The development of science centres in the Nordic countries

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1. The birth of the first science centres.

The first "science centre" in the world, Urania, was inaugurated in 1888 in Berlin. This cultural institution consisted of a collection of high-precision instruments, an observatory, a scientific theatre and a hall of experiments for everybody.

Later, in 1906 opened Deutsches Museum in München (founding father Oscar von Miller); in December 1931, The Children's Gallery in Science Museum, London (founding father Sir Henry Lyons) and in 1938, the Palais de la Découverte in Paris on the success of the 2 million visitor exhibition "Arts and techniques in modern life" with the Nobel-price winner Jean Perrin as the founding father.

Inspired by these marvellous institutions, Frank Oppenheimer created the first modern science centre, Exploratorium in San Fransisco in 1969. The same year, Ontario Science Centre opened to the public in Toronto, Canada.

With Exploratorium and Ontario Science Centre (OSC) a new kind of institution was created. These two institutions had no collections, no research duties. They just wanted to exhibit science, not to explain their research but to explain science in general with the general public as the target group.

Both Exploratorium and Ontario Science Centre became very popular from the beginning. Exploratorium attracted more than a half million visitors and Ontario Science Centre attracted more than a million visitors a year.

A new kind of cultural institution had been born!

The science centres proved that there was a need (or desire) in the population to learn more about science. Attracting a high number of visitors, new science centres have been developed in many countries all over the world. First in North America and later in Europe, Asia, South America, Australia and Africa.

A rough guess tells us that today there are more than 500 science centres (in the sense of an institution that only have the diffusion of science as the raison d'etre and NO collections) in the world.

2. The first Nordic Science Centres

2.1 The Norwegian Science Centre, Teknoteket in Oslo

As early as in 1985, the first science centre in Scandinavia was established in the building of the Norwegian Technical Museum in Oslo. The centre was established by one man's dedicated work, Dag Kjelldahl. Teknoteket was a private institution directed by a board with representatives from Oslo University, local companies and the teachers association. It approximately welcomed 140.000 visitors per year. Teknoteket rented 1.000 m2 in the cellar of the Technical Museum. In 2000, Teknoteket tried to raise funds for a new building in downtown Oslo, but in vain. Therefore, Teknoteket became an integrated part of the public owned Norwegian Technical Museum. Later, Norwegian Technical Museum was adopted to receive operational funds from the Norwegian Science Center Committee (2004).

2.2 Teknikens Hus (House of Technology) in Luleå, Sweden

The House of Technology, in Luleå, Sweden was the next science centre to see the daylight. It was opened to the public on 27 May 1988. The initiative came from The Luleå High School that educates teachers. The driving force in setting up The House of Technology was AnnMarie Israelsson. The capital money for the project came from 130 different sources. The main sources were a private foundation and four major companies, mostly from the forest industry. Some of the collected funds were used as an endowment from which the interest could support the operation. Also, the community supported the operation considerable, but suggested at the same time that entrance should be free to all.

The centre receives approximately yearly 180.000 visitors and the exhibition area is 2.000 m2. From 1997 Teknikens Hus started to get operational support from The Swedish Governments grant programme.

2.3 The Finnish Science Centre, Heureka

Already in 1983, the first step was taken to establish the Finnish Science Centre, Heureka. By the initiative by Dr. Hannu Miettinen and Dr. Per-Edvin Persson, The

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Science Centre Foundation was established on 21 December 1983 by the University of Helsinki, the University of Technology, the Federation of Finnish Learned Societies and the Confederation of Finnish Industries and Employers. The Foundation arranged a number of pilot exhibitions and on 28 April 1989, Heureka was inaugurated.

Heureka have grown to be one of the most appreciated science centers in the World. Especially, on the international scene, Heureka have played a pioneering role in conceiving The Nordic Science Centers Association (NSCF), one of the founding fathers of the European Network of Science Centers (ECSITE) and as the founding father of the Science Centre World Congresses.

2.3 Vitensenteret in Trondheim (The Trondheim Science Centre)

The second Norwegian science centre was established as a foundation in 1988 and the centre opened to the public in 1990. The capital money for the establishment came from the government, The county, the community, The Technical University of Norway, research foundations and private companies. Today, many of the founding institutions are still represented in the board.

The centre receives app. 90.000 visitors and the exhibition area is app. 1.500 m2. Vitensenteret in Trondheim also receives grant from The Norwegian Science Centre Committee.

2.4 Experimentarium, Copenhagen, Denm ark

Experimentarium's founding father was Esben Dragsted, the President of the Egmont Foundation. He visited Exploratorium in 1983 and came back to Denmark with the strong desire to open a similar institution in Denmark. The Egmont Foundation funded a feasibility study that was published in January 1986. Experimentarium's Deputy Executive Director up to 2010, Nils Hornstrup was one of the authors of the feasibility study. The conclusion of the study was that Denmark deserved a science centre. The study also concluded that it would be a good idea to start the project with a pilot exhibition. Experimentarium was founded on 6 November 1986 with funds from three foundations: Egmont, Augustinus and Thrige Foundations. The three foundations had each one representative in the Board. The three foundations asked Jannik Johansen from the Ministry of Education to serve as the President of the Board, a position Dr. Johansen is still holding today, 24 years later. Being the Board representative for the Augustinus Foundation, Peter Augustinus was a member of the Board from November 1986 and in 1998, he became the Vice President of the Board, a position that also he still holds.

The three foundations founded Experimentarium with 560.000 € to build the pilot exhibition. The work with the pilot exhibition started in the beginning of 1987. Nils Hornstrup was the project leader. Asger Høeg was appointed Executive Director on 1 April 1988 with the clear goal to secure the financing of a permanent science centre. The theme for the pilot exhibition was decided to be The Man's Body. The exhibition was named, "Man - Here is your body!" and opened to the public on 15 April 1988. In 90 opening days, the exhibition attracted 72.000 visitors in the area of 400 m2 in the old (hot!) carbarn in the centre of Copenhagen. The success was obvious. The Carlsberg Breweries decided to donate the 60 years old Bottling Hall North of 18.000 m2 in the Tuborg Area free to Experimentarium for period up to 20 years. The Minister of Education donated 1,4 M € to the permanent science center. And Egmont Foundation donated 3,5 M € to secure the operation after the opening.

On this basis, the fundraising campaign started in September 1988 and in January 1989, the needed extra 6 M € to the permanent science centre was secured. The money came mainly from foundations: Augustinus Foundation, Novo Nordisk Foundation, Lundbeck Foundation, Lego Foundation etc.

Her Majesty The Queen of Denmark inaugurated Experimentarium on 9 January 1991. The first year Experimentarium welcomed 530.000 visitors. But the following years, the visitor number fell to 300.000 per year. In 1994, Experimentarium introduced the temporary exhibition strategy with presenting one exhibition every year to stimulate more revisits. The first temporary exhibition was "Sport" from the Finnish Science Centre, Heureka that opened to the public in April 1989. In 1995 a new temporary exhibition area and The Great Stage was build. And in 2001, at the 10th Anniversary, the second temporary exhibition area was build.

Normally, Experimentarium introduces two new exhibitions every year. One in late January just before the winter holidays; one in early October just before the Autumn Holiday.

3. The support from the Governments to the Scandinavian Science Centres

3.1 The Danish case

It has been difficult to secure economic balance in the operation of Experimentarium. The endowment from Egmont Foundation was reduced in the first years after the opening year of 1991. In the years of 1992 – 1995, Experimentarium constantly asked the Government for operational support. The operational grant from Egmont Foundation was not totally spent, but everyone could see that Experimentarium could not operate without support from the Government.

In Denmark there has been a law supporting museums operations since 1958. And since 1977 there has been a law supporting the operations of zoos and aquariums. But there is still not today, a law that support science centres.

From 1985 to 1995, a large number of independent institutions with interactive pedagogical methods had been opened to the public in Denmark. These institutions had a great need of operational financial help. But these institutions were neither a museum nor a zoo. What to do?

In 1996, the Ministry of Education decided to set up a fund (1,1 M €) to support the operation of these so called "Institutions with interactive pedagogical methods" (among which Experimentarium was selected). Today, 13 very different institutions receive operational grants from this fund of 2 M € of which Experimentarium now receives 550.000 €. Among these institutions you will find a cultural centre in a cemetery (!), two Middle Age Visitor Centres, A Freshwater Centre and a Pre Historical Centre. As the reader can understand, this is not a fund for science centres. The common ground for these institutions is their communication methods.

As quoted, Experimentarium receives 550.000 € per year in operational grants but that is only 10% of the total operational expenditures of Experimentarium. This level of support is very low to a European standard.

3.2 The Swedish grant system to the science centres

In Sweden they look different on the idea of supporting the operation of the science centres. In Sweden from 1988 and forward, a great number of rather small science centres emerged (Tom Tits, Navet, Molekylverkstan, Innovatum and especially Universeum in Gothenburg). In 1997, the Swedish Government decided to set up a grant as support to the Swedish science centres. In 1997 the total grant was 2 M € which was given to 9 institutions. In 2010 the total grant is 3 M € to 14 centres. The supporting level per centre has not followed the inflation. The grant is given after criteria including the communication quality, the number of visitors and the size of the institution.

Many of the Swedish science centres are fighting hard to balance the operational income and expenditures. The level of support from the Government is not enough to define a stable operation of the Swedish science centres.

3.3 The Norwegian Science Centre Committee

In 2004, the author of this article was invited to be a member of the Norwegian Science Centre Committee (Vitensenterstyret, NSCC). From 2004 to 2007, it was lead by Yngve Astrup and from 2007 by Ragnhild Sohlberg. AnnMarie Israelsson was also invited as a member of the Committee. In 2004 there were only three science centres in Norway, Teknoteket (in the Norwegian Technical Museum), Vitensenteret in Trondheim and Vitengarden, Jærmuseet near Stavanger. The NSCC defined a very clear strategy. First of all, there should be a science centre in 6 Norwegian towns: Oslo, Bergen, Trondheim, Stavanger, Tromsø and Gjøvik. These 6 centres should fill a regional role as the disseminator of science to the schools in the region. The operational budget of a science centre should be at average 15 MNOK and 33% of that should be support from the NSCC. 33% should be regional and local support. And the rest should come from the visitors. With 6 centres, the Government intended to find 30 MNOK to the operational support.

With this strong statement, capital money became plenty in the mentioned cities. In 2004 , Norsk Hydro (Now Statoil) decided to donate 100 Million NOK in the occasion of the company's 100th Anniversary to a new science centre in Bergen. VilVite opened to the public in 2007 and receives more than 100.000 visitors per year. In Sandnes, near Stavanger, Jærmuseet raised 150 MNOK in capital money to open the Vitenfabrikken (The Knowledge factory) as a new institution in Jærmuseet. Innlandets Vitensenter in Gjøvik raised 60 MNOK and opened a smaller science centre to the public in 2007. In the little town Tromsø to the north in Norway, The Nornorsk Vitensenter has

raised 90 MNOK to enlarge the Planetarium and establish a classic science centre which will open in 2011. Finally, the old science centre in Trondheim from 1988 will receive support from the Government to move to new buildings in connection with the Norwegian Technical University (an investment of the size of 200 MNOK).

In total, the Norwegian Science Center Committee have seen investments of the size 600 MNOK equal 75 M €.

Since 2004 two new science centres have been approved under the NSCC's programme: Grenland and Sarpsborg.

No other country in the World have experienced such a fast and successful development of science centres as Norway in the period from 2004 to 2011.

3.4 Conclusion concerning the support to the science centres in Denmark, Norway and Sweden

The movement of science centres came to Sweden in 1988 but the Government waited until 1997 to set up a grant programme. The programme's impact have been reduced since several new science centres opened to the public and started to receive grants. Since the total grant has not been adjusted, there is now less money per science centre than in 1997. The Swedish science centres fight for their lives because of the inadequate operational support from the Government.

In Denmark, the Government have paid very little attention to the importance of having science centres as useful institutions to stimulate the formal learning system. The Government have no strategy or programme for establishing more science centres in Denmark. In the south of Denmark, the factory Danfoss, have set up its own, private science park, Danfoss Universe. Being a private owned institution, Danfoss Universe do not ask for public support.

In Norway, the Government formulated a science centre strategy in 2004 and this strategy has generated 600 MNOK in investments in new science centres. In few years Norway will have 8 excellent science centres.

4. Experimentarium have grown into being a science communication centre

In the discussion how to disseminate science to the public, science centres are very interesting in one particular way: They only have one purpose, namely to communicate science to the public.

Science museums, natural history museums and technical museums have several purposes: To collect artefacts, to preserve them, to study them and to communicate the findings of the research and exhibiting the artefacts.

But science centres have only one purpose, to communicate science.

There is a contradiction in preserving and exhibiting artefacts. Perhaps this contradiction has been a limiting factor in the ability of museums to communicate science and technology?

Most science centres are self owned institutions such as foundations with the purpose to stimulate the public interest in science and technology.

Many of the science centres started with "Exploratorium-like" exhibitions with hands-on exhibits supplemented with demonstrations and science shows performed by "explainers". Having only one purpose – the dissemination of science – science centres became experts in "explaining science" both with exhibitions and with all other possible tools and methods. The science centres senior management was not only academic trained persons. The Directors could come from the corporate business or they could have a marketing or sales background.

When new demands and new opportunities appeared, the science centres quickly learned to respond and to use the new opportunitues in their exhibitions and programmes.

The Omnimax Films was a new media. Many science centres installed a Omnimax Theatre and attracted many visitors because of the appealing new technique. Later, the information technology provided endless possibilities of using new features to reach the audience. And with the entrance of the Internet on the scene, new opportunities emerged for the science centres.

In 2002, Experimentarium decided to become a multi media science centre. This means, that Experimentarium wanted to establish new departments where science and technology is communicated with all possible tools, media and methods that is at hand for those who want to communicate science and technology.

In 2003, a School Department was established. The department develop educational programmes. Xciters, Masterclass, MethodLab, Climate Minds, The Youth

Climate Summit are examples of school activities developed and operated by Experimentarium's new school department. Every year, the department announce a nation wide school competition.

Another department develop and conduct teachers training. The department also give lectures and courses to students and journalists. The MethodLab project has given lectures to 600 teachers in 2009.

A third department is producing educational material. Both as supplement to Experimentarium's numerous exhibitions and books, web based material and 3D experiments to the schools.

Experimentarium have also established a News Department where the "customers" are newspapers, Radio, TV and websites. The News Department balanced its operations after 18 months.

Also, a TV Department have been established. The department shall conduct Media Workshops at the Experimentarium and produce Youth Science Television.

Finally, Experimentarium is building up a Research Department that is making research in the science communication that is taking place in Experimentarium's departments.

If added that Experimentarium produce one or two exhibitions every year, is a partner in 4 EU projects of which Experimentarium is the coordinator of the large TWIST programme (2,3 M €) and that Experimentarium have a turnover of app. 2 M € every year by renting out and selling exhibits and exhibitions, one can understand that Experimentarium today is a middle sized communication company that has a large advantage of the immense synergy that is created when the numerous departments co-operate. This synergy is created both in terms of better science communication but also in terms of economic synergy.

Having grown to be a science communication centre, Experimentarium has been stronger and more capable of surviving. The income stream is coming from more diverse sources and the supporting network around Experimentarium has grown considerably.

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