed to provide a perspective from an institution that, to date, has made a conscious decision not to engage in CD-ROM production. The Oregon Museum of Science and Industry (OMSI) was also interviewed to provide a US perspective. Individuals in the Smithsonian familiar with CD-ROM production were interviewed to provide general information. The institutions that were interviewed are as follows:

- Alexander Graham Bell Museum
- Canadian Museum of Civilization
- Dawson City Museum
- McMichael Canadian Collection
- Musée David Stewart
- Oregon Museum of Science and Industry
- Royal Ontario Museum

- **Data Compilation on the CD-ROM Market** — We undertook a number of initiatives to obtain additional information on the CD-ROM market in Canada and the US. One of these initiatives was the administration of a brief questionnaire to some museums in Canada. These museums had produced CD-ROMs but were not interviewed for this study. The purpose of the questionnaires was to obtain additional data on costs, revenues and the number of units distributed. Three questionnaires were returned, and the data from these questionnaires was used to supplement data from the interviews. Additionally, we performed secondary research and conducted a limited number of interviews with individuals knowledgeable about the CD-ROM market in Canada and the US.

The research was conducted between October 1997 and March 1998.

1.4 Caveats and Limitations of the Analysis

The analysis is based mainly on a set of interviews with staff at museums who had been involved in CD-ROM production. It is interesting to note that the staff responsible for having produced CD-

ROMs in the past often had limited knowledge of the CD-ROM project finances. The staff often had a good sense of the costs associated with CD-ROM development but had little knowledge of sales, which are usually the responsibility of other partners. In some cases, these staff members were reluctant to share information about CD-ROMs that are currently under development. Also, commercial partners tended to withhold their sales or financial information. We did not have access to detailed financial statements or financial summaries that outlined the economics of CD-ROM production and distribution.

Our analysis mainly focused on business issues rather than technical ones, although business success is more likely if the product is technically sound and of high quality.

2. Overview of the Market

The following is a compilation of data from various sources on each of the US and Canadian markets for CD-ROMs. The following section focuses more on the US market than on the Canadian one. We have included an emphasis on the US market for the following reasons:

- Many respondents who were interviewed, as well as Canadian studies on multimedia, indicated that it is necessary to achieve US and/or international distribution if the CD-ROM is to be successful, particularly for more expensive CD-ROM products.
- The focus of the US data is on the children's educational CD-ROM market. Respondents tended to view CD-ROMs produced by Canadian museums as targeting this market segment, rather than the home entertainment segment.
- There is more published data outlining the size and trends in the US market for CD-ROM production than for the Canadian market. However, the US data may be useful in estimating Canadian market trends.
- The detailed data in the following section will help to provide valuable background information and context for institutions planning to produce and market a CD-ROM.

2.1 US

The following data presents an overview of the educational and home CD-ROM market in the US. The figures in this section are in US dollars.

- Home and school sales of children's educational software, including diskettes and CD-ROMs, totaled almost \$2 billion in 1997 (Find/SVP).
- For 1997, the home market sales of children's educational CD-ROMs is estimated at \$1.2 billion. The home market represented over \$1 billion and the school market accounted for approximately \$120 million (based on Find/SVP studies). (The majority of the school market, \$840 million, is 'floppy' software). The term 'educational CD-ROM' is used in its broadest sense and includes

games and entertainment (or 'edutainment'), as well as its traditional educational meaning.

- The numbers of CD-ROMs sold represent about 60 to 75 million units annually in the US.
- The home market for children's CD-ROMs will be approximately \$2 billion and the school market approximately \$300 million by the year 2000 (Find/SVP).

Home Market

- Packaged educational software for the home market, which includes diskettes and CD-ROMs, is almost \$1 billion (Find/SVP).
- In 1997, 38% of American households had PCs (SPA).
- In 1997, 27% of US households with children between the ages of 12 and 17 owned computers (Find/SVP).
- In 1997, 12.5% of US adults owned a CD-ROM drive (Find/SVP).
- In 1997, the number of installed computer-based CD-ROM drives was 67 million worldwide (Freeman Associates).
- The number of CD-ROM disks purchased per household with a CD-ROM drive computer in the US is approximately 6 per year (Foreign Affairs and International Trade, based on other sources).

Educational Market

- The sales of floppy software to schools totaled \$840 million in 1997 (Find/SVP).
- Integrated learning systems and packaged software in schools (CD-ROM) is estimated to be \$120 million in 1997 (Find/SVP).
- The installed base of computers in K-12 education in the US ranges from 5 to 7 million units (SPA, based on several sources).
- The typical school spent approximately \$91 per student on technology in the 1996/97 school year. This estimate includes \$57 for hardware and \$5.50 for software (Quality Education Data).
- The US ratio of students per computer is approximately 10:1. The student to multimedia computer ratio is 35:1 (National Center for Education Statistics, QED, Market Data Retrieval).

- School districts are 62% likely to purchase instructional software from consumer catalogues and directly from the publisher. Only 57% are likely to purchase instructional software from school software catalogues (QED).
- In US K-12 schools, 54% to 86% of schools own one or more computers with a CD-ROM drive. Multimedia computers represent 17% of the installed base (QED, CCA Consulting Inc.).
- An estimated 50% of schools have Internet access. Only 9% of instructional rooms have Internet access (NCE).
- A bestseller in the CD-ROM business sells approximately 50 000 units (FAIT, based on other sources).
- The average product life cycle for a game is 12 to 16 weeks; for educational or entertainment titles, 2 to 3 years (FAIT, based on other sources).

The US market is a large one with reasonably solid growth. The market in the US has matured faster than in Canada and the distribution channel structures are different. A large amount of CD-ROM and software (41% in the US) is sold through specialized software stores and computer specialty stores that also sell office products. Games are one of the biggest segments outside business products.

Market for CD-ROMs Produced by Museums

Interviews with museums in the US and a US multimedia publisher suggest that:

- The market for CD-ROM products produced by museums is estimated to be less than 1% of the market for US CD-ROM products. This represents approximately \$10 million for 1997.
- Most publishers have not made profit on CD-ROMs produced by museums.
- Profitability of CD-ROMs to publishers will vary depending on the nature of the product. Generally, a publisher can expect a 'decent title' to sell 10 000 to 15 000 units, with 20 000 sales or more providing more profits. Despite ROIs, the publisher of the Smithsonian's CD-ROMs has not made money with this volume of sales.

- Large institutions such as the Smithsonian Institute were interested in CD-ROM production some years ago, but current emphasis is more on the use of the Internet to support technological initiatives.

2.2 Canada

The following is a compilation of data from Canadian museums distributing CD-ROMs, based on our interviews and surveys of industry participants.

- Canadian museums have produced approximately 40 CD-ROMs to date. These CD-ROMs include a small number of 'portfolio' CD-ROMs, which are primarily static images and text.
- Canadian museums have distributed an estimated 80 000 CD-ROMs.
- Assuming an average retail price of \$35 to \$40, the end users have purchased approximately \$3 million of museum-produced CD-ROMs since the first CD-ROM was released. This translates into sales of roughly \$500 000 to \$1 million per year over the last three years to the home and school segments of the market. The museums, which typically obtain a share of the wholesale price, could have received approximately \$500 000 from the above market since inception. This figure is considerably less than the expenditures of CD-ROM development for museums.
- Whereas most CD-ROMs are sold to the home segment, our interviews indicated that the main market for distribution of museum-produced CD-ROMs is the educational market. According to Micro-Intel, approximately 65% to 70% of museum-produced CD-ROMs are sold to schools.
- There are approximately 16 500 elementary and secondary schools in Canada.
- Canada's K-12 enrolment is 5.3 million students, approximately one-tenth the size of the US market.
- An average CD-ROM produced by a museum sells about 3 500 units. A strong Canadian title will sell approximately 15 000 to 20 000 units (which compares to 5 000 to 7 000 titles in 1995-96).

- McLelland & Stewart indicates that its Canadian encyclopedia CD-ROM, which retails at approximately \$69.95, sold 150 000 units — a bestseller by Canadian and international standards.

3. Profile of Museum CD-ROMs Produced

This section presents an overview of the costs and generated revenues of the CD-ROMs produced by the museums in this study. This section also includes a discussion of a museum's ability to meet financial objectives.

3.1 Overview of CD-ROMs Developed

The following is a brief profile of the institutions we interviewed and the CD-ROMs discussed in this project. Because our primary goal is to focus on the business issues of CD-ROM production, we first present a brief overview of the CD-ROM and discuss the multimedia partners who may be involved in the project. An examination of the costs and revenues of the CD-ROM project follows. At the end of this section, we outline the perspective and rationale of the ROM, which has not developed a commercial CD-ROM product.

***Alexander Graham Bell* — Alexander Graham Bell Museum**

This CD-ROM was produced and developed by Fitzgerald Studio with the involvement of the AGB Museum in Baddeck, NS. The initiative was largely that of Fitzgerald Studio, which approached the museum with the idea for the project. The museum had limited staff time to commit to the project. Its involvement focused on reviewing the content and the layout for accuracy, and providing editorial content where appropriate. The Bell family's approval of the project was required before the project could begin. The developer periodically presented the material to the descendants of the Bell family to keep them informed of the progress of the project. The CD-ROM features clips of interviews with a descendent of Alexander Graham Bell, and the Bell family was involved in the press conference when the product was released.

The museum's commitment was approximately four person-months of time, which was spread over a longer time period. The project began in the autumn of 1995 and the CD-ROM was released in June of 1996. The developer's costs are estimated at \$300 000. The product has had estimated sales of \$400 000. Bell Canada's

purchase of 12 000 copies, which essentially financed the product development, is included in this figure.

The museum is entitled to five percent of net revenue¹ from the project, but it has not yet received any payment. The question of who retains the rights to the digitized photographic images produced as part of the CD-ROM is not clear since the rights were not clarified in the Agreement. The Library of Congress in Washington retains the original photographs, which are in the public domain. The developer performed digitization of the images.

***Klondike Gold* — Dawson City Museum**

The Dawson City Museum originally wanted to create a multimedia presentation as part of its traveling exhibition. It approached Hyperborian Productions in Whitehorse to produce the CD-ROM on its behalf. Hyperborian worked on the project with DNA Multimedia in Vancouver. The CD-ROM product evolved from the CD-ROM kiosk component of the traveling exhibition.

The project involved approximately 1 000 hours of the Chief Curator's time, and cost the museum approximately \$180 000 in addition to the time value. The museum's costs were offset by grants of approximately \$140 000 from the Yukon Government Economic Development Agreement and other granting agencies. The Yukon Government provided the funds because it viewed the project as supporting tourism and economic development initiatives.

To date, approximately 1 200 copies have been sold. The museum is entitled to royalties of ten percent of gross revenues, less the replication and packaging costs, which average about seven dollars per unit.

RJN and DNA produced this CD-ROM on the museum's behalf. The agreement between the museum and its partners stipulates that the museum owns and has copyrighted the multimedia program, including its images and text. Operating under the terms of its license, RJN and DNA are joint owners of the commercial product.

¹ Net revenue is defined as all gross revenue less any commissions, sales discounts, shipping, manufacturing, distribution, technical enhancements, technical support, warranties, interests and/or repayment amounts applicable to the development and production costs of the *Alexander Graham Bell* CD-ROM.

The museum reserves the rights in and to the kiosk materials and images, including the right to use the images in any future work.

***Pocket Museum, Stampville and Inuit* — Canadian Museum of Civilization**

The development of CD-ROMs by CMC is a result of two strategies:

- a mandate to disseminate knowledge
- participation in the overall Canadian Government strategy to become a world leader in the development of content for the Information Highway

To achieve these goals CMC has made electronic outreach one of its top two priorities. CMC has received significant funding from the Federal Government for this purpose. In addition, CMC has devoted substantial funds from its own resources.¹

The CMC has produced ten CD-ROMs to date and a new one is in development. We have focused on CMC's experience with three of its most recently produced CD-ROMs. As with many other museums interviewed, CMC typically works with a large number of partners on any project, including developers, publishers, distributors, granting agencies, and others. CMC partnered with Canada Post for *Stampville* and with Ediroam for *Inuit*. The main multimedia partner for *Pocket Museum* was Public Technologies Multimedia (PTM), as well as Videotron. Videotron committed funds for the development of a web site in connection with the CD-ROM. The resulting product is a 'hybrid' CD-ROM, which allows interaction between the CD-ROM and the web site.

Each of the three CD-ROMs incurred similar costs. The CMC estimates that the cost of production for each CD-ROM is \$350 000. This figure includes approximately \$125 000 each from the CMC and the developer, and approximately \$100 000 of CMC staff time value. Marketing and promotion costs to CMC are approximately an additional \$25 000. This figure must be combined with the cost of the marketing actions undertaken by the other partners. It takes about two to three years for CMC to complete a CD-ROM project.

¹ For this reason, this section on the CMC's experience is somewhat more developed than for the other museums.

These costs have been offset to some extent by grants to the multimedia partners from agencies such as the Canadian Studies and Multicultural Directorates of the Department of Canadian Heritage. Approximately 2 000 copies of *Pocket Museum* have been sold to date (only the French version has been released thus far), and CMC is targeting sales of approximately 10 000. CMC and PTM will share the revenues in a 50:50 arrangement after CMC has recovered the first \$100 000. The CMC receives all revenues from sales up to the first \$100 000.

Typically, the wholesale price varies between 30% to 50% of the retail price. Assuming a wholesale price at 40% of retail (\$39.96), the CMC's revenues are approximately 20% of the retail price, or \$8 per unit. Assuming CMC's costs are \$275 000, it will be necessary to sell approximately 34 000 units to achieve an ROI.

Inuit will be released shortly, and, according to the CMC, international buyers have indicated a strong interest in the product. As well, a book on Inuit life recently sold 50 000 copies, which indicates a good demand in the marketplace. The CMC will share the revenues for this project on a 50:50 basis with Edirom.

Stampville has been financed differently from other CD-ROMs produced by CMC. Canada Post agreed to a one-time purchase of 15 000 units from CMC. This sale financed the production costs. *Stampville* is the only CD-ROM produced by CMC that has recovered its costs to date. However, CMC believes that the market is now maturing, since schools are rapidly becoming equipped with multimedia computers. It therefore believes a market is growing for CD-ROM products that have been developed in the past, and unlike other goods, educational CD-ROMs will have a shelf life of many years. Therefore, CMC is convinced that it can recover its investment in the future.

***Jacques Cartier, Balloon Age and New World* — Musée David Stewart**

Jacques Cartier and *Balloon Age* are two CD-ROMs produced by Musée David Stewart in association with Micro-Intel of Montreal. In 1992, *Jacques Cartier* was one of the earliest CD-ROMs produced. The project evolved from the multimedia component of an interactive station at an exhibition commemorating the 250th

anniversary of Montreal. As an early CD-ROM, *Jacques Cartier* has some audio components, but no moving images. Its simplicity reflects the multimedia capabilities at that time.

The product was created quickly by current standards and involved about \$4 000 of staff time, excluding the Director's time. A grant from the Museums Assistance Program of the Department of Canadian Heritage (DCH) added \$20 000 to the project. Micro-Intel, the multimedia partner, committed \$20 000 towards production. The total project, including staff time, was therefore approximately \$45 000. Since Musée David Stewart received a grant from DCH to finance its initial costs, and because it did not include the value of staff time in its assessment, it views the *Jacques Cartier* CD-ROM as an ROI proposition. Any additional revenues are profit.

The multimedia partner has indicated that 15,000 units have been sold, at the suggested retail price of \$29.95. According to the revenue sharing formula of their five-year contract, Musée David Stewart is entitled to 17 percent of gross sales from distribution. The Stewart Museum retains the right for all the images it provided, including the narration for which international rights were acquired from the narrator.

Musée David Stewart has also produced the CD-ROM *Balloon Age*. The CD-ROM was developed in association with the National Museum of Science and Technology, the Musée de l'Air et de l'Espace du Bourget in France, and Micro-Intel. The financing of the project was through a grant from Department of Canadian Heritage, which offset all but approximately \$15 000 of staff time value. The Stewart Museum estimates that the gross costs of production were close to \$100 000 for all partners.¹ The product has had a total of 1 500 units distributed at a retail price of approximately \$50US. The two museums share thirty percent of the gross income (fifteen percent to each partner) while the multimedia partner and the distributor share the remaining seventy percent. Micro-Intel acquired the reproduction rights for the *Balloon Age* images that the Stewart Museum provided.

The co-production contract between the museum and Micro-Intel refers to a percentage (i.e. 15%) of the suggested retail price. Yet there is a discrepancy between the contract and the formula currently

¹ NMST believes the cost to be considerably higher (approximately \$300,000).

being used to pay royalties to the museum. The Stewart Museum maintains that the revenue sharing formula is based on a percentage of retail sales prices. Under this formula, the Stewart Museum should have received approximately \$50 000 or more from the sales of *Jacques Cartier* and *Balloon Age*, depending on their retail prices. The Stewart Museum is currently receiving approximately \$500 per year from the sales of the two CD-ROMs. The museum has not raised the issue of additional royalty payments with its commercial partners. The corporate restructuring of the developer and the distributor may have affected the sales and, thus, the royalty payments.

***ARTIFICE* — McMichael Canadian Art Collection**

The McMichael Canadian Art Collection is in the development stages of a multimedia project, *Archeological Research Terminal for Independent Cultural Explorations (ARTIFICE)*. The philosophy governing the project is to develop dynamic cultural content across multiple mediums (CD-ROM, Internet, TV, print, film, etc.). The project involves a series of product lines. The project is a partnership between McMichael, Digital Renaissance and the York Region District School Board. Other partners include the CBC who is providing archival material, various Canadian artists and producers who allowed their work to be featured, and almost 30 museums, galleries and cultural organizations¹ who are providing images and content for the project.

The *ARTIFICE* CD-ROM is an interactive learning tool and resource that presents Canadian art and artists within the broader Canadian historical context. Using artwork, photography, video, text and animation, the tool allows the user to experience time travel through Canada's provinces, experiencing the relationships between art, society and history.

Phase 1, now completed, was the development of a CD-ROM prototype in association with Digital Renaissance and the York Region District School Board. Phase 2, commissioned by Bell, will develop content for a broadband trial which will focus on the home market using Bell's high speed network trials. The next step, Phase 3, will involve the research and development of an on-line hybrid CD-ROM with supplementary materials (teacher and student

¹ See Appendix B, *ARTIFICE* Associate Partners for a complete list.

guides). This CD-ROM will be released to schools, libraries and homes using a national rollout.

A multimedia project team that meets every two weeks is coordinating the *ARTIFICE* project. The team is currently negotiating with both commercial and educational publishers.

The budget for phases 1 and 2 is approximately \$300 000. McMichael has committed approximately \$50 000 from their federal and provincial funding for the digitization of its collections. Bell Canada, a minority owner of Digital Renaissance, has agreed to commit \$250 000 to fund the development of Phase 2. In return for funding the research and development costs, Bell will own the material that is developed for use on its broadband network for a period of three years.

The anticipated investment for Phase 3, which McMichael expects to complete in 1999, is approximately \$1 million.

A revenue sharing formula is being discussed in draft form. The formula will divide the revenues between McMichael, Digital Renaissance and the York Region District School Board. In principle, the revenue sharing formula reflects the investment of time and resources of each of the parties involved. The time contributed by each of the three main partners will be monitored on an ongoing basis as part of the agreement. The partnership also owns the rights to any digitized images that are produced as part of the project.

***Dinosaur Safari* — Oregon Museum of Science and Industry**

OMSI was approached by the Creative Multimedia (CM) Corporation, a multimedia publishing company. CM commissioned OMSI to develop a CD-ROM product in 1992. At that time, OMSI staff had developed some basic interactive material on dinosaurs and Creative Multimedia was interested in producing a high quality CD-ROM product to coincide with the release of the movie, *Jurassic Park*. In 1992, *Dinosaur Safari* was considered highly innovative and interactive, involving simulations and a variety of games.

The museum was initially commissioned by CM to develop the *Dinosaur Safari* CD-ROM for approximately \$125 000US. The developer contributed an additional \$15 000 near the end of the project. OMSI committed approximately \$30 000US of its own

funds to the project, which was more than the original project budget estimated. The project involved a considerable investment of time for the museum. Four staff members worked overtime for 18 months. Because the staff was not paid for their overtime work, OMSI invested six person years to the project. OMSI's estimated budget for the production of the CD-ROM is approximately \$175 000.

The royalty agreement with Creative Multimedia entitled OMSI and its production team to 15% of net revenues. OMSI received a 10% share. The lead designer at OMSI who originated the project received five percent of royalties, and he in turn gave 0.5 percent of his share to the graphic artist who worked on the project. To date, OMSI has received approximately \$80 000 to \$100 000 in royalty payments. The detailed project budget is difficult to reconstruct because most of the key staff members involved are no longer with the institution. However, OMSI staff members believe that the project made a modest profit once royalty income is included and given there was a considerable investment of unpaid time, or 'sweat equity,' by museum staff. It is likely that the profits would have been insignificant if the museum had paid overtime to the staff who worked on the project.

It is interesting to note that in budgeting the staff time, OMSI charged the developer 30% of the total budget to cover project overhead, or indirect costs. This is a common practice for OMSI.

There were spin-off benefits to OMSI's involvement in the CD-ROM production. According to staff familiar with the project, the museum received excellent computer equipment to carry out the project. However, these staff members do not believe that full potential spin-off benefits were reaped by the institution, although OMSI's name did appear on the CD-ROM package. For example, the museum and the developer could have worked more closely to support each other's marketing efforts and to develop spin-off or follow-up products. Due to financial pressures and a flood that damaged the institution, OMSI went through a difficult period financially. As a result, institutional priorities focused more on financial stability than on further investment in the *Dinosaur Safari* project.

Dinosaur Safari is perceived to be somewhat outdated by current standards and the institution no longer receives royalty payments. The product originally carried a retail price of \$60US, but towards

the end of its product life cycle it was bundled with hardware and other CD-ROMs. The product is now listed on the Internet for \$12.99. The product has been converted for use in the Chinese and Japanese markets.

CM owns the rights to the CD-ROM product, while the graphic artist retains the rights to the artwork.

OMSI currently has no plans to release another CD-ROM product. OMSI staff estimates that it would require between \$500 000 and \$1 million to release a second multimedia *Dinosaur Safari* product using current technology. Publishers, reportedly, are not funding the development of multimedia products the way they were some years ago. Most of the OMSI's recent technological efforts have been involved in developing its Internet site.

Royal Ontario Museum

The ROM has developed high quality multimedia on hard drive for exhibit interpretation purposes, but has never developed a CD-ROM for commercial purposes. The ROM maintains that it has not ruled out the production of CD-ROMs, but has not yet been compelled as an institution to become involved in this market. ROM has not developed CD-ROMs for the following reasons:

- Good CD-ROM products are very expensive to produce, and it is difficult to recover expenses of \$100 000 to \$500 000. There are large overhead costs, particularly in obtaining copyright approval and in clearing rights.
- There are very few bestsellers on the market to prove the existence of a valid commercial market for CD-ROMs.
- Although ROM is very interested in outreach through technology, it does not view CD-ROMs as a sound strategy from an institutional perspective. Other technologies, such as the Internet, private networks and high-speed modems, may be equally, if not more, important to their strategy.
- Technology is evolving rapidly, and ROM does not wish to be limited by "today's technological delivery mechanisms." The CD-ROM could be a suspect technology that may lose its popularity, or be susceptible to replacement by other technologies.

- While ROM is not committed to CD-ROM production, it has considerable resources in-house (e.g., storyboard experts, programmers, writers, translators, video editors, etc.) to develop related technological products.
- The use of technology to promote outreach objectives is important to the ROM. In the future, the CD-ROM could be a spin-off of other high-quality integrated multimedia interpretation initiatives, rather than simply a stand-alone product.
- The ROM might be interested in CD-ROM production if it was approached by a well-known partner with brand recognition, who was asking the institution to join them in a project.
- Many museum-produced CD-ROMs emerge from an academic mentality that does not pay sufficient attention to key marketing issues, such as the target market, the needs of the market, the packaging and merchandising, the positioning of the CD-ROM if it must penetrate the educational market, etc.
- If the ROM were to become involved in CD-ROM production, it would likely work with knowledgeable outside partners who could offer a better understanding of the market and the distribution issues.

3.2 Meeting Financial Objectives

The main conclusions to our examination of the financial return to museums from CD-ROMs production appear in the following list. First, two terms must be defined for the purposes of the discussion:

- *‘lower order interactive CD-ROMs’* — describes CD-ROMs which are catalogue-style products, using primarily static images and a linear design, with limited user control over content and little to no moving images or simulations. This type of CD-ROM includes ‘portfolio CD-ROMs.’ Typically, the gross production costs of these products is \$40 000 to \$100 000.
- *‘higher order interactive CD-ROMs’* — describes CD-ROMs which include more complex programming, higher levels of interactivity including moving images, extensive branching in their design, high levels of opportunity for user interaction with the software, real time event simulation, animations, hyperlinks, multiple modules, a capability to interface with other output devices, Internet hybrid capability, etc. These products typically cost at least \$200 000.

Our main conclusions are as follows:

- Most CD-ROMs in our study involved multiple partnerships, with a variety of revenue sharing agreements. (Partnerships are addressed in Section 5).
- CD-ROM development costs can be substantial, largely due to the staff time required to develop the materials. Many museums tend to focus on their disbursements in connection with actual development of the CD-ROM, and not all staff time is included.
- Excluding staff time value, two lower order catalogue-style CD-ROMs produced by Musée David Stewart have produced an ROI and even a small surplus to the institution.
- AGB's higher order CD-ROM, *Alexander Graham Bell*, has produced a surplus to the developer because Bell Canada placed a large order and, essentially, financed development costs. The profits to the museum will be modest.
- CMC's higher order CD-ROM, *Stampville* had its development costs covered by Canada Post, who committed to a large one-time purchase. Canada Post has not yet recovered its costs.
- OMSI's CD-ROM, *Dinosaur Safari*, produced a modest profit through its royalty income, which offset a project overrun. The project was financed through an agreement with a multimedia publisher. The museum required considerable unpaid overtime from the staff to complete the project. It is likely that the profit to the museum would have been insignificant if these staff had been paid for their overtime hours.
- According to the terms of their contracts, some museums appear to be entitled to royalty income associated with their CD-ROMs, but have not received payment or have not received their full due.

In conclusion, it is possible to generate revenues from the development and sale of CD-ROMs. However, many institutions have not recovered their costs. Generally, CD-ROMS are expensive to produce and revenues have been received through grants, or from a corporate partner who agreed to fund CD-ROM development in return for access to the finished product

4. Achievement of Museological Objectives

Generally, all respondents and partners took pride in the quality of the CD-ROMs that they had produced, and believed that these products had met their museological objectives. Several products have won awards and received favourable reviews and media coverage. As expressed by one respondent concerning the museum's relationship with their multimedia partner: "There must be a level of trust. The underlying philosophy must always be at the forefront. The CD-ROM must be an excellent product." Museological objectives vary depending on the interests and mandate of each institution. The following includes several observations on the achievement of specific museum objectives:

- Some museums which had produced lower order interactive CD-ROMs viewed these CD-ROMs mainly as an alternative to a print catalogue of an exhibition. As such, the CD-ROM was somewhat more expensive than a print catalogue. However, its product life is longer, and it occupies less space. In the museum's view, old print catalogues occupy more space and are almost worthless, whereas the CD-ROM appears to have residual market value.
- The museums perceive most CD-ROMs as having a high value as educational material. Some CD-ROMs were designed as instructional learning systems that provide teachers with curriculum and lesson plans. Most institutions indicated that there is a deficiency of good educational material available on CD-ROM, particularly with Canadian content.
- Museums view the higher order interactive CD-ROM product as a way of meeting more intangible outreach objectives by providing institutional profile, or providing a means of digitizing a collection for reference purposes.
- Most museums do not believe the CD-ROM or Internet technology has raised the profile of their museum to the extent that it has increased visiting or attendance revenues.

It is interesting to note that the museums respected their multimedia partners and experienced relatively good relations with them. Museums emphasized the importance of a shared vision with their partners in terms of the project objectives and quality of the product. Undoubtedly, the objectives of each party are likely to differ somewhat. For example, the museological and curatorial orientation

of the museum is likely to be somewhat different than the objectives of the developer, who may be more interested in ensuring the product meets a market need and provides a return on investment. However, a healthy creative tension between the museum and the developer can lead to the development of a better quality product, without compromising the objectives of either the museum or its partners.

Canadian multimedia developers appear to appreciate this difference in museological and commercial perspectives. One Canadian commercial developer interviewed indicated that it does not view the CD-ROMs it has produced with museums as having significant commercial potential. In this case, the developer was more interested in the project as a way to showcase the firm's expertise in developing multimedia products. Yet, in our view, several small Canadian multimedia firms appear to have used their museum experience to help establish credibility in the marketplace. This arrangement has subsequently led to the growth of their business into more commercially attractive areas.

According to a multimedia producer at the Smithsonian, the museum's objectives do not always merge with the developer's objectives and, occasionally, the museum has had to terminate the relationship. The following is a synopsis of this respondent's views:

- Generally, there is a tension between the museological objectives and the commercial objectives.
- The curatorial mentality is more academic and oriented towards research, and long time frames are not unusual. These values may conflict with those of the commercial developer who is more interested in producing good product for the market and a financial return within a shorter time frame.

5. Partnership Arrangements

5.1 Overview of Practices

Partnership structures tend to vary widely, but there are few common patterns. All institutions interviewed and all except one of those that responded to the survey had used various types of partnership arrangements. Possible partners and their roles in the project can include the following:

Partner	Responsibility
Producer	Overall production and content
Developer	Integration of content with software; usually a specialized multimedia company or companies
Publisher	Manufacturing and packaging
Distributor	Distribution of the final product
Sponsor	Financial sponsorship

- In addition to the above, many others may become involved in a production, although they may be subcontractors instead of partners. For example, researchers, actors or writers may be contracted to contribute to the content development. Depending on the content and the parties involved, other groups may become logical partners or involved in the process. For example, the Bell family descendants reviewed material for *Alexander Graham Bell* and one descendent was featured in clips in the production.
- Generally, the term ‘partner’ suggests some sharing of equity, risk or revenue in the project. Museums may view multimedia companies as co-producers and/or co-developers, depending on the role the institution adopts. The roles can overlap. Some producers are also developers and publishers.
- Revenue sharing formulae will usually reflect the degree of involvement, equity and risk sharing among the partners.
- Partners may be involved at several levels in return for product or a share of the revenues, by contributing to content development or production, or by offering financial help.
- In the case of the *ARTIFICE* project, the York Board of Education is a partner that is contributing to content development and is likely to be a user of the final product.

Role of the Museum

In most of the cases examined, the museum's role was concerned largely with production and development. Publishing and distribution were always handled by outside suppliers, many of which were known to the multimedia company. The use of publishers and distributors is addressed in Section 7.

The museum or the commercial partner can assume the leadership role in the project. This section contains a discussion of the advantages and disadvantages — as well as some of the financial risks — associated with various forms of this relationship.

The relationship can assume one of the following forms:

1. Museum as Lead or Executive Producer
2. Multimedia Company as Lead or Executive Producer
3. Museum as Co-Producer or Co-Developer
4. Museum Co-Producing with Other Museums
5. Publisher Initiated and Financed, Museum as Lead Producer

1. Museum as Lead or Executive Producer

In this case, the museum is likely to have originated the idea for the project and has an influential role in all aspects of content development and production.

The advantages and disadvantages of this relationship is as follows:

- **Advantages:** The museum can retain control over all aspects of the production. Potentially, due to the degree of equity retained in the project, the museum can increase its rewards or revenues.
- **Disadvantages:** The museum must invest substantially more time, money and risk.

2. Multimedia Company as Lead or Executive Producer

In this situation, the multimedia company takes the lead in producing and developing the product. The museum assumes a more passive role, which includes monitoring content at key points in the process.

The advantages and disadvantages of this relationship are as follows:

- **Advantages:** The museum invests minimal time and commitment to the project, and the risk is reduced.
- **Disadvantages:** The museum does risk losing control over content development and production. As previously noted, museums have withdrawn from projects in which they found the quality of production and content did not meet their standards.

Quite often, the museum and its partner share the responsibility for production and/or development. While it may seem logical for the museum to retain responsibility for content development, this does not need to be the case. Both parties may suggest ways of organizing or presenting the material, particularly given the ease with which digitization and multimedia lend themselves to new creative possibilities. The responsibility for content development can also become blurred since the developers may originate ideas for the project, which they should review and discuss with the museum.

3. Museum as Co-Producer or Co-Developer

There are many examples of museums that have worked collaboratively with other partners. Sometimes, the partners include other museums. Usually, the co-producer or developer is a multimedia company that is responsible for integrating the content with the software. It is common for the multimedia company to work with other multimedia companies with specialized skills. The multimedia company may commit its own time and resources to a project, in addition to the funds and resources it receives from the museum.

The advantages and disadvantages of this relationship are as follows:

- **Advantages:** The museum and its partners share the risk and the effort. Each partner offers the developed skills and competencies of their field.

- Disadvantages: The project can become more complex and costly with the addition of multiple partners. Effective project management and communications are required throughout the process.

4. Museums Co-Producing with Other Museums

It is also possible for museums to cooperate with other museums in different ways. The CD-ROM *Balloon Age* was a collaboration of three museums: Musée David Stewart, the National Museum of Science and Technology, and le Musée de l'Air et de l'Espace du Bourget, in France. In this example, the French Musée de l'Air sold the rights to its material for approximately \$3 000, and the two Canadian museums are each entitled to a share of revenues.

The advantages and disadvantages of this relationship are as follows:

- Advantages: The risk is shared between the partners.
- Disadvantages: Multiple partnerships are likely to require considerably more time than if the CD-ROM was developed produced totally in-house.

5. Publisher Initiated and Financed, Museum as Lead Producer

This model emerged from the OMSI example, and has been used by publishers working with the Smithsonian on CD-ROM development. In this model, the publisher has the original idea and forms a contract with the museum, who takes the responsibility for developing the product. The publisher advances funds to the museum to develop the product. The museum may retain a share of royalties. Respondents in the US indicate that this process was more common in the early days of CD-ROM development, but is now less common, since publishers have had difficulty earning a return on their investment.

The advantages and disadvantages of this relationship are as follows:

- Advantages: The publisher bears the majority of the financial risk and finances the overall development of the CD-ROM. The museum can retain control over the content, because the museum is developing it.

- Disadvantage: The museum staff must be committed to a project which may not be a high institutional priority for the museum. This risk is compounded if the project takes longer than the initial budget predicted, in which case the museum staff may be subsidizing the publisher's development costs.

Financial Partners

- Canadian museums can seek financial partners from several sources within the public, private and Crown Corporation sectors. While museums are not currently eligible for many grants directly, the production and private sector partners may be able to qualify for some of this funding. The following organizations and agencies have provided grants and contributions to Canadian museums and their partners:
 - Department of Canadian Heritage (Museum Assistance Program)
 - Canada Council (for translation)
 - Telefilm Canada (for production and marketing)
 - Canadian Studies Directorate of the Department of Canadian Heritage
 - Multiculturalism Directorate of the Department of Canadian Heritage
 - Provincial and territorial governments (for economic development and tourism)
- In addition to the above sources, museums have approached the private sector directly for partnership opportunities. For example, Bell Canada was involved with the *Alexander Graham Bell* and *ARTIFICE* CD-ROMs. The Crown Corporation Canada Post helped to finance *Stampville*. Typically, these corporations will fund a portion of development by guaranteeing a large purchase of the CD-ROMs. Their guarantee is in the form of funds that are used for the CD-ROM development. Apart from these examples, there appears to be limited involvement from the private sector in financing the development of CD-ROMs.

Summary

- Many different partnership models have emerged from the cases examined. Each partnership was based on the skills, competencies and assets of each participant. There are advantages and disadvantages associated with different partnership arrangements.
- The addition of partners adds to the skills and resources which can be used in the project. However, the addition of partners can make the project more complicated, more time consuming and therefore more costly. The revenue sharing must be split between the partners and the museum may receive a smaller share. To be successful, the project will require effective project management over the partners, who may have different mandates and objectives.
- In most of the cases examined for this study, the museums assumed a large role in producing and developing the CD-ROM, and committed its own time and resources in return for a share of the revenue.
- The museum may be exposing itself to more risk when it lends its name to a venture which is largely the idea of a commercial developer. In this case, the commercial developer often has the original concept, develops the product. The museum is in a more passive role than if it were responsible for all aspects of production. For this relationship to work, the museum must retain sufficient leverage in order to influence the overall content and quality of the final product.
- The role of the museum in the production of *Alexander Graham Bell* was a passive one, and the commercial supplier took prime responsibility for the project. The museum provided input and editorial content at key points. Despite the risk the museum took in lending its name to the project, the project was successful and the museum is entitled to royalty income from the venture.
- The museum can generate a financial return in both an active or passive role. In any partnership model, it is imperative that the partners work with a shared vision of the final product and communicate with each other on a regular basis. The executive producer must be an effective project manager over the various participants and their activities.
- Many of the partners committed considerably more time and resources to the project than anticipated at the outset. The staff time is the largest component of CD-ROM cost. The partners, particularly the developer, must have a prepared strategy if

development time takes much longer than originally planned. When the museum is the lead developer, the extra time value may be borne by the institution as part of the developer's normal salary, for which the institution may or may have formally budgeted. When the commercial partner is the lead developer and the development budget is fixed, the developer may be unable to recover the extra time value in the event of an overrun. In this case, the commercial developer has two choices: to commit more paid staff time to the project; or, work long hours in order to use as much unpaid time as possible and try to keep to the original project timelines. In either event, the developer's recoverable fees per hours worked drops. The use of an equity arrangement when the partnership agreement is developed appears to provide for the possibility of project overruns without committing additional funds to finance the additional time required. In this case, the additional time needed to complete the project is the risk each partner is prepared to accept up front. In a sense, the risk of additional time is a form of 'sweat equity' which is contributed in return for a share of revenues.

- Some museums are reconsidering their approach to working with private sector partners in order to guarantee increased funding at the outset. The private sector pays the museum royalties for the use of the museum content and for the time the museum contributed in working with them. This approach removes some of the risk from the museum's involvement and provides a better possible return to the museum.
- One museum estimates that the value of each of its images is approximately \$35. For example, a CD-ROM with 1 600 images, the museum contributes assets worth \$56,000 to a CD-ROM with 1 600 images. This formula helps the museum negotiate a contract and justify its 50% of gross revenues with private multimedia partners.
- Museums should use legal assistance in developing and reviewing contracts with partners. Despite goodwill on all sides and the best intentions of all parties, the museum must ensure that its interests are protected. Protected interests become even more critical once the museum considers the rapidly changing laws for multimedia and intellectual property.

5.2 Critical Success Factors in Working with Partners

Several considerations of partnership opportunities are worth emphasizing. These considerations will undoubtedly be necessary to accomplish success with CD-ROM development. As a general comment, it is important for partners to mutually respect one another's skills, to share a vision of the final product and to treat each other in the spirit of fairness, especially since the partner relationships could easily extend for years. The following are several points that emerged from the interviews.

Critical Success Factors in Working with Partners

- Take time to research potential partners prior to selecting one.
- Conduct reference checks with regard to all partners' technical and business successes in similar ventures.
- Be prepared to take the lead in managing your relationship with partners.
- Start with clearly defined goals and objectives for each party.
- Make sure you understand the risks and rewards inherent in different types of revenue sharing arrangements.
- Take your revenues from gross rather than net sales if possible.
- Design a system using a share of gross revenue model to ensure you obtain to revenue to which your institution is entitled, if the partner has not recovered its costs.
- Ensure you have a proper auditing mechanism to obtain agreement on revenue sharing calculations.
- Obtain qualified legal advice in developing a contract with partners.
- Review CHIN's *Sample CD-ROM Licensing Agreement for Museums: Canadian Common Law Edition, 1997*, (or *Quebec Civil Law Edition*) as a possible model in structuring your agreement.
- Assign a value to the artifacts and their digitized images. Consider the associated rights in your collections when negotiating with private sector partners.
- Ensure that ownership of the multimedia product, related products and the rights are clarified and incorporated into the agreement, including the rights to use digitized images.

- Clarify which party holds the rights to use any spin-off technologies, products or intellectual property.
- If partners are in a subcontractor role, ensure deliverables are specified to your satisfaction.
- Retain control over the content and the use of museum branding at all stages.
- Ensure that you communicate regularly with your partners at all stages.
- Ensure that senior management in the management company is committed to your venture.
- Develop a project management system to which you and partners adhere.

6. Project Conception, Development and Production

6.1 Overview of Practices

Generally most institutions interviewed believed that they were relatively competent at understanding the development and production issues of multimedia and CD-ROM. The institutions, together with multimedia partners, have well-developed competencies in this area. Museums emphasized the following issues:

- the importance of defining clear project objectives
- developing the business case and the business plan
- the costs associated with obtaining the right to use certain material
- the need for an effective project manager
- the need to choose a technology platform and design that corresponds to the speed and limitations of your target audience's system capabilities.

Defining Clear Project Objectives

Several institutions interviewed emphasized the importance of being very clear in defining project objectives from the outset. There are several reasons for this:

- Museological and commercial objectives may not always be the same. While this can result in a healthy creative tension, it may also lead to outright conflict.
- The more partners involved, the more important it is to be clear on project objectives and the role which all partners will play in developing the product.
- It is necessary to establish clear goals which are matched both to the needs of the target market as well as to the resources available.
- Generally, museums market to a somewhat ill defined audience. The museum must clearly define its target audience, position its

product and communicate effectively with the audience. While this point more properly belongs in a marketing section, it does have development implications. A lack of clear objectives will make the project more complicated, which in turn will add an enormous amount of time to complete the work.

Developing the Business Case or Business Plan

It will be important for the museum to develop a clear business case and, ideally, a business plan for the project. Business plans can be written in many different formats. A business plan describes:

- the opportunity
- the CD-ROM product concept
- the market
- the financial projections and investment requirements

The advantages of the business plan document are as follows:

- it clearly communicates the business case, including the opportunity and the risks
- it becomes the basis for business planning and budgeting activities
- it serves as an informal level of understanding between the various parties
- it serves as a planning and control document

Most of the museums contacted had developed a budget, but had not developed a very detailed business plan.

Obtaining the Rights to Use Material

One respondent noted that “museums are content rich, but rights poor.” The museum may have large collections, but no rights to use them for multimedia purposes.

The costs of obtaining the rights to use digital images of material can involve substantial time and fees for its use. Museums are now beginning to pay an additional fee for the use of material that they acquire. If a museum wishes to use a paper or digitized photograph, it must pay the artist, photographer or their heirs a royalty as long as

these works are protected by copyright. Similarly, if the institution wishes to use an artifact, it must clear rights with the creator, unless the material is in the public domain. While museums are well aware of copyright issues, it is important to note that the time involved in researching, writing, contacting the creators or their heirs is substantial. What is a fair price to pay for the rights to material is not well established and prices can vary considerably.

In many of our case studies, the material used was in the public domain and therefore the museum did not have to pay for most of the rights for the CD-ROMs that they developed.

Since issues surround the right to use material contained in the museum, it will be important for the museum to determine who owns the rights to the CD-ROM and any derivative products associated with it. In the case of AGB, which assumed a passive role, the rights to use photographs developed for the CD-ROM were never clarified. Usually, the rights remain with the museum or belong to all the development partners.

The Need to Develop Effective Management Systems

The museum is often the lead or executive developer on a project. It will be critical for the museum to develop effective project management systems. This is particularly necessary when the museum is in a subcontractor role, or when the museum is not completely supportive of the project from an institutional perspective, and there is a risk of project overruns. Remember that the total cost of CD-ROM development is at least 80% time value, and one or more of the partners must contribute the time.

Remember also that there can be only one project manager. Many items can greatly affect the time committed to the project. Lack of in-house multimedia expertise and resources, unclear objectives or design strategy, complex subject matter, unfamiliarity with software or multimedia technology, inadequate documentation, unfamiliarity with the target audience or an inexperienced project team are some examples. While it is impossible to anticipate all the problems in advance, effective project management can help to reduce project risk.

The lessons of good project management apply to CD-ROM production. These include the importance of having a clear work plan with well-defined objectives and responsibilities of key players,

and a budget assigned to the individual tasks. A timetable is also essential, so that any given time you can assess the progress of the project and the state of budget.

In our study, several institutions noted that it is easy to expand the scope on multimedia projects and the time committed to the project. The project lends itself easily to creative ideas introduced by the partners. Furthermore, digital add-ons of more complex elements such as videos, simulations, linkages to web sites, etc., can appear relatively easy to do. However, experienced developers maintain that the production of digital add-ons is usually more difficult to achieve than originally thought, and additional time is likely to be incurred to achieve the desired level of quality.

Choosing a Technology Platform and Creating a Design for the Audience's System Capabilities

It is likely that the product will be designed for both PC and Mac applications. It is tempting to design and develop CD-ROMs that are compatible with the current advanced technological capabilities. One museum respondent pointed out that her computer, which is a two-year-old Pentium computer, already cannot handling some currently released CD-ROMs. There are limits to the speed at which computers run, to the amount of memory and space that is required, as well as to the speed of the CD-ROM drive. Remember that your target audience, particularly if it is the school sector, may be using older computers. It is necessary to create a design that considers the speed and limitations of the equipment your target audience is, or will be, using.

6.2 Critical Success Factors for Project Conception, Development and Production

Critical Success Factors for Project Conception, Development and Production

- Be as clear as possible in defining the objectives of the project at the outset.

- Be aware that the level of complexity and the costs increase considerably with the addition of multimedia elements such as video and sound clips.
- Develop a clear business case and convert it to a brief (6- to 12-page) business plan.
- Share your business plan with the other partners and revise it as necessary.
- Design a mechanism to retain the rights to any new material developed.
- Review the literature on the current costs of developing interactive multimedia (see Bibliography).
- Ensure that the product is appropriate to the technology platform most commonly used in the market.
- Consider purchasing high quality production equipment if resources allow it, since the equipment can reduce the development time significantly.
- Develop a project management plan that includes a Gantt chart and use it to monitor your progress over time and against your budget.
- Consider the use of a more detailed project plan on longer projects. This type of plan includes:
 - a statement of project requirements
 - a work breakdown structure
 - a schedule of key milestones and activity duration for each work element
 - time-phased resource loaded cost estimates for each element
 - descriptions of all outputs and deliverables

7. Marketing, Distribution and Sales

7.1 Overview of Practices

In all the cases examined, the commercial partners handled the distribution, marketing and sales, instead of the museum. Often the multimedia partner was responsible for finding publishers, who in turn worked with distributors.

Most museums indicated that they had the most difficulty with marketing issues. The museums often had little idea of the progress of their CD-ROM sales. Interestingly, publishers and distributors also struggle with marketing issues, and all parties learn in the marketplace.

Defining the Target Market

As noted, the importance of defining the target market is critical and this must be done as clearly as possible. The CD-ROM subject must be matched to the target market. The museum should consider this with the following information in mind:

- According to the CMC, which has developed high quality CD-ROM products, the multimedia audience ideally must be an international one, since the Canadian market may be too small for more costly products. The topics should be broad enough to have generic appeal to other countries (e.g., *Inuit*) or specifically designed to fill a niche in the Canadian market (e.g., *Native Images of Canada*, or *Stampville*). The CMC emphasizes the importance of identifying the target market clearly and insists that a general audience does not exist.
- In designing for a French and English audience, it is important to recognize the cultural nuances and context of each market. A good translation is unlikely to be sufficient to develop a market in another language. The cultural context may require a change in the packaging design, the text and the writing style to reflect the cultural differences. For example, French versions are written in a more descriptive style to appeal to the French audience.
- When the museum assesses a possible CD-ROM topic, it should try to determine the answers to certain questions. What are the main assets of its collection? Who is most interested in these collections?

Which specialists are most interested in the collection? Who is writing well about the collections? Who else can add value to the product?

- In developing new CD-ROMs, the museum should develop material around themes which are broadly accessible to other cultures. Such themes include, for example, the basics of life, stories about courtship, marriage, family, animals, etc. It may be necessary to create new images or to purchase the rights to other images if this can improve the final product.
- The *Pocket Museum* is an example in which CMC chose to design for children aged six and above. They wanted to create a product that would allow parents to spend time with their children as they worked with the product. The product development focused on families with young children as the target market, and the product was developed very differently than if, for example, teenagers had been the focus. The same approach to each product and its development will not work if the target markets are different. For example, CMC is developing *Inuit* for an adult audience, and it is marketing this CD-ROM differently than it marketed *Pocket Museum*.
- Most museums interviewed believed that their products had the most appeal to the educational segment of the market, and not to the home segment. Some had designed lesson plans and instructional aids for the CD-ROM product to make the product more attractive to the educational market. Some had conducted focus groups and brainstorming sessions with students and teachers at key points during the development process.
- Museum-produced CD-ROMs are not exclusively targeted towards the educational sector. OMSI believes approximately 80% to 90% of the market for *Dinosaur Safari* is the home segment. The product is oriented more towards entertainment and games than on educational values.
- Several CD-ROMs produced by Quebec museums have had more success in France than in the US. This is mainly due to the subject matter, which may have more historical and cultural relevance to a French audience. American consumers are reportedly interested in showier productions with less descriptive content than European audiences are. American consumers are reportedly not interested in a product unless it features a high-profile American theme. For example, the *Balloon Age* CD-ROM does not sell well in the US

because it does not include a well-known American historical personality involved in ballooning.

- Sales of Canadian produced CD-ROMs through museum gift shops are usually relatively low. The Smithsonian achieves approximately 20% of its CD-ROM sales through museum gift shop sales.
- The shelf life of CD-ROMs produced by museums as reference material is reported to be about 4 to 5 years. The shelf life of most entertainment CD-ROMs is shorter, between 2 and 3 years. The payback calculations for CD-ROM development must therefore take this life cycle into account.

Choosing Marketing Partners

Most museums rely on their multimedia partners to find publishers, who in turn have contacts with distributors. In this respect, the link between the museum and the distribution channels is a tenuous one. Usually, the commercial developer has publishers and distributors with which it works. In many cases, the museums have not been involved in selecting a publisher. An exception is McMichael, which is currently in negotiation with publishers in the education field. CMC's experience with distributors is interesting and typical of the difficulties museums have in finding distribution channels. The following points describe this experience:

- CMC spends most of its efforts working with its development partners and usually begins to consider distribution issues after it has started the project, rather than at the beginning. CMC believes it must begin to find distribution partners at the conceptual and business planning stage. CMC would like to improve its search for distributors, particularly to enhance the promotion of its product internationally. The use of distribution partners must also be connected to the audience that the museum is trying to attract.
- The museum will find it useful to leverage the marketing efforts of the other partners. For example, CMC is spending \$15 000 to \$25 000 in marketing resources for each CD-ROM in each of two languages. These resources are combined with the actions and resources of the various partners to achieve maximum visibility for its products. As a result, the high profile of *Pocket Museum* in print and electronic media in Quebec has been quite exceptional and unique in the short history of multimedia in Canada. This is a result of the efforts of the multimedia partner, PTM, and their dynamic

leader Louise Guay who is seen as a multimedia star in Quebec and Canada

- CMC believes it should begin to focus more on working with private partners who can help with financing and bring a proven distribution record to the partnership. One of CMC's current products under development is *Inuit*, which has generated so much interest from several European countries that the CD-ROM was displayed at the Frankfurt book and multimedia fair, the largest book fair in the world.
- In their search for international distribution, the CMC is interested now in obtaining written commitments from distributors with proven international distribution records and a solid presence at international book and multimedia fairs.

Price Points

- Usually, museums rely on publishers to assist them in determining prices for their products. Most high quality interactive CD-ROMs are priced between \$30 to \$50 and are positioned to be competitive with other CD-ROM products.
- CMC believes that the content value of *Pocket Museum* is worth approximately \$70. The product is priced at \$39.95 because it is believed to be a more attractive price point for marketing to children.
- CMC has priced its *Inuit* CD-ROM at \$50, because it is targeted towards adults and it is believed to be a reference product.
- CMC's *Totem Poles* is priced as follows:

Package offered	Market	Price Point of <i>Totem Poles</i> CD-ROM
CD-ROM only	Consumer	\$50
CD-ROM + teacher's guide	Educational	\$60
5 CD-ROMs + 1 guide	Educational	\$210
10 CD-ROMs + 1 guide	Educational	\$395

- Prices for CD-ROM products decline with the passage of time and they can be quite low at the end of the product life cycle. For example, OMSI's *Dinosaur Safari* originally retailed for \$60 US and is now available on the Internet for \$12.99.
- High quality interactive CD-ROM products were priced around \$39.95 for the Christmas market in previous years.

- Museums review prices of comparable products to price their own products.

7.2 Critical Success Factors for Marketing, Distribution and Sales

Critical Success Factors for Marketing, Distribution and Sales

- Develop a marketing plan as part of your business plan.
- Be as clear as possible in defining the target market and in positioning your product in that market.
- Develop a clear statement of the opportunity, outlining why your CD-ROM is necessary in the marketplace, or what needs you will fulfill with it.
- Describe the unique features and benefits of your product.
- Determine whether there may be opportunities to develop new types of products by working with other museums or other types of partners.
- Consider how you might extend the product life by the addition of follow-up version, product enhancements, or hybrid linkages to the Internet.
- Visualize your collection as an asset that can be managed and leveraged through the CD-ROM.
- Define the target market and key market segments for your products.
- Consider using brainstorming or focus groups of potential consumers at key points in the development process to test the concept or prototype, particularly when targeting the educational market.
- Research curricula when marketing to the educational market and design your product to enhance curriculum content.
- Include teaching guides such as lesson plans and tests in the CD-ROM product developed for the education market to determine absorption rates, etc.

- Consider using a hyperlink to an Internet site to keep the content and the teaching guides current and to provide a mechanism to obtain consumer feedback.
- Consider working with various educational publishers to penetrate the education market if appropriate.
- Conduct reference checks on possible marketing partners to determine their ability to conduct similar work.
- If the project has an Internet component, determine who will manage it and how it will be financed.
- Define the normal marketing channels and the possible untapped channels.
- Determine whether the use of the Internet or catalogue sales can help you market your product.
- Consider adding game features to your product to give it more appeal to the home segment.
- Leverage the resources of the other partners in your communications and marketing programs.
- Conduct a break-even or return on investment (ROI) analysis for different price points and volumes, and incorporate it in your business plan.
- Conduct a sensitivity analysis by changing the critical variables by 10% and determine the impacts on your bottom line to isolate the critical variables.
- Clarify and define how after-sales support, customer service and replacements will be handled.

8. Recommendations

1. Most museums have not generated significant, if any, net revenues through the production of CD-ROMs. If net revenue was generated, it was likely a result of special circumstances. For example, the institution may have received a grant for production, a corporate sponsorship, or a large one-time purchase of product. Also, in many cases, the museum's overall cost does not account for the staff time contributed to the production. Moreover, when net profits have been realized, the profits tended to be relatively small. **Accordingly, museums should be very cautious about developing CD-ROMs primarily to generate revenues. Even when CD-ROMs are developed for other purposes (e.g., for educational or marketing reasons), museums should carefully undertake a cost-benefit analysis of any such initiative (including the imputed costs of staff time).**

2. Notwithstanding the above, museums do have artifacts, collections and expertise that can be the basis for very interesting, educational and attractive CD-ROM offerings. As a rule, though, rather than attempting to develop CD-ROMs completely in-house (a strategy that can have a very steep learning curve unless the institution has in-house capability), **museums should consider a partnership with established commercial organizations in the development, marketing and distribution of titles.** Such an approach will help the museum share financial risk, as well as improve the quality of the final product. Production partners bring to the relationship expertise in the development, production, marketing and distribution of CD-ROMs, whereas the museum brings the content of the production. Both are critical elements of a successful CD-ROM.

3. **In the negotiations between the museum and the production house, museums should, where possible, negotiate the following:**

- **compensation for — or an upper limit to — the amount of time and expertise provided by museum staff**
- **involvement in decisions regarding the distribution of the CD-ROM**
- **percentage of sales**

- **prominent display of the museum branding — its name, image and logo on the packaging**

These principles should apply regardless of the scale of production.

4. In the current environment of rapidly changing technology and explosive growth in multimedia, **CD-ROMs should not be considered as stand-alone initiatives. Rather, they should be thought of as a component in the museum's multimedia strategy.** This strategy, in turn, is likely to reinforce other institutional objectives such as marketing, programming, exhibit interpretation, outreach, etc. The costs and benefits of producing a CD-ROM should be viewed relative to using other digital media such as the museum's web site, hybrid CD-ROM products containing, for example, embedded hyperlinks to the museum's web site, or the sites of other museums and relevant organizations. Alternatively, if a CD-ROM is being developed for the first time, it can be undertaken as an initial stage in the development of the museum's web site, or as a component of other multimedia and technological initiatives undertaken by the museum. The relative costs and benefits of each strategy are likely to change with time.

5. The checklist of critical success factors in working with partners should be considered by any museum planning to develop a CD-ROM in partnership with another organization.

Appendix A

Persons Interviewed

Aynsley MacFarlane	AGB
Owen Fitzgerald	Fitzgerald Studio
Jean Francois Blanchette, Publisher	CMC
Suzanne Bubic	CMC
Mac Swackhammer	Dawson City Museum
Bob Nardi	Hyperborian Productions
Guy Vadeboncoeur, Chief Curator	Musée David Stewart
Nicole Michaud, Director of Sales	Micro-Intel
Anthony Hushion, Information Services	ROM
Shelley Falconer, Education Services	McMichael
Divonna Ratliff, Project Manager, <i>Dinosaur Safari</i>	OMSI
Trish Graboske, Publications Officer	National Air and Space Museum, Smithsonian Institute
Ted Hill, Publisher	Macmillan Digital Reference
Greg Bryant, Production Specialist	National Air and Space Video Disk Museum, Smithsonian Institute
John Tyler, Audio Production Manager	Smithsonian Productions
Lee Woodman, Executive Producer	Office of the Undersecretary, Smithsonian Institute
Jim Cutting, Sr. Policy Analyst	New Media and Entertainment, Industry Canada
Ritoo D'Souza, Economist	New Media and Entertainment, Industry Canada
Sylvain de Tonnancour, Economist	New Media and Entertainment, Industry Canada

Surveys

Dr. Victoria Dickenson, Senior Advisor, IT

National Museum of Science
and Technology

Martine Bernier , Directrice de la diffusion

Musée du Séminaire de
Sherbrooke

Martin Segger, Director

Maltwood Art Museum and Gallery

Appendix B – *ARTIFICE* Associate Partners

Artists

Barbara Astman
Carl Beam
Dominique Blain
Geneviève Cadieux
Melvin Charney
Domingo Cisneros
Paterson Ewen
Marcel Ferron
General Idea
Betty Goodwin
Will Gorlitz
Natalka Husar
Roland Jean
Rita Letendre
Micah Lexier
John McEwen
Norval Morrisseau
Jean-Paul Riopelle
Michael Snow
Claude Tousignant
Irène F. Whittome
Tim Zuck

Organizations

Art45 inc. Montréal
Art Gallery of Hamilton, Hamilton
The Art Gallery of Newfoundland and Labrador, St. John's
Art Gallery of Nova Scotia, Halifax
Art Gallery of Ontario, Toronto
The Beaverbrook Art Gallery, Fredericton
Canadian Broadcasting Corporation, Toronto
The Canadian War Museum, Ottawa
Galerie René Blouin, Montréal
The Glenbow Museum, Calgary
The London Regional Art and Historical Museums, London
The Mackenzie Art Gallery, Regina
The Manitoba Museum of Man and Nature, Winnipeg
Musée des beaux arts, Montréal
National Archives of Canada, Ottawa
The Nova Scotia Museum, Halifax
Olga Korper Gallery, Toronto
The Robert McLaughlin Gallery, Oshawa
Royal Ontario Museum, Toronto
Sable-Castelli Gallery, Toronto
Susan Hobbs Gallery, Toronto
The University of BC / Museum of Anthropology, Vancouver
University of Toronto, Toronto
Walter Phillips Gallery, Banff
The Winnipeg Art Gallery, Winnipeg

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