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KEYS TO ECONOMIC SUSTAINABILITY OF AQUARIUMS: EXAMPLES FROM THE WORLDWIDE AQUARIUM “INDUSTRY”

This paper was prepared by Mr. Thomas J. Martin, President of ConsultEcon, and Ms. Elena Kazlas, Principal of ConsultEcon, and presented by Ms. Kazlas in October 2008 at the International Aquarium Congress in Shanghai, China. It will be published in the Conference Proceedings.

Introduction

A large number of aquariums exist in many countries of the world and are established attraction types in the U.S., Europe and Asia. In some countries, like Japan, there are already exists a concentrated number of aquariums therefore limiting the potential for new aquarium projects. While in other countries, like India, new market opportunities may exist for aquariums. Overall, the economic sustainability of aquariums varies depending on their unique location, governance and competitive market environment.

Mr. Martin and Ms. Kazlas are leading experts in the economic sustainability and development of aquariums worldwide. They have combined over 50 years of experience in the aquarium “industry” and have worked on aquarium projects in North America, Europe, Asia, Australia, Middle East, South America, Central America, and Africa. ConsultEcon is the leading consultant to the aquarium industry.

No one that we are aware of has undertaken a review of the worldwide aquarium industry. This paper is a first attempt to profile the industry and review keys to economic sustainability.

Our paper is based on our work in the aquarium industry, our primary market research in the form of an online survey about potential new aquarium developments, and our internal project reference files of aquariums, zoos and other attractions worldwide. The result of our paper is a review of the future of the aquarium “industry” internationally and new markets for aquariums, including the requirements for an economically sustainable aquarium.

World Aquariums: The Current Collection

Aquarium is defined as “a building or institution in which fish or other aquatic animals or plants are kept for exhibit, study, etc.”¹ Interestingly, according to the Encyclopedia Britannica, the Chinese, who raised carp for food as early as 1000 B.C., were probably the first to breed fish with any degree of success. Their selective breeding of goldfish was later introduced to Japan, where the breeding of ornamental carp was perfected.

Aquariums can be either freestanding attractions; components of other natural history attractions such as zoos, museums or nature centers; or as part of larger marine animal theme parks. In addition, the ownership and governance of aquariums also varies, whether public/private, not-for-profit or for-profit. As the costs associated with building and operating an aquarium attraction are relatively high in comparison to other attraction types, there are many varying examples of

¹ Source: Dictionary.com.

financing models for aquariums. As aquariums are proven education, conservation, entertainment and economic development institutions in their communities, these economic development and community benefits have been the basis for substantial government funding support for many aquariums, and many aquariums are developed as public/private partnerships.

We have attempted to count the total number of aquariums worldwide. We compiled a databank from a number of sources including aquarium member organizations worldwide, other online sources and from our Project Reference Files, research and experience (see References). We have records, including our Project Reference Files, on 725 aquariums worldwide, as shown in **Table 1**, with the majority located in Western Europe, North America and Asia. However we estimate the total actual number of aquariums worldwide to be between 900 and 1,000 facilities. It is indeed an “industry” in the sense that there are people and firms with skills and expertise unique to the industry and aquariums have unique needs that have created supportive industries.

Table 1
ConsultEcon Aquarium Database Summary

Location	Number of Aquariums	Percent of Total
Western Europe	272	38%
North America	173	24%
Asia	166	23%
Eastern Europe	40	6%
South America	34	5%
Australia/New Zealand	23	3%
Africa	9	1%
Middle East	8	1%
Total	725	100%

The international experience of aquariums indicates that there are many major aquariums that successfully serve large resident and/or tourist markets as well as many mid-sized aquariums that serve smaller resident and/or tourist markets. Stand-alone, public aquariums

were first developed as public attractions over 150 years ago at such locations as Paris (1867), Berlin (1869), Brighton, England (1872), Naples (1874), New York (1896), and Honolulu (1904). The New York Aquarium reportedly recorded over 1.6 million visitors in 1897.² The second generation of aquariums were developed in the early 20th century in San Francisco (1922), in Chicago (1929) and in Qingdao, China (1932).³ In those facilities and other early aquariums, single species of animals were typically displayed in jewel tanks. In the 1950's, a new aquarium concept emerged in the U.S. The Oceanarium, initiated by Marine Studios near St. Augustine, Florida, included exhibits with whole communities of marine animals displayed in huge tanks containing hundreds of thousands of gallons of water. The emphasis was on entertainment, with dolphins (and later, whales) performing in shows for seated audiences. The concept was so successful that it was repeated in other locations and many sea life parks were developed in the Americas, Europe and Asia. A new concept emerged in the 1960's, which was an indoor aquarium with dramatic and iconic architecture and large realistic aquatic exhibits, such as the New England Aquarium in Boston (1969). This approach was very popular, and along with outdoor sea life parks has been successfully replicated throughout the world at different physical scales and interpreting many aquatic habitats. Both types of aquariums have been very popular as they appeal to people of all ages. An important recent trend has been the re-creation of habitats that represent entire ecosystems that include land and aquatic environments and different strata of life. These include examples of the world's most important and interesting biomes. Careful planning and project execution are the hallmarks of successful aquarium projects.

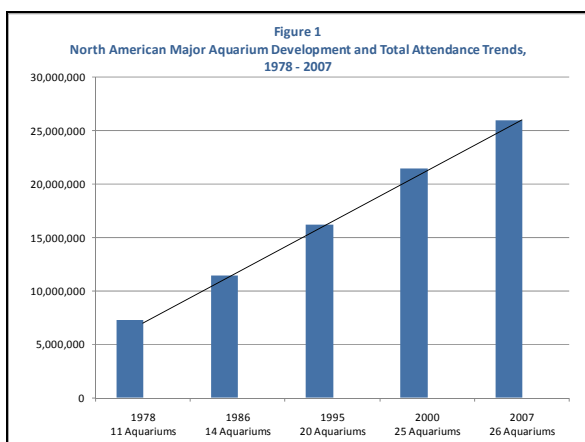
² Leighton Taylor, *Aquariums, Windows to Nature* (Prentice Hall, 1993).

³ Zhang, X et al, *Tour d'horizon des Aquariums en Chine*, Bulletin de l'Institut océanographique, Monaco, n° spécial 20, fascicule 1 (2001), English translation.

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The benefits of public aquariums have been such that they have been developed throughout the world, and continue to maintain popularity with tourists and achieve high rates of repeat visitation among resident populations. These public aquariums are often a city's most high-profile visitor attraction. Aquariums have particularly "enjoyed a renaissance"⁴ in the past 30 years and have been seen as urban renewal catalysts, as both large and small cities have planned to develop or have developed aquariums not only for social value but also for economic development benefits. An example of this is the experience in North America.

Figure 1 shows the growth of major aquariums in North America and their combined annual attendance over the past 30 years. As shown in Figure 1, both the number of projects and total attendance has grown substantially over the 30-year period. Aquariums are now a well-known attraction type that many visitors have visited in the past and in locations worldwide. Aquariums are considered high value experiences to be included on a tourist's itinerary and as a special outing for area residents. Many aquariums have successfully interpreted their unique, local marine or freshwater stories, becoming a "must-see" destination in tourism settings, as a visit to the aquarium becomes part of the tourists' experience in learning about the place they are visiting.



Source: ConsultEcon, Inc.

⁴ Association of Zoos and Aquariums, *2020 Trend Report* (1999).

Overall, public aquariums have been a source of quality entertainment for many years exhibiting a variety of marine species that patrons would not otherwise be able to see and creating a unique and memorable experience. In the past few decades, aquariums have evolved into not just a source of entertainment for its visitors but also a vehicle for public education and research about aquatic environments, directly and indirectly stimulating the desire to preserve these environments.

The technology and exhibit techniques of aquariums have improved substantially in the past decades. Advanced life support systems; improved husbandry techniques; larger, unobstructed acrylic panels and tunnels for better viewing; and other improvements are available to the new generation of aquariums. However, as technological advances have improved and enhanced the visitor experience, visitor expectations have also risen.

Potential Markets

To gain further insights into the future of the industry, we surveyed about 350 people in the aquarium industry worldwide about what they saw as the top potential new markets for aquarium development, and about the location and status of new aquarium development underway. The responses were weighted to those with understanding of the English language, with 75 percent within North America and 25 percent from outside North America. There were a wide range of respondents from aquarium employees, to architects and exhibit designers, to owners and operators to aquarium suppliers and consultants. We received 85 responses, or about a 24 percent response rate.

After weighting the responses for top markets for new aquariums, the top six markets for aquarium development (in order) were China, the Middle East, North America, Southeast Asia, South America and Eastern Europe. The survey also found that there are currently about 53 new aquariums being developed worldwide. For those 51 projects for which there were responses, 55 percent are in the planning phase, 25 percent are in design, and 20 percent are under

construction as shown in **Table 2** below.

Phase of Development	No. of Aquariums	Percent of Total
In Planning	28	55%
In Design for Construction	13	25%
Under Construction	10	20%
Total	51	100%

Of the 53, 42 percent are in North America, 23 percent are in Asia, 11 percent for both the Middle East and Western Europe, 6 percent in South America, and 4 percent for both Eastern Europe and Africa as shown in **Table 3** below.

Location	No. of Aquariums	Percent of Total
North America	22	42%
Asia	12	23%
Middle East	6	11%
West. Europe	6	11%
South America	3	6%
Africa	2	4%
Eastern Europe	2	4%
Total	53	100%

Overall, our survey conclusions are that there is currently aquarium development activity in all parts of the world.

Keys to Economic Sustainability

We have identified 11 factors, or “keys to success”, that contribute to the successful aquarium. They are as follows:

1. **Established on a Sound Financial Basis** - An aquarium must be established on a sound financial basis for it to have adequate resources to accomplish the success factors above, and to achieve its goals of education and benefits to conservation in an entertaining environment. The sources of revenue for aquariums typically

comprise the following:

Earned Revenues:

- ◆ Admissions
- ◆ Memberships
- ◆ Retail
- ◆ Food Service
- ◆ Special Events and Facility Rentals
- ◆ Programs
- ◆ Miscellaneous (i.e. stroller and locker rentals, donation boxes, traveling exhibits rentals, parking, audio tour rentals)

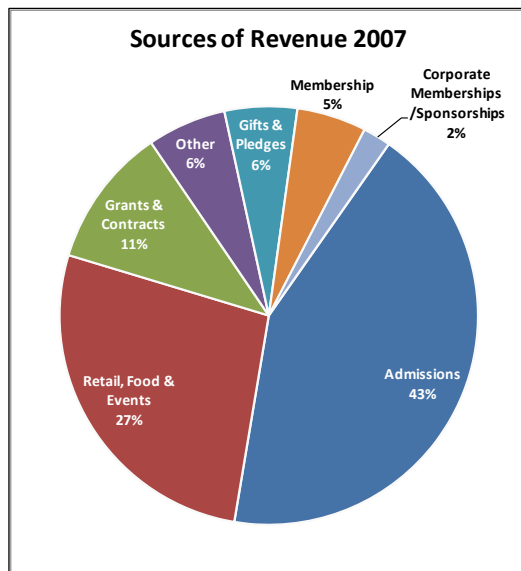
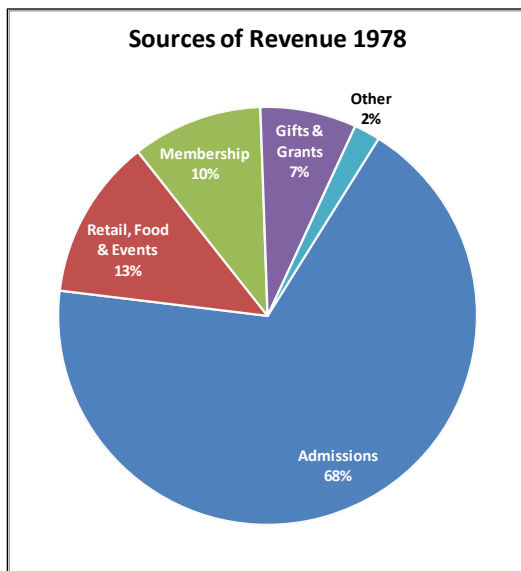
Private, non-profit aquariums, and some for-profit aquariums, have the potential for non-earned revenue which can comprise between 0 and 50 percent of total revenue for some aquariums.

Non-Earned Revenues:

- ◆ Donations
- ◆ Gifts In-Kind
- ◆ Corporate Memberships and/or Sponsorships
- ◆ Educational Programs
- ◆ Research Grants
- ◆ Interest on Operating and Replacement Reserve Account Balances
- ◆ Endowment Proceeds
- ◆ Other

Notably, over the past few decades, aquariums, like other attractions, have focused on increasing their earned revenue potential by adding such activities as unique interactive programs, facility rentals and educational programs on and off-site. The following pie charts show an example of the shift of sources of revenue for an aquarium over a 30-year period.

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Aquariums have been structured in many different ways. There are a number of legal and operational distinctions between non-profit institutions and for-profit enterprises. It is important to note, however, that non-profit attractions can operate or “behave” much like commercial ventures, and for-profit ventures can embody many of the behaviors more typically associated with non-profit institutions. As such, it is instructive to view each institution on a continuum: at one end, a fully-integrated

commercial vacation destination such as Sea World; at the other end, a non-profit, low admission aquarium with a largely local visitor base. Most aquariums, clearly, fall somewhere in the middle of these two ends of the continuum, and the relative placement of each aquarium on this continuum depends on the institution’s organizational structure, the nature of the products and services offered, and the overall mission and goals of the organization. Key factors that help differentiate for-profit and non-profit aquariums include aquarium mission, extent of education and conservation activities, tax status, capital funding sources and to an extent the nature of the visitor experience. However, recent trends have shown that for-profit aquariums are expanding their educational and conservation activities through a non-profit “friends” group to gain access to public funds to support these programs, increase their attendance potential and improve their image.

2. **Good Location and Site** - Visibility, accessibility, adequate parking and an attractive site are all critical to project success. Good views from the site, supportive nearby land uses and strong connections to the water are also important determinants of the quality of a site for this public use.
3. **Critical Mass of Attraction Elements** - The aquarium (often augmented by nearby visitor attractions) must offer sufficient content to draw residents from nearby and on longer day trips, and to attract visitation from tourists to the area. Some aquariums that have struggled for attendance have not had supportive attractions and visitor infrastructure.
4. **Strong Thematic Focus** - The new generation of aquariums have tended to focus their exhibit program to create a comprehensive “story line” that is much more than the sum of its individual exhibits.
5. **Depth of Visitor Experience Offered** - The aquarium visitor currently has high expectations

of their visit, and a very rewarding experience is needed to sustain repeat attendance and to attract new visitors.

6. **Length of Stay/Attraction Content** - A length of stay and quality of aquarium content must be commensurate with ticket price.
7. **Outstanding Exhibits and Programs** - New aquarium technologies and interpretive techniques are available for the next generation of aquariums to achieve these requirements and goals.
8. **Serves Residents and Visitors** - Aquariums rely on both resident and tourist markets. The location, program and marketing must address both major audience groups and must be sensitive to the unique characteristics of these markets.
9. **Broad Audience Mix** - Exhibits and interpretation that appeal to a wide audience are needed. The audience varies in age and education, level of interest in scientific detail and in expectation for an entertainment versus learning experience.
10. **Offers Multiple Visit Opportunities** - An aquarium must develop a pattern of repeat visitation in its resident markets (and even in its travel markets if possible). Changing exhibit galleries, special programs and events, and attractive membership options are ways to build the repeat visit audience.
11. **Offers Opportunities to Spend and to Relax** - The aquarium must ensure that all of its visitors' needs are fulfilled including opportunities to purchase a souvenir, have a light meal or snack, and have a place to sit and rest during the visit.

The worldwide experience of aquariums indicates that there are many major aquariums that successfully serve large resident and/or tourist markets, as well as many mid-sized aquariums that serve smaller resident and/or tourist markets. The individual market profiles of major aquariums vary depending on their local market

context. Some have achieved deep market acceptance of local markets. Other aquariums have relied more on tourist markets. Still other aquariums maintain a balance, with visitation drawn equally from local residents and tourists. It is an important finding that aquariums can achieve success in various market contexts given quality program content, competitive pricing, strategic marketing programs and developing a sustainable operating model, in particular to offset outside forces, such as economic recession.

Examples of Future Prospects / Challenges

Examples of Future Prospects include:

- ◆ Large, untapped urban markets and tourist destinations.
- ◆ Smaller markets with potential for smaller aquariums.
- ◆ In combination with zoos, natural history museums, nature centers, other mixed-use developments or other facilities.

Examples of Future Challenges include:

- ◆ High cost associated with building new aquariums.
- ◆ General economic conditions.
- ◆ Marine mammals are popular with audiences, especially with the trend in interactive programs, but there issues regarding captivity and public perception.
- ◆ Risk from outside forces, such as being located in a tourist destination that is reliant on international air travel, or challenged economy's impact on both non-earned and earned revenue potential.

Conclusions

We are in a growth industry. Of the top 100 most populated cities in the world, those with metro populations of over 3 million, only about half currently have aquariums. In some of the larger markets there exists more than one major aquarium. For example, Shanghai has two, the Shanghai Ocean Aquarium and

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Shanghai Chang Feng Ocean World.

Based on our survey, of the proposed new aquariums, over 26 percent are located in the top 100 most populated cities in the world. On the basis of

population alone, this leaves an estimated 40 percent of the most populated cities that do not yet have aquariums or that have aquariums planned. There is significant growth potential for the aquarium industry worldwide.

ConsultEcon, Inc. provides services to clients in the areas of project and plan concept development, evaluation and implementation in the fields of Visitor Attractions, and Travel, Tourism and Resort Development.

Our services in the aquarium industry include:

- ◆ **Business Planning** - Plans for existing and new aquariums and other attractions.
- ◆ **Feasibility Studies** – Evaluation of market support and financial feasibility, including sensitivity analysis.
- ◆ **Site Reviews** – Review of proposed site from market and economic development perspective, including such issues as visibility, accessibility and nearby uses.
- ◆ **Alternative Site Selection** - Evaluation of alternative sites for aquariums and attractions.
- ◆ **Operations Evaluation** - Evaluation of management and operations with strategic solutions for both non-profit and commercial operators.
- ◆ **Economic Impacts** - Economic and fiscal impacts of aquariums and attractions. This is often an important component in project funding with publicly supported projects.
- ◆ **Project Reviews** - Independent project evaluations for leadership and funders.

- ◆ **Master Plans** - Site and market analysis, operating plans, and sensitivity analysis for single and multiple use sites.
- ◆ **Expansion Plans** - Analysis of potential visitation and operations impacts.
- ◆ **Pre-Opening Planning** - Development of pre-opening plans including timing of staff hires, operating expenses, exhibit programming, animal collections, temporary holding, installation, marketing for opening, and cash flow.
- ◆ **Project Repositioning** – Strategic evaluation of marketing and operations for a project based on those project’s unique circumstances and/or related to outside forces, such as an economic recession.
- ◆ **Primary Market Research** - Visitor surveys and focus groups, pricing, and interpretive approach.
- ◆ **Real Estate Evaluations** - Rent, valuation, and feasibility analysis for aquarium, other attractions’, retail and food service properties.
- ◆ **Tourism Development** – Local and regional strategies for developing and increasing visitation.

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