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«A story of friendship and misunderstandings»: the origins of the Swiss National Supercomputing Centre 1985–1992

Paolo Bory, Ely Lüthi, Gabriele Balbi

Abstract

This article retraces the origins of the Swiss National Supercomputing Centre (CSCS), founded in Manno in 1991, and the fervent debate surrounding them. Relying on a vast corpus of primary sources collected in institutional, private, and national archives, we show how the early history of CSCS reflects key features of the Swiss federalist model, while also revealing its ambitions, challenges, and contradictions. The two main questions the research sought to answer are: Why build a supercomputer center in Switzerland? And why in Ticino? Our research shows that, as was commonly noted at the time, the supercomputer signaled a further step toward the digitization of Switzerland and was an act of solidarity with the Italian-speaking area of the country. Moreover, the supercomputer was intended to enhance Switzerland's international dimension, stimulating collaborations with other European countries and even beyond. Finally, by highlighting the longstanding tension between centralizing and decentralizing efforts, the early history of CSCS reveals how, rather than following a linear trajectory, digital federalism faced a series of difficult political, economic, and cultural choices.

Introduction: a history that «must be written down»

On 2 December 1985, the Swiss Federal Council decided to apply special measures in favor of training and research in computer science and engineering.¹ One outcome of these measures was the founding of the Swiss National Supercomputing Centre (CSCS), today one of the world's most important centers in this field.

¹ Swiss Federal Chancellery, Botschaft über Sondermassnahmen zugunsten der Ausbildung und Weiterbildung sowie der Forschung in der Informatik und den Ingenieurwissenschaften vom 2. Dezember 1985 [Message Concerning Special Measures in Favor of Training and Further Education as well as Research in Computer Science and Engineering of 2 December 1985], in: Bundesblatt 1986, 1(5): 321–383.

Relying on archival research and an extensive corpus of primary sources, this article retraces the path that led to the founding of CSCS in Manno (canton of Ticino), in the Italian-speaking part of Switzerland. As we will show, even more than the center's founding, the decision about where to locate it triggered a political debate among Swiss institutions and stakeholders from 1985 up to 1992, when CSCS was inaugurated. In fact, in the late 1980s and early 1990s, the canton of Ticino still lacked scientific and academic institutions.

During his inaugural speech in 1992, States Council member Giuseppe Buffi, a key figure in national and local politics at the time, argued:

The choice of the building in which to locate the center was a matter of controversy, of decisions taken then reneged on, of misunderstandings: this is the reason why I said [at the start of this speech] that this is a story of friendship and misunderstandings. [...] I think that one day, a detailed history of the awarding of CSCS to Ticino must be written down, so as to provide an illustrative example of what can happen in our local reality.²

This article is a first attempt to fulfill Buffi's wishes; but it is also something more. As we will show, this story reveals key features of the Swiss federalist model, including its ambitions, difficulties, contradictions, and the complex geographic, political, and scientific relations that the model itself entails. Retracing the pre- and early history of CSCS is thus essential to understanding how different actors imagined the digital future of Switzerland and the way in which the founding of a federal institution was negotiated among these actors. Our main goal is to elucidate the relationship between the history of CSCS and the process through which the location of a supercomputer in the Italian-speaking part of Switzerland gained consensus in the late 1980s to early 1990s.

2 CSCS Archive, 1.10.1992 Inaugurazione CSCS, For the press, Giuseppe Buffi's inaugural speech, pp. 5–6. Original text in Italian: «La scelta dell'edificio dove dare sede al centro fu motivo di polemiche, di decisioni prese e rimangiate, di equivoci: ed è questa la ragione per cui ho affermato che questa è una storia di amicizie ed incomprensioni. Penso allora che un giorno la storia dell'assegnazione al Ticino del Centro Svizzero di Calcolo Scientifico andrà scritta nei minimi particolari, perché rimanga testimonianza emblematica di quanto può capitare nella nostra realtà locale.»

The paper is organized in four sections. The first section outlines the reasons for studying supercomputing history, a still uncharted subject in media and technology studies. In the second section, we summarize the archival work and the corpus of sources selected for analysis. The third section is dedicated to analyzing the main theoretical and political issues surrounding the birth of CSCS, and especially its location in the Italian-speaking part of Switzerland: the decentralization efforts of the Swiss Federal Institute of Technology in Zurich (ETHZ), the Federal Council and the federal government; the troubled path to and the local dispute regarding the center's location; and the future of CSCS as a bridge to international relations. The last section, in addition to giving a brief nod to the unsolved issues that further research should address, summarizes how the origins of CSCS can be read vis-à-vis digital federalism, stressing three key concepts that characterize this historic case: CSCS as a bridge, as a decentralization strategy, and as an act of solidarity.

Supercomputers in media and technology studies

The history of supercomputers constitutes a blind spot in media and technology studies. In these fields, from the perspective of the humanities and social sciences, computers are depicted as sociotechnical machines with a four-stage history. The first, called the mechanical age, goes from 2500 BC to the 1930s, with intensification from the 19th century when the birth of the nation-state, the industrial revolution, and the emergence of mass society fueled demand for calculation. During a second age, called the mainframe age, which ranged from the mid-1930s to the mid-1970s, the military and large corporations built powerful computers to fulfill their needs. The third age, from the mid-1970s to the 2000s, saw the rise of small computers bought by ordinary people that were also used for everyday needs. Finally, in the last 20 years – a post-PC age – other digital devices, such as smartphones and tab-

lets, have complemented PCs.³ In general, supercomputers are not included in this conventional story.⁴

Nevertheless, studying supercomputers and their histories is more and more relevant for media and technology studies from a political, economic, technical, and sociocultural perspective.

The scientific literature on supercomputers comes mainly from the hard sciences, such as informatics, computer science, mathematics, physics, and chemistry. This literature shows the relevance and application of supercomputers in the respective fields: supercomputers are powerful tools for doing numerical simulations and analyzing huge amounts of data; or they are useful in scientific and industrial research and in the military.

In general, supercomputer histories are just ancillary parts of this literature. These histories focus primarily on techno-nationalist battles between the United States and Japan, the two most important producers of supercomputers up to the 2000s, when China started to become the global leader in the field. The United States and Japan fought for supremacy in the industry through two companies that adopted opposing paradigms: Cray, the American champion of parallel supercomputing, and Japan's NEC, which produced vector supercomputers.⁵ Supercomputers have always been linked to national and, to an extent, nationalistic visions. For example, even today supercomputers continue to compete based on calculating power in a race called the Top500 project, which ranks the 500 most powerful non-distributed computer systems in the world.⁶

³ Gabriele Balbi, Paolo Magaudo, *A History of Digital Media: An Intermedia and Global Perspective*, New York: 2018, pp. 27–66.

⁴ For a compelling analysis of the history of supercomputing as conspicuous technology, see also David Gugerli and Ricky Wichum's article in this issue.

⁵ See for example, Marie Anchooguy, *Japanese-American Trade Conflict and Supercomputers*, in: *Political Science Quarterly*, 1994, 109(1): 35–80; Susan L. Graham et al., *Getting Up to Speed: The Future of Supercomputing*, Washington DC 2005, Ch. 3; Yoshio Oyanagi, *Development of Supercomputers in Japan: Hardware and Software*, in: *Parallel Computing*, 1999, 25: 1545–1567.

⁶ In November 2020, the first ten supercomputers were listed in the United States (4), China (2), Japan (1) – the most powerful supercomputer in the world – Italy (1), Germany (1), and Saudi Arabia (1). CSCS slipped from the top ten in 2020. Looking at the

But supercomputers are not only about computing power. They also matter in terms of the political economy of communication, a discipline that deals with the distribution of power and the role of states and private companies in media and communication markets.⁷ Supercomputers are tools supported by national strategies and public money in areas such as telecommunications, broadcasting, the movie industry, and other media. National (and international) armies, private companies, and research centers use supercomputers for different purposes.

However, despite their relevance for national governments and businesses, why and how supercomputers influence people's everyday lives is not well known. Media and technology studies focus on how consumer goods are incorporated in people's lives – newspapers, books, radios and TVs, audio devices, movies, comics, cameras, smartphones, PCs, and dozens of other devices that are bought and used by people at home or on the move for information and entertainment. Supercomputers are not «visible» and, apparently, not relevant to everyday life. They are not visible because they are generally hosted in closed spaces, sometimes far from city centers, and only a limited number of people know of their existence. Supercomputer infrastructures are hidden as well, despite their huge size: a supercomputer needs cooling systems (water or air-conditioning), big hangar-like buildings to accommodate humming machines, electrical energy grids, and high-speed digital networks to receive and send data before and after calculation.⁸ This mostly

distribution of supercomputers by country, China is first (214, 42.8 % of the total system share), the United States second (113, 22.6%), and Japan third (34, 6.8%). Source: <https://www.top500.org/statistics/list/> (23/11/2020).

⁷ The literature on the political economy of communication is extensive, like the «classics» in the field. For a recent and updated reconstruction, see Dwayne Winseck, *Reconstructing the Political Economy of Communication for the Digital Media Age*, in: *Political Economy of Communication*, 2016, 4(2): 73–114.

⁸ On the material dimension of supercomputers, see Thomas A. Weber, *The National Science Foundation Supercomputer Centres Program*, in: *International Journal of Supercomputing Applications*, 1991, 5(4): 3; Tapasya Patki et al., *Supercomputing Centres and Electricity Service Providers: A Geographically Distributed Perspective on Demand Management in Europe and the United States*, in: Michela Taufer et al. (eds.), *High Performance Computing. ISC High Performance 2016. Lecture Notes in Computer Science*,

invisible material dimension, a topic which has mainly been studied by science and technology studies,⁹ represents a second approach to studying supercomputing that focuses on different and combined infrastructures and stakeholders at the national and transnational level.

Supercomputers are invisible not only because of their hidden infrastructures but also because they seem to be useless for citizens. This impression is incorrect, but, again, it is difficult to explain the role of supercomputers in everyday life. A media studies approach to supercomputing should be helpful in this sense. John E. Aldag claims that «supercomputers have the potential to have a broad, pervasive, and very positive impact in the world around us».¹⁰ This does not mean that «normal» people use or will use them (academics and industrial researchers are and will probably continue to be the main users), but people keep on benefiting from supercomputer calculations. The automotive, oil, nuclear, molecular, health, and many other sectors use supercomputers for simulations, helping to improve security standards and to drive innovation. In the nuclear sector, for example, instead of carrying out destructive and socially unpopular tests, supercomputers can simulate them. In the oil industry and in the field of atmospheric pollution, supercomputers are able to reproduce via longitudinal simulations what would take decades to observe. Other very popular fields that require huge

Cham 2016; Mario Romero et al., Supercomputers Keeping People Warm in the Winter, Paper presented at the 2nd International Conference on ICT for Sustainability (ICTS), 24–27 August 2014, Stockholm, <http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-159065> (23/11/2020). See also Guido Scherrer, Manno: A Superbrain for Switzerland, in: Monika Dommann et al. (eds.), *Data Centers: Edges of a Wired Nation*, Zurich 2020, pp. 30–44.

⁹ In the last decade, media studies and science and technology studies have constantly overlapped and influenced each other. In order to explore this disciplinary connection, see, for example, Pablo Boczkowski and Leah A. Lievrouw, *Bridging STS and Communication Studies: Scholarship on Media and Information Technologies*, in: Edward J. Hackett et al. (eds.), *The Handbook of Science and Technology Studies*, 3rd Edition, Cambridge MA 2008, pp. 949–977.

¹⁰ John E. Aldag, *The Impact of Supercomputers: Global, Pervasive, Positive*, in: *International Journal of Supercomputing Applications*, 1989, 3(2): 3.

calculations include climate change¹¹ and weather forecasting. For example, people get forecasts on their smartphones without asking where they come from or who produced them. Supercomputers make these forecasts possible through complex calculations that only powerful machines can do. Other examples exist. But the point is that supercomputers play a crucial role in routine areas of modern society. Supercomputers enable these practices, and for this reason studying them can help to better understand contemporary social practices and innovation.

Archival research and sources

To investigate the origins of CSCS, we mainly selected sources from two archives: the CSCS archive in Lugano and the ETHZ archives in Zurich.¹² We searched primarily for documents from 1985 to 2000, although we also found and collected previous and later relevant materials. The physical visits were followed by online research to find missing documents, for example, some of CSCS's annual reports. In total we have collected and digitalized a total of over 8000 documents.

These sources are diverse and are mainly written in German, although they also include French, Italian, and English documents. Projects to build a national supercomputing center are the most frequent types of documents. Among these, we found various project proposals published by ETHZ, other national institutions and some private companies, reports, and evaluations on the various proposals (mainly published by ETHZ and the Swiss federal government), as well as personal letters and exchanges of communication between the numerous political and economic actors involved (among which

¹¹ Paul N. Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*, New York 2010.

¹² The ETH Zurich University Archives mainly contain documents from ETHZ and from the ETH Council. We went through documents from these sources between the years 1985 and 2000, in particular administrative documents from the ETH «Schulleitung» (ETH Executive Board). Access was possible after a request to the General Secretariat of ETH Zurich. Other documents were subject to an embargo period and were therefore not provided in certain cases.

the ETH Council¹³). Other sources included internal material from CSCS and ETHZ, such as magazines, press releases, flyers, and brochures. Finally, materials from national and local political actors, international and Swiss tech-magazines (mostly focused on different types and uses of supercomputing), as well as articles published in Swiss newspapers and programs for public events and research seminars also proved useful.

The most relevant sources were translated into English and categorized according to different political, economic, and even geographic visions. Especially in the ETHZ archives, we found several sources regarding the importance of federalism and decentralization in supercomputing. In the CSCS archive, issues related mainly to location and to political and industry debates on the rationale for the center. Both archives contain sources and documents on future users and on the international connections the CSCS was thought to be able to build. The press release folders were crucial for understanding how Swiss newspapers reported on the origins of the center in the German- and Italian-speaking areas.

At a later stage of this research, we were able to get in touch with Fulvio Caccia, a member of Ticino's Council of State from 1977 to 1987 and of the Swiss National Council between 1987 and 1998. Caccia provided us with materials from his personal archive, collected during the four-year mandate assigned to him by the Ticino State Council in 1987 to develop the cantonal university, in particular possibilities for collaboration with the universities and the two Swiss Federal Institutes of Technology.¹⁴ These materials comprise several personal letters and a memorandum in which Caccia explains his role in the founding of CSCS.

13 The Federal Council had mandated ETHZ to implement the supercomputing project. However, because it was a large national project, decisions needed to follow a specific path. Decisions were first taken by the ETHZ Executive Board, then by the ETH Council (which involved representatives of both ETHZ and EPFL), and then finally the Federal Council. For this reason, we also examined documents involving the ETH Council and the Federal Council.

14 Fulvio Caccia, personal collection, Memorandum on CSCS, 30/9/1991.

Why build a supercomputing center for Switzerland?

An «act of solidarity» by ETHZ: a supercomputer to promote informatics in Switzerland

The federal government's decision of 1985 to foster the development of digital infrastructures in Switzerland not only resulted in a supercomputing center; it also gave rise to a national university network named SWITCH.¹⁵ The aim of SWITCH was to provide Switzerland with a decentralized infrastructure connecting different research institutions, whereas the supercomputing «center» would act as a key hub in which raw data would be collected and processed for scientific purposes. The Swiss Federal Council had several motives for acquiring a scientific supercomputer and building a computer network among universities. The «information society» was «at the door» and «no one» could «stop the technological revolution».¹⁶ According to the Federal Council, in the late 1970s and early 1980s Switzerland had «fallen into a new and dangerous dependence on foreign resources».¹⁷ To safeguard its independence, the country had to react. Huge efforts were undertaken at both the technological and intellectual level to educate new engineers, to help Swiss companies compete in the international market, to train new professionals in the field of informatics, and to connect Swiss higher education and research institutions both nationally and internationally. The government's decision was thus in line with global investments in the information and communications technology (ICT) sector and with the mainstream political economy of communication, which encouraged embracing the «information society» in Western countries. As media historians have shown, this idea had

¹⁵ For a compelling analysis of the history of SWITCH, see Daniela Zetti's article in this issue.

¹⁶ Swiss Federal Chancellery, 1986, p. 273. Original text in Italian: «[È] incontestabile che nessuno è in grado di contenere la rivoluzione tecnologica. La società informatica è alle porte».

¹⁷ Ibid. Original text in Italian: «La Svizzera è caduta in una nuova e pericolosa dipendenza dall'estero. La Svizzera, paese povero in materie prime, deve già da tempo sfruttare l'unica risorsa di cui dispone, segnatamente la propria «materia grigia»».

been circulating globally at least from the 1970s, if not before, and it would characterize the final decades of the 20th century.¹⁸

The Federal Council decided to fund the supercomputing project – to establish centralized supercomputing somewhere in Switzerland – in the amount of 40 million Swiss francs and directed ETHZ to implement it.¹⁹ For its part, ETHZ supplemented the public funds with 8 million francs, plus human and technical resources. Such numbers turned out to be only a minimal part of the real investment in CSCS; in the years that followed, managing the supercomputing center would entail considerable annual costs for human and technical resources.²⁰

The relevance of CSCS for the future of Switzerland as a nation was evident in its full name: Swiss National Supercomputing Centre. Despite the fact that supercomputing power was already being exploited by Swiss institutions such as the two Swiss Federal Institutes of Technology in Zurich (ETHZ) and in Lausanne (EPFL), the new center represented an innovative service for Switzerland far beyond its cantonal borders. In fact, notwithstanding the key role of ETHZ both in the founding and operation of CSCS, the center was and still is the «Swiss» supercomputing center. In other words, CSCS was (and is) a central national service and facility aimed at accelerating and favoring the digital growth of the country. As stated in the federal

18 Some key national reports and studies from the 1960s to the 1970s have been analyzed in depth in the literature of media and technology studies. Consider, for instance, the influence of Nora and Minc's *Computerization of Society* or Daniel Bell's neologism «post-industrial society». However, historians have paid less attention to certain key texts on the managerial and business aspects of computing, such as articles and reports released by McKinsey and Company. These texts are often cited in the business literature on computing and supercomputing, and they constantly come up in our corpus of sources from the CSCS Archive: see, for example, Simon Nora and Alain Minc, *L'informatisation de la société*, La documentation française, Paris 1978; Daniel Bell, *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, New York 1983; McKinsey and Company, *Unlocking the Computer's Profit Potential*, in: *Computers and Automation*, 1969, 16(7): 24–33.

19 Fulvio Caccia's Personal Archive, «Memorandum on CSCS», 30/9/1991.

20 ETHZ Archives, Box 12_ER-GS-Leh01:1.5.21 f, CSCS Manno & POL-HLR 91_2. Most of this information is contained in a letter from Seehars to Scheidegger on the settlement of the Federal Council's loan for the high-performance supercomputer, pp. 2–8.

dispatch of 1985, the first goal in acquiring the supercomputer was to provide «all» Swiss institutions with «a real computer service able to manage a decentralized system for a heterogeneous usership».²¹

Decentralization, both at the technical and symbolic level, is a crucial concept for the birth of CSCS, especially in terms of national policies and sociotechnical imaginaries.²² Arguably, decentralization is relevant for at least three reasons. First, it is part of the «digital federalism» model that characterizes Switzerland. In combination with the future network SWITCH, the future CSCS was imagined as a technical tool for decentralizing and, in turn, federalizing Swiss digital resources and services. The idea was to create a new and (partially) independent institution that would provide a kind of «public service» separate from the internal activities of ETHZ and EPFL. Notably, ETHZ played a key role in this process since it was mandated by the Federal Council to implement the supercomputer project and contributed to it with additional funding to create the center. ETHZ has also consistently supervised CSCS workflow, productivity, and budgets.

For ETHZ, locating the center in Ticino meant clearly separating its internal projects – which were kept in Zurich – from its external ones, which were shifted to CSCS. Furthermore, from a more pragmatic perspective, the lack of physical space in the buildings owned by ETHZ and the location in a «neutral» area like Ticino encouraged the support of the governing body of the Swiss Federal Institutes of Technology (ETH Council), thus overcoming the competition between ETHZ and EPFL.

Second, the new center also meant extending computational resources to scientists throughout the country. The supercomputing center was expected to provide all Swiss scientists, engineers, and computer scientists with new tools and professional skills. As stated in a 1990 ETHZ press release:

²¹ Swiss Federal Chancellery, 1986, p. 283.

²² We use the expression *sociotechnical imaginaries* as defined by Jasanoff and Kim, namely, «collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects». See Sheila Jasanoff and Sang-Hyun Kim, *Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea*, in: *Minerva*, 2009, 47: 120.

Now a single national computer is to be added for selected top needs of all universities. The various research groups – above all chemists, physicists, biologists, and, to an increasing extent, engineers – will use this national high-performance computer mostly via fast data lines from their place of work, but in some cases also locally at the location of the computer center.²³

Actually, digital literacy and specialization in informatics were two milestones for Swiss digital development, increasing access to the «information society» and becoming up-to-date:

All these measures by the Confederation clearly document the strong determination of the federal authorities to provide Swiss research with the necessary means to keep abreast of the rapid worldwide scientific advances and to develop as much as possible the creativity of its scientists.²⁴

Finally, centralizing the computing facilities in Ticino served to deliver a critical facility to a canton that had previously lacked academic and scientific institutions. This decision aimed somehow to balance the gap between the German- and French-speaking parts of the country with the Italian-speaking region. Hence, the decision to locate the center in Ticino, apart from its local impact, was in line with the federalist principle to distribute not only political power but also scientific and infrastructural functions and institutions to bring all the regions closer together. ETHZ president Jakob Nüesch defined the founding of CSCS in Ticino as «an act of solidarity to a promising region for both research and production [...] (with) great capacity potential»²⁵ This sort of *political federalism* also included «the willingness to involve the

²³ ETHZ Archives, Manno_Akz2000-01_Auswahl, 1989-1991_POL HLR-91_3, ETHZ Press release, 26-27/6/1990, p. 1. Original text in German: «Nun soll ein einziger nationaler Rechner für ausgewählte Spitzenbedürfnisse aller Hochschulen dazukommen. Die verschiedenen Forschungsgruppen – vor allem Chemiker, Physiker, Biologen und in zunehmendem Mass auch Ingenieure – werden diesen nationalen Hochleistungsrechner meist über schnelle Datenleitungen von ihrem Arbeitsort aus benützen, teilweise aber auch lokal am Standort des Rechenzentrums.»

²⁴ CSCS Archive, Project HLR-91, Project basis/initialization, On the initiative for an HSC center in Switzerland, pp. 5-6.

²⁵ CSCS Archive, 1.10.1992 Inaugurazione CSCS, For the press, Nüesch's discourse for CSCS inauguration, pp. 3-4.

Italian-speaking area of Switzerland in the academic sphere through an important national project».²⁶ Moreover, it went hand in hand with the idea of *social federalism*, which aimed at making CSCS into «an excellent example of a high-level scientific service placed at the disposal of the whole [national] scientific community»,²⁷ able to «act as a bridge»²⁸ connecting the higher education sector with national academic and industrial research.

In line with this narrative, Werner Carobbio, member of Ticino's parliament, stated during a parliamentary hearing in 1989:

The decision to install the new supercomputer for ETH Zurich in Ticino is very welcome, as it recognizes regional policy requirements and the administration's decentralization efforts. In addition, it goes a long way toward enabling the peripheral region of Ticino to move closer to the centers of Zurich and Bern.²⁹

Notwithstanding the clear positive stance toward the founding of a «decentralized» center, Carobbio's statement highlights an unsolved contradiction in CSCS history: the fact that the supercomputing center was «for ETH Zurich» as a federal institution and not for Switzerland. Even today, CSCS is a national service and represents the expression of the federalist vision of a decentralized distribution of power; but it is also a symbol of the power of ETHZ. It is a kind of scientific (but also political) «soft power» exercised by the most prestigious academic institution in Switzerland. This contradiction between federalism and scientific authority, or in other words between decentralization and centralization, deeply impacted CSCS in its first decades,

²⁶ CSCS Archive, Project HLR-91, Technical documents, Report on CSCS for Ticino government, p. 1. Original text in Italian: «la volontà di coinvolgere la Svizzera Italiana nella sfera accademica con un importante progetto a carattere nazionale».

²⁷ CSCS Archive, Annual Reports, 1992, p. 7.

²⁸ Ibid., 1999–2000, p. 3, Interview with new director Michele Parinello.

²⁹ CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Parliament, Interpellation of Mr. Carobbio, 14/6/1989, p. 3. Original text in German: «Der Entschied, den neuen Supercomputer für die ETH Zürich im Tessin zu installieren, ist sehr begrüßenswert, trägt er doch die regionalpolitischen Anforderungen und den Dezentralisierungsbemühungen der Verwaltung Rechnung. Ausserdem rückt mit Sicherheit auf diese Weise die Randregion Tessin den Zentren Zürich und Bern etwas näher.»

at least until the rebirth of the center when it was moved from Manno to Lugano in 2012.

In fact, following the 1991 inauguration, the promises of outstanding success for the center failed to materialize. Several interrelated reasons explain why. First, according to Fulvio Caccia, the new president of ETHZ, Jakob Nüesch, did not drive the CSCS project with the enthusiasm and long-term perspective of his predecessor, Hans Bühlmann. During the 1990s, the center went through five different directors, and ETHZ had great difficulty managing and supervising its activities from Zurich. Second, despite the construction of new Swiss digital and transportation infrastructures, the physical distance between Manno and Zurich did not help. It took academics and scientists coming from Zurich several hours to reach the center. And although CSCS and the regional airline Crossair³⁰ were able to find some agreement, the most efficient hub for getting to Manno was far away in the Italian city of Milan. Third, decisions taken by scientists and academics not affiliated with ETHZ were difficult to supervise. The supercomputing market was changing fast in the 1990s, and both technical and managerial decisions required substantial human, political, and scientific resources that ETHZ could not (or perhaps did not want) to use for the center. Finally, from an infrastructural perspective, data connections for supercomputing were slow and very expensive at the time. Indeed, the supercomputer was not a normal client, and supercomputing was not a mainstream application; it required particular effort, also in terms of data management and infrastructure. These needs called for further federal financial and infrastructural investment that would only come about with time. Overall, as current CSCS director Michele de Lorenzi has argued, «ETHZ had its baby. But there is a difference between giving birth to a baby and raising it».³¹

³⁰ On the deal between CSCS and Crossair, see ETHZ Archives, Box 12_ER-GS-Leh01:1.5.21 f, R-GS-Leh01: 1–5–21e-f, p. 34, Mail from Grin to Chapuis, 2/7/1997.

³¹ Interview with Michele de Lorenzi, 18/12/2019.

A «cultural and economic future» for Ticino: the choice of Manno and the dispute about location

As soon as the Federal Council decided to finance a new supercomputer, discussions started on where to locate it. In the early years, both ETHZ and EPFL wanted to host the supercomputer and to secure the federal funds for it. This tension between the two institutions blocked the decision process for some time. Then, at the beginning of 1988, it was decided to establish a new research center to host the supercomputer (this was not taken for granted in the federal dispatch) and serious location proposals started to come in. The search for a location was also a race against time because, as stated in the federal dispatch, «[the] period of validity [of the fund] is limited to five years and, in view of the difference between the academic year and the calendar year, will begin on 1 October 1986 and expire on 30 September 1991».³²

A definite location therefore needed to be found as soon as possible, also given the fact that ETHZ was «already planning to install the national HLR [*Hochleistungsrechner*, «supercomputer» in German] in mid-1991»; as such, any «postponement of the installation should be avoided».³³ Hence, it was agreed that «the location decision should be finalized in April 1989», so as to allow the center's installation «in a timely manner and without significant inconvenience to users».³⁴

In February 1988, as part of his mandate from the Ticino State Council, Fulvio Caccia went with Giuseppe Buffi to meet ETHZ president Hans Bühlmann. When asked about establishing collaborations between ETHZ and Ti-

³² Swiss Federal Chancellery, 1986, pp. 270–271. Original text in Italian: «La durata di validità è limitata a cinque anni e, in considerazione dello sfalsamento tra anno accademico e anno civile, inizierà il 1° ottobre 1986 e scadrà il 30 settembre 1991.»

³³ ETHZ Archives, Manno_Akz2000-01_Auswahl, 1989–1991_POL HLR-91_10, p. 3. Original text in German: «[D]ie ETH Zürich plant schon heute mit der Zielsetzung, dass der nationale HLR Mitte 1991 installiert wird. Deswegen soll eine Verschiebung der Installation vermieden werden.»

³⁴ CSCS Archive, Project HLR-91, Realization phase, Bühlmann on the location in Ticino, pp. 1–2. Original text in German: «Ein Standort Tessin ist für den nationalen HLR zeitgerecht und ohne wesentliche Nachteile für die Benutzer möglich, sofern der Standortentscheid im April '89 definitiv fällt.»

cino, Bühlmann affirmed that a first step could be the realization in Ticino of a scientific seminar center related to ETHZ (Centro Stefano Franscini at Monte Verità, Ascona); subsequently, a bigger project, such as a supercomputing center, could be evaluated. Seven months later, the seminar center had advanced very well, and so Bühlmann confirmed his interest in locating the supercomputing center in Ticino.³⁵

Nevertheless, two main objections emerged at the federal level: the telecommunication networks in Ticino were not equipped to transmit the required volumes of data and, especially, there was not enough time to build the center by September 1991.³⁶ Buffi then pushed Caccia to do his «best in order to avoid the closure of the dossier, recognizing at the same time that a public building with such special needs could not be built in three years».³⁷

At the same time, Silvio Tarchini, a successful local entrepreneur active in the construction industry, was about to erect several industrial buildings in Manno (seven kilometers north of Lugano), at a site he had just rented from the Swiss Federal Railways (SBB) with a lease term of sixty years. He then planned to rent these buildings to various other companies. When Caccia learned about this project, which was already at an advanced stage, he met Tarchini and explained the supercomputing project to him. Interested in taking part, Tarchini proposed to rent ETHZ a space inside one of the SBB buildings to house CSCS.³⁸ Close to the railways, several industries, and the airport, Manno seemed the perfect location for the center.

In early September 1988, Caccia met with the ETHZ Executive Board. After some initial skepticism,³⁹ and the ironic observation on the part of some

³⁵ Caccia, Memorandum on CSCS, p. 2.

³⁶ Ibid.

³⁷ Ibid. Original text in Italian: «Buffi m'incarica di fare il possibile per non lasciar chiudere l'incarto in quel modo, pur convenendo che in tre anni non si realizza nessun edificio pubblico con esigenze speciali.»

³⁸ Ibid., p. 3.

³⁹ «With the tact that denials can well justify, I am told clearly that there is nothing to do, that this is not the right opportunity for Ticino, that we need to look for another one». Original text in Italian: «Con la delicatezza che i dinieghi possono ben giustificare, mi si dice in modo chiaro che non c'è niente da fare, che non è l'occasione buona per il Ticino, che occorre cercarne un'altra». Ibid.

that the center risked ending up being a «cathedral in a desert», Caccia persuaded the board to create a working group to «investigate whether and at what price the structural, technical, and personnel infrastructure required for the national high-performance computer could be provided in Ticino» and, if yes, which location would better suit the center.⁴⁰ This working group included ETHZ vice-president Carl August Zehnder, his secretary Mr. Schindler, Fiorenzo Scaroni from the ETHZ computing center, and Caccia.⁴¹ The group sent its final report to Bühlmann on 1 March 1989; the report was accepted a week later by the entire ETHZ Executive Board and on 29 March by the ETH Council. The Federal Council was then informed of the Manno site's suitability and, after further evaluation, final approval was given to the project.⁴²

The first hurdles to the location were not long in manifesting, however. On 3 June 1989, an article published in the *Tessiner Zeitung*⁴³ reported that the previous owners of the site in Manno, which «was expropriated from them in the seventies», had «filed a complaint with the court» against the SBB, which was using the site «for purposes other than [those which led to the] expropriation» (Fig. 1). Indeed, the SBB had acquired the land to construct a goods depot and later decided «to rent out the remaining part that was not needed» to several investors, including Silvio Tarchini, who then offered part of the site «to the Federal Office for Buildings [and Logistics] for rent».⁴⁴

⁴⁰ CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Parliament, Answers to questions on HSC center. Original text in German: «Die Schulleitung der ETH Zürich setzte in September 1988 eine Arbeitsgruppe mit dem Auftrag ein, zu untersuchen, ob und zu welchem Preis im Tessin die für den nationalen Hochleistungsrechner erforderliche bauliche, technische und personelle Infrastruktur bereitgestellt werden kann.»

⁴¹ Fulvio Caccia, personal communication, 27/8/2020, and Caccia, Memorandum on CSCS.

⁴² CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, On location, Minutes ETH Council, 29/3/1989, and Caccia, Memorandum on CSCS.

⁴³ The *Tessiner Zeitung*, published weekly in Ticino, is a German-speaking newspaper aimed at German speakers living in Ticino.

⁴⁴ CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Press articles, *Tessiner Zeitung*, 3/6/1989. Original text in German: «Ihnen war das 140 000 Quadratmeter grosse Grundstück in Manno in den siebziger Jahren enteignet worden. [...] Die Bundesbahnen beschlossen deshalb, den nicht benötigten Rest zu vermieten. [...] Unter den Mietern figuriert auch der Luganeser Bauunternehmer Silvio Tarchini. Er

3. Juni 1989

3772

Die ehemaligen Besitzer des SBB-Geländes in Manno haben beim Gericht Klage eingereicht

Erste Hindernisse für das geplante Super-Elektronenhirn im Tessin

«Ein äusserst komplizierter Rechtsfall kommt auf uns zu»

MANNO (bk) - Erste Hindernisse verzögern den rasanten Einzug des Supercomputers ins Tessin: Die Anmietung eines fixfertigen Rechenzentrums in Manno klappt doch nicht so reibungslos, wie Bund und Eidgenössische Technische Hochschule (ETH) sich das vorgestellt haben. Dazwischengeschaltet haben sich mit einer Klage die ehemaligen Besitzer des Geländes.

Ihnen war das 140 000 Quadratmeter grosse Grundstück in Manno in den siebziger Jahren enteignet worden. Es war von den SBB als Standort des geplanten Güterbahnhofs Lugano-Veduggio ausersehen. Doch für den Bau des "Cargo Domicilio" war dann nur ein Teil des Geländes notwendig. Die Bundesbahnen beschlossen deshalb, den nicht benötigten Rest zu vermieten. Und zwar für jährlich zehn Franken pro Quadratmeter und mit einer Mietvertragsdauer von 60 Jahren.

Unter den Mietern figuriert auch der Luganeser Bauunternehmer Silvio Tarchini. Er will auf dem Grundstück ein 16 500 Quadratmeter grosses Industriezentrum bauen und hat einen Teil davon - 2000 Quadratmeter - dem Amt für Bundesbauten zur



Baubeginn trotz unklarer Besitzverhältnisse?

Miete angeboten. Die Offerte kam gerade recht, denn das Amt hielt nach einem Standort für ihr nationales Zentrum für Hochleistungsrechner Ausschau. Ausserdem hatte Architekt Tarchini gleich auch noch auf eigenes Risiko ein Projekt für einen Pavillon zur Installation des Elektronenhirns und der dazugehörigen Büros ausgearbeitet (TZ vom 20. Mai).

Dass die SBB ihr ehemaliges Grundstück nun einfach gewinnbringend vermieten, stösst den früheren Besitzern des Geländes sauer auf. Sie reichten Klage beim Gericht ein. Denn gemäss Artikel 104 des Enteignungsgesetzes müssen enteignete Besitzer informiert werden,

wenn ihr ehemaliger Boden plötzlich einem anderen als dem Enteignungszweck zugeführt wird. Dies haben die SBB jedoch unterlassen.

Der Bellinzoner Rechtsanwalt Tuto Rossi, der die Bundesbahnen in dieser Angelegenheit vertritt, hat eine harte Nuss zu knacken. Die rechtliche Lage,

mit der er es hier zu tun hat, ist äusserst kompliziert. Und sie könnte noch verzwickter werden: «Sollte das Gericht zugunsten der Kläger entscheiden, hätten wir es mit einem der schwierigsten Rechtsfälle überhaupt zu tun», orakelt der avvocato. Das Grundstück könnte dann an die früheren Besitzer zurückgehen - allerdings um ein privates Industriezentrum und einen bundeseigenen Supercomputer angereichert.

Derweil hat das von Architekt Tarchini geplante Bauvorhaben - vorläufig noch ungestört - die ersten Hürden genommen. Das Municipio von Manno hat dem Unternehmer bereits eine Baubewilligung erteilt. Ein paar Auflagen sind dem Architekten zwar aufgebrummt worden. Aber die sind eher nebensächlicher Natur - wie beispielsweise die Anordnung, dass ein Teil der 400 im Freien vorgesehenen Parkplätze unterirdisch angelegt werden soll. Die abgeänderten Baupläne werden in ein paar Tagen an die Gemeinde zurückgehen. Dann könnte mit den Bauarbeiten begonnen werden. In der Zwischenzeit sitzen derweil der Bund und die ETH, die angesichts der unklaren Besitzverhältnisse nicht so recht wissen, wohin mit ihrem Computer.

Fig. 1: Tessiner Zeitung, 3 June 1989, «First hurdles for the planned supercomputer in Ticino» (CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Press articles, Tessiner Zeitung, 3/6/1989).

After learning about this problematic situation, on 14 June 1989, the Swiss federal government warned that a final decision on the location was not to be taken too quickly, since the project was extremely important on a national level and the consequences of a bad decision would seriously impact its completion. Along with the problematic legal disputes, it was pointed out that «[neither] the location in a highly industrial zone nor the buildings se-

will auf dem Grundstück ein 16 500 Quadratmeter grosses Industriezentrum bauen und hat einen Teil davon - 2000 Quadratmeter - dem Amt für Bundesbauten zur Miete angeboten. [...] Dass die SBB ihr ehemaliges Grundstück nun einfach gewinnbringend vermieten, stösst den früheren Besitzern des Geländes sauer auf. Sie reichten Klage beim Gericht ein.»

lected seem to reflect the importance of the project». ⁴⁵ In addition, «[it] would have been better to house the computer in a specially designed and constructed building», and to actively involve the Canton of Ticino with «a regular call for proposals», ⁴⁶ also considering that «tempting offers from other entrepreneurs in the area» had been rejected without being considered. ⁴⁷

Moving the deadline for the definite decision on the location to 30 March 1990, ⁴⁸ and the deadline for the final installation of the center to 30 June 1991, ⁴⁹ the working group started to look for other possible locations in case the dispute between the former owner of the space in Manno and the SBB was not quickly resolved. ⁵⁰ On 24 October 1989, a public request for proposals was published by the Canton of Ticino, and in one month 36 different proposals were submitted. ⁵¹ The proposals included Tarchini's original site in Manno (the dispute over which was now resolved), as well as one from a pair of brothers, Giuliano and Attilio Bignasca, in the nearby town of Bioggio (which had previously been considered as an option but was discarded due to non-compliance) (Fig. 2). These two projects appeared to be

⁴⁵ Ibid., Parliament, Interpellation of Mr. Carobbio, 14/6/1989. Original text in German: «Weder der Standort in einer ausgesprochen industriellen Zone noch die ausgewählten Gebäude scheinen der Bedeutung des Projektes Rechnung zu tragen. [...] Besser wäre, den Computer in einem eigens dafür konzipierten und errichteten Gebäude unterzubringen.»

⁴⁶ CSCS Archive, 1988–1991 CSCS – Zeitungsartikel Entwicklung Infrastruktur Manno, *Gazzetta Ticinese*, 22/8/1989. Original text in Italian: «un regolare bando sul Foglio ufficiale».

⁴⁷ Ibid., *Giornale del Popolo*, 12/9/1989. Original text in Italian: «rifiuti di allettanti offerte di altri imprenditori della zona che permetterebbero di installare il Centro di calcolo ad un tiro di schioppo da Manno».

⁴⁸ ETHZ Archives, Manno_Akz2000–01_Auswahl, 1989–1991_POL HLR-91_12, Minutes meeting HLR-91-Infrastruktur, 18/9/1989, p. 2.

⁴⁹ Ibid, p. 4.

⁵⁰ CSCS Archive, Project HLR-91, Realization phase, Swiss Federal Chancellery on CSCS, 2/10/1989.

⁵¹ ETHZ Archives, Manno_Akz2000–01_Auswahl, 1989–1991_POL HLR-91_8, p. 3. Press release on the continuation of work on CSCS location in Ticino, 1/12/1989.

the only ones «able to meet the 1991 deadline»,⁵² but this two-horse race led to a local dispute over the location of CSCS. In particular, the Bignascas reproached the government for not previously publishing a public request for proposals, but rather favoring a near ready-made project for time reasons to the detriment of normal competition. The Bignascas wanted the public to be aware that Tarchini's initial offer and, consequently, the government's decision had not followed regular procedures. In a local newspaper, Giuliano Bignasca now claimed to be very satisfied the government had finally decided to open the public request for proposals, arguing that «[i]n our country there is a competition to award the construction of a few meters of sewer. Why should the same not be done for a [...] supercomputing center?». ⁵³

In addition to the Tarchini–Bignasca affair, another protest against the initial choice of Tarchini's project came from a group of architects in Ticino. In a letter addressed to the Ticino State Council signed by prestigious figures, including Mario Botta, architects reclaimed their right to create a more «functional, decent, representative building of good quality» for CSCS and to safeguard the Ticinese cultural landscape.⁵⁴

On 1 December 1989, Tarchini's proposal was pronounced «the only suitable project»⁵⁵ by the ETH Council. The project was accepted by the Fed-

⁵² CSCS Archive, 1988–1991 CSCS–Zeitungsartikel Entwicklung Infrastruktur Manno, *Giornale del Popolo*, 25/10/1989. Original text in Italian: «soltanto io [Bignasca] e Tarchini siamo in grado di rispettare la scadenza del 1991».

⁵³ Ibid., 9/11/1989. Original text in Italian: «Al Poli dovrebbero essere pervenute una ventina di proposte, in seguito alla pubblicazione sul Foglio ufficiale e cioè da quando l'arrivo del Centro in Ticino ha preso una piega «pubblica»: una conclusione più che logica, ha aggiunto Bignasca. «*Nel nostro paese si fa un concorso per attribuire la costruzione di pochi metri di fognatura, perché non si doveva fare con un centro di calcolo da 20 milioni?*»»

⁵⁴ CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Architect. Letter from Belinelli and Galfetti to Ticino State Council, p. 2. Original text in Italian: «una struttura funzionale, dignitosa, rappresentativa: di buona qualità.»

⁵⁵ ETHZ Archives, Manno_Akz2000–01_Auswahl, 1989–1991_POL HLR-91_8, pp. 4–5. Letter from Scaroni to Zehnder, 1/12/1989. Original text in German: «Besonders auffallend ist das Zitat von Herrn Tarchini für das Projekt in Manno, das einzige bewilligte Projekt». According to Caccia, the decision in favor of the Tarchini project was made during a meeting with federal councilor Flavio Cotti and finance minister Otto Stich.

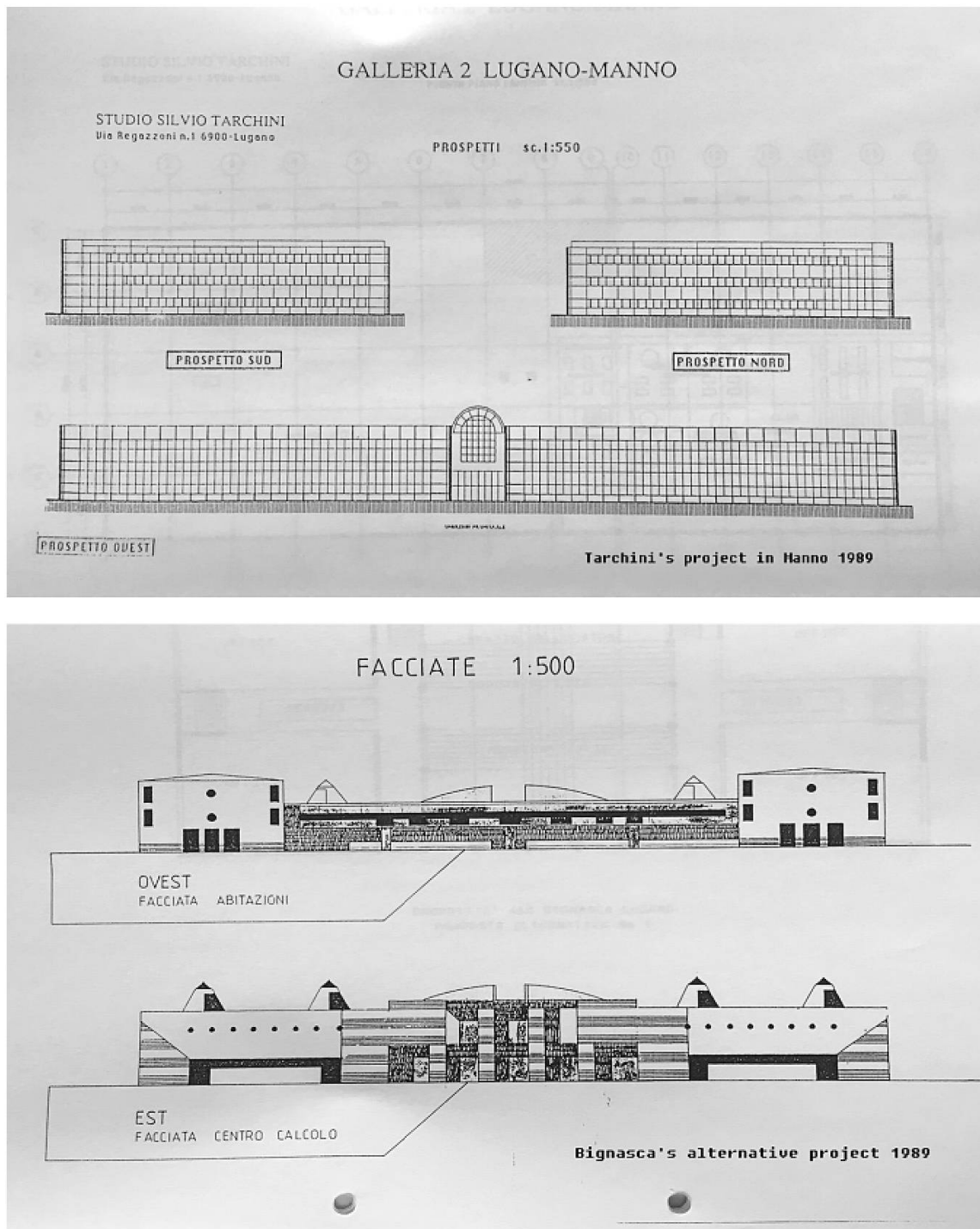


Fig. 2.1 and 2.2: The architectural plans of the competing buildings proposed by Tarchini and Bignasca in 1989 (CSCS Archive, 1989 Manno – Nationales Hochleistungsrechenzentrum, Tarchini, Stabile Galleria Manno 2; Bignasca, Alternative Project).

Stich would agree to a solution in Ticino only if it offered the most advantageous financial terms, which Tarchini's proposal did.

eral Council during its session of 14 February 1990,⁵⁶ giving the go-ahead for the final steps of the CSCS installation. Inaugurated in Manno on 1 October 1992, CSCS was immediately framed as an incredible asset for Ticino. The canton «ha[d] gained an important academic research institution»⁵⁷ as well as «access to advanced technology»,⁵⁸ making the region «the reference point of all national universities and the ETHs»⁵⁹ and securing «a successful cultural and economic future»⁶⁰ for Ticino. Indeed, together with technical standards, the criteria for selecting the best project also included the opportunity to «[initiate] further activities in the immediate vicinity of the center», an aspect which had been considered extremely relevant since the very beginning of the project. The CSCS was also intended «to promote teaching, research and technology transfer in the third national language» area, a desire of many for several years, as well as creating a hub that, along with the university sector, was meant «to act as a crystallization point for these activities», as well as «a number of projects» in higher education.⁶¹ Among these projects was the local university (USI Università della Svizzera italiana), al-

⁵⁶ CSCS Archive, Project HLR-91, Realization phase, Federal Council on HSC center location, 14/2/1990.

⁵⁷ CSCS Archive, 1.10.1992 – Inaugurazione CSCS, Press articles, Tessiner Zeitung, 5/10/1992. Original text in German: «Denn mit dem Superrechner habe der Nicht-Universitäts-Kanton Tessin eine wichtige universitäre Forschungseinrichtung erhalten.»

⁵⁸ CSCS Archive, Project HLR-91, Realization phase, Swiss Federal Chancellery on CSCS, 2/10/1989, p. 1.

⁵⁹ CSCS Archive, 1.10.1992 – Inaugurazione CSCS, Press articles, Corriere del Ticino, 2/10/1992.

⁶⁰ CSCS Archive, 1992–2000 Cross-cuts, 1994, p. 2, Editorial by Alfred Scheidegger.

⁶¹ ETHZ Archives, Manno_Akz2000–01_Auswahl, 1989–1991_POL HLR-91_11, Analysis of location options, 12/10/1989, p. 6. Original text in German: «Als zusätzlicher Aspekt für die Gesamtbeurteilung des Projektes gilt die Möglichkeit, weitere Aktivitäten in der unmittelbaren Umgebung des Zentrums anzusiedeln [...]. Dadurch wird die Realisierung des politischen Vorhabens Lehre, Forschung und Technologietransfer in der dritten Landessprache zu fördern, erst möglich. Neben dem universitären Bereich soll das HLR-Zentrum als Kristallisationspunkt für diese Aktivitäten wirken. Auf kantonaler, eidgenössischer und europäischer Ebene zeichnen sich bereits einige Projekte ab, die für eine Umsiedlung in die Nähe des Zentrums in Frage kommen.»

ready considered as a possible partner before its establishment in 1996 and the creation of its Faculty of Informatics in 2004.

Several of these projects actually saw the light of day (for example, USI), although the resistance of numerous actors, especially in Ticino and its State Council, seriously delayed or prevented cooperation between CSCS and other emerging schemes. According to Fulvio Caccia, the latter included «the concentration of scientific activities already present in Ticino (the Dalle Molle Institute for Artificial Intelligence, the Institute for Research in Biomedicine, and the Institute of Earth Sciences), or others underway, such as the IT and electronics sections of the University of Applied Sciences and Arts of Southern Switzerland (SUPSI)».⁶²

If Tarchini was the winner of this local dispute, probably the most persistent local narrative around CSCS concerns the losers – the Bignasca brothers. According to them, their exclusion from the competition was an abuse of power by national stakeholders (the federal government, ETHZ, and SBB in particular). A few months later, the Bignascas decided to found the Lega dei Ticinesi, a regional movement intended to bring greater weight in Swiss decision-making processes for the Italian-speaking part of the country. Historically, it is uncertain whether the trigger for this development really was the «CSCS affair», but this narrative endures in Ticino.⁶³

A bridge to «the highly industrialized north of Italy»: internationalization and regionalization

CSCS was not only envisioned as a national strategic asset but was also planned as a bridge for international connections. Notably, Ticino was considered a strategic location for connecting Swiss supercomputers (and Swiss research) to the rest of Europe, especially Northern Italy. This was a long-standing goal that emerged before the creation of the center; it was relevant to the decision-making process; and it persisted at least for the first decade of

⁶² Caccia, personal communication.

⁶³ For example, in 2016 *La Regione*, one of the most important newspapers in Ticino, celebrated the 25th birthday of CSCS with an article reporting this story (see *La Regione*, 20/10/2016).

CSCS. But it was also in tune with a more general turn in Swiss and European politics in the 1980s and 1990s. In his *History of Switzerland*, Jakob Tanner states that the politics of the country embraced this European idea of regionalization and that Ticino was framed as one of the seven Swiss greater regions (*Grossregionen*), with the task of connecting itself to Milan and of respecting Swiss «federal sensitivities» (*föderalistische Empfindlichkeiten*).⁶⁴ The history and politics of CSCS are integral to the broader political economies and ideas that arose at that point in history.

A 1989 document compares the ten best locations of the 36 originally proposed. Among other reasons, Manno seemed to be the best option to establish a bridge with Europe, as evaluators from Zurich noted:

ERCOFTAC. First contacts with EPFL show that the ERCOFTAC coordination group could be advantageously accommodated in Ticino. Synergies with SWITCH for the coordination, planning, and implementation of Europe-wide high-speed communication networks are conceivable. The chairman of ERCOFTAC in Brussels supports this idea.⁶⁵

ERCOFTAC is the European Research Community on Flow, Turbulence and Combustion. It is a mixed public-private network of international collaboration and exchange between industry and research, and it promotes research centers for collaboration, simulation, and applied research. The main goal was to link CSCS with other research centers, to make it one of ERCOFTAC's nodes, and more generally to link Swiss research centers to European ones. In other words, placing the supercomputer in Manno meant opening a door to Europe.

On 2 October 1989, the Federal Council confirmed that locating the center in Manno would create an «important link to similar areas in north-

⁶⁴ Jakob Tanner, *Geschichte der Schweiz im 20. Jahrhundert*, Munich 2015, pp. 481 and 1982.

⁶⁵ ETHZ Archives, Manno_Akz2000-01_Auswahl, 1989-1991_POL HLR-91_11, Analysis of location options, 12/10/1989, pp. 6-7. Original text in German: «ERCOFTAC. Erste Kontakte mit EPFL zeigen, dass die Koordinationsgruppe des ERCOFTAC mit Vorteil im Tessin untergebracht werden könnte. Synergien mit SWITCH für die Koordination, Planung und Realisation von europaweiten schnellen Kommunikationsnetzen sind vorstellbar. Der Chairman von ERCOFTAC in Brüssel unterstützt diese Idee.»

ern Italy».⁶⁶ This is one of the first instances in which Italy is mentioned. Starting from the late 1980s, linking Switzerland and Swiss academic and scientific institutions to Italian ones would be obsessively repeated by different stakeholders.

As stated in a 1990 ETHZ press release:

ETH Zurich would like to establish the national computer center in the Italian-language area in order to improve Swiss university relations with the area of the third national language and also to create a bridge to scientific partners in the highly industrialized north of Italy [...] which will also be politically significant for technology policy across borders.⁶⁷

Note how improving «university relations» with Ticino was essentially a vague goal for ETHZ, whereas establishing links with industrialized partners in Northern Italy was considered «politically significant». This idea underpinned part of a strategy implemented by ETHZ since the second half of the 19th century, the so-called *Annexanstalten*. Research institutes such as EMPA (Eidgenössische Materialprüfungsanstalt) in Dübendorf and, later, the Paul Scherrer Institute in Würenlingen functioned as *annexes* to ETHZ, exploiting industrial interests and research with local partners and leaving academic and theoretical research to the polytechnic.⁶⁸

⁶⁶ CSCS Archive, Project HLR-91, Realization phase, Swiss Federal Chancellery on CSCS, 2/10/1989, p. 2.

⁶⁷ ETHZ Archives, Manno_Akz2000-01_Auswahl, 1989–1991_POL HLR-91_3, Press release after the ETH Board meeting on 26–27/06/1990. Original in German: «Da alle Hochschulen der Schweiz im deutschen und im französischen Sprachgebiet liegen, möchte die ETH Zürich das nationale Rechenzentrum im italienischen Sprachgebiet errichten, um so die schweizerischen Hochschulbeziehungen zum Gebiet der dritten Landessprache zu verbessern und auch um eine Brücke zu wissenschaftlichen Partnern im hochindustrialisierten Norditalien zu schaffen [...] welcher auch für die Technologiepolitik über die Grenzen politisch bedeutungsvoll sein wird.»

⁶⁸ On the ETHZ annexes policy, see David Gugerli, Patrick Kupper, et al., *Transforming the Future. ETH Zurich and the Construction of Modern Switzerland 1855–2005*, Zurich, 2010.

In September 1992, Giuseppe Buffi himself addressed a letter to the local department of education that outlined similar arguments but a broader strategic plan:

The goal of this Swiss scientific computing center is to radiate the strength of its message and to find synergies with the places that host it, here, and perhaps as far as nearby Lombardy. [...] This represents a new paradigm for Ticino. It is the Ticino that many Ticinesi aspire to. [...] I really don't think we will stop here. Not out of self-serving ambition, but to participate with equal commitment, rights, and dignity in the progress of civil society with an eye to European horizons.⁶⁹

This is another way of framing the same narrative from the vantage point of the local stakeholders. The about-to-be opened supercomputing center could usher in a new era for Ticino, a region often underestimated by the rest of Switzerland and by Italy itself. This was the origin of a new paradigm, according to Buffi, also because thanks to CSCS Ticino could bridge the rest of Switzerland to Italy and to a broader European perspective.⁷⁰ Buffi was right. CSCS proved to be a real turning point in the scientific and academic emergence of Ticino and in its opening up to the international scientific community. In 1986, for example, a referendum on the establishment of the university (Centro universitario della Svizzera italiana) was rejected by citizens. But the same politicians who lobbied in favor of CSCS, such as Buffi and Cotti, in the 1990s made the university a reality. Together, CSCS and USI Università della Svizzera italiana would attract scientists and students from all over the world, helping to internationalize the region.

During the CSCS inaugural ceremony, several addresses touched on the strategic relevance of the regional dimension. According to Alfred Scheideg-

⁶⁹ CSCS Archive, 1.10.1992 – Inaugurazione CSCS, For the press, Letter from Buffi to the Ticino department of education, 30/9/1992, pp. 11–12. Original in Italian: «L'ambizione di questo centro svizzero di calcolo scientifico è di riuscire a irradiare attorno a sé la forza del suo messaggio, e di trovare sinergie con i luoghi che lo ospitano, qui, e magari fin giù nella vicina Lombardia. [...] Qui siamo su un quadrato di Ticino nuovo. È il Ticino cui molti ticinesi aspirano. [...] Credo proprio che non ci fermeremo qui. Non per vuota ambizione, ma per partecipare, a parità di sforzi, di diritti e di dignità, al progresso della società civile con uno sguardo rivolto alle prospettive europee.»

⁷⁰ Interview with Mauro Martinoni, 25/8/2020.

ger, CSCS's first director, «the supercomputer [was] not only important for Swiss research and the economy, but it [would] also play an important role in Switzerland's research policy, which aim[ed] at integrating the country within Europe». ⁷¹ Among the new activities to develop the center, cooperation with universities, research centers, private industry, and computer manufacturers in Europe were mentioned. Similarly, ETHZ president Jakob Nüesch underscored the fact that the center enabled «access to Lombardy and its considerable potential. In this way, CSCS can become a relevant point of contact in the Swiss scientific and industrial communication networks». ⁷²

Heinrich Ursprung, former president of ETHZ and the newly elected state secretary for science, spoke at length on the origins and history of supercomputing in Switzerland. He mentioned four main reasons for locating the center in Ticino instead of either with EPFL or ETHZ, as seemed «logical»: the lack of space at the ETH Zurich main campus; the willingness to keep a national computer separate from those in the institutes of technology; the desire to establish high-tech scientific activities in Ticino; and, finally, «the value of an active approach – a European regional policy – toward Northern Italy». ⁷³

The regional and supranational role of CSCS continued to be quoted by new CSCS directors over time without significant changes. At the annual press conference in 1996, Jean-Pierre Thierre declared that CSCS aimed to act as:

⁷¹ CSCS Archive, 1.10.1992 – Inaugurazione CSCS, Press articles, Tessiner Zeitung, 5/10/1992. Original in German: «dass der Hochleistungsrechner nicht nur für die Schweizer Forschung und Volkswirtschaft von Bedeutung sei, sondern auch eine wichtige Rolle in der forschungspolitischen Integration der Schweiz in Europa spielen werde».

⁷² Ibid., For the press, Nüesch's discourse for CSCS inauguration 1/10/1992, p. 4. Original in German: «Der Standort in der italienischen Schweiz auf einem zukunftssträchtigen Gebiet, sondern erschliesst unserem Lande den Zugang zur Lombardei mit ihrem beträchtlichen Potential. Das CSCS kann zu einem wichtigen Glied eines wissenschaftlichen und industriellen Beziehungsnetzes unseres Landes werden.»

⁷³ ETHZ Archives, Box 12_ER-GS-Leh01: 1.5.21f, R-GS-Leh01: 1–5–21e-f, pp. 88–90, Discourse of Heinrich Ursprung (representing the Confederation) at the opening of CSCS in Manno. Original in French: «l'intérêt d'une ouverture active – politique européenne des régions – sur l'Italie du Nord».

promoter of specific projects that may interest Ticino and Lombardy. [...] [CSCS] intends to play a bridge role, acting as a catalyst, between the research of higher education institutions and industry, public administration, [and] the academic community as a whole». ⁷⁴

The same key terms were invoked («Lombardy», «bridge», «catalyst»), the same idea of providing connections between the Swiss and Italian research communities.

In 1999 Michele Parinello, the new director of CSCS and later professor at USI Università della Svizzera italiana, delivered a speech in which he proposed a change of strategy for the Swiss supercomputing center, a shift from «a service center to a science center». The aim was to make CSCS a world-leading research center for computer-assisted simulations of physical, chemical, and biochemical processes. What did not change, yet again, was the focus on the research centers of Northern Italy, especially Lombardy: «CSCS opens up: Links with scientists and institutions in Switzerland and abroad are to be strengthened, particularly the collaborations with the Università della Svizzera italiana and Politecnico di Milano». ⁷⁵

Opening to Europe, and Northern Italy in particular, was one of the enduring discourses that emerged before, during, and after the founding of CSCS. Between the late 1980s and early 1990s, it was considered one of the justifications for placing the center in southern Switzerland and was part of the European policy of regionalization embraced by the country. Linking to Italy meant linking to Europe. The Italian border was so close to Manno and then to Lugano (about twenty kilometers away), that this link looked «natural». During the 1990s, referring to the link to Italy and Europe justified the existence of the center itself, which in its first years was beset by problems, including unstable management.

⁷⁴ ETHZ Archives, Biographisches Dossier ETH/CSCS, *Corriere del Ticino*, 15/6/1996. Original in Italian: «promotore di progetti specifici che possano interessare Ticino e Lombardia [...] intende svolgere un ruolo di ponte, agendo come catalizzatore, tra la ricerca degli istituti di insegnamento superiori e l'industria, la pubblica amministrazione, la comunità accademica nel suo insieme.»

⁷⁵ CSCS Archive, *Annual Reports, 1999–2000*, p. 3.

Despite these declarations, at least in the 1990s, research projects and industrial connections with Italian companies were lacking, and Italian partners were not privileged over other partners.⁷⁶ On the contrary, probably the strongest international link was with Japan and with a private company, NEC. Indeed, the NEC SC-3/22 was the first supercomputer installed at CSCS, and from 1993 CSCS signed an agreement with NEC to allow the Japanese company to «set up a research center at CSCS in order to develop software for supercomputers».⁷⁷ This collaboration, which brought Japanese engineers from NEC to Manno for collaboration «in the field of research and development»,⁷⁸ lasted for three years (Fig. 3). It was stopped in 1996.⁷⁹

The multiple failures of regional and international collaborations in the early 1990s do not mean that this narrative was weak, specious, or even false (we do not have enough evidence to make such a claim). It was one of the narratives that helped different stakeholders to frame a simple and probably successful argument: Switzerland needs a supercomputer. Ticino is the right place to host it (also because it is close to Italy and thus to Europe). Consequently, the supercomputer will attract researchers and expand collaborations in the region and worldwide. In short, thanks to its supercomputer, Switzerland will be closer to Europe or at least on the map of regional and global collaborations.

⁷⁶ ETHZ Archives, Biographisches Dossier ETH/CSCS, *Neue Zürcher Zeitung*, 20/5/1995. This article does indeed list companies that used the supercomputing center in Switzerland. Only one Italian company is listed (*Agusta compagnia aeronautica italiana*), which went bankrupt a few years later. The other companies mentioned are ABB, Ciba, Convex, and the supercomputer companies Cray and NEC.

⁷⁷ Ibid. Original in German: «Die japanische Firma hat im CSCS eine Forschungsstelle zur Entwicklung von Software für Supercomputer eingerichtet.»

⁷⁸ ETHZ Archives, Box 12_ER-GS-Leh01: 1.5.21 f, R-GS-Leh01: 1–5–21e-f, p. 71, Invitation letter from Scheidegger to Grin, 23/2/1993. Original text in German: «Zusammenarbeitsvertrag zwischen dem Centro Svizzero di Calcolo Scientifico (CSCS) und der Firma NEC im Bereich Forschung und Entwicklung».

⁷⁹ Ibid., p. 41, Letter from Grin to Faranak Grange on the end of the CSCS/NEC collaboration, 4/11/1996. Original in French: «[J]e vous donne quelques informations sur la collaboration à ce sujet, maintenant terminée, entre NEC et le Centre suisse de calcul scientifique (CSCS), à Manno (Tessin).»



Fig. 3: Group photo of the fifth NEC-ETHZ joint workshop, 11–12 May 1995 (ETHZ Archives, Akten des Vizepräsidenten Forschung der ETH Zürich, CSCS – NEC – Manno IV).

Conclusions: CSCS and the many faces of digital federalism

The birth of CSCS provides a series of compelling anecdotes and sources that relate directly or indirectly to the digital federalism concept. These sources show the complexity that the creation of an innovative scientific institution implies at the economic, political, and technological level. The history of CSCS also highlights some of the key issues that a country like Switzerland had to face during a technological transition in order to follow its federalist model. The role of CSCS in the digitization of Switzerland was, in fact, not only to provide Swiss people with a technological innovation. Rather, CSCS represented the attempt to address the transition to the information age in accordance with the principles of federalism and to maximize the potential

of the Italian-speaking part of the country, which demanded to take part in national and global technoscientific advancements.

In particular, three key concepts that emerged from our research, and that are strictly linked to the preceding sections, perfectly summarize the symbolic and historical relevance of CSCS for Swiss digital federalism. These concepts embed both the discourses surrounding the birth of the center and federalism as a cultural, political and economic template.

First, CSCS was often compared to a «bridge» that would connect Ticino with the rest of Switzerland, and Switzerland to Northern Italy and thus to Europe (and maybe the world). This center would act as a national, inter-cantonal, regional, and international node, respectively, bringing Ticino and the other cantons closer together but also linking it with Swiss scientific institutions and Italian companies. This bridge would thus cross the local, national, and regional and international boundaries, becoming a strategic infrastructure for a techno-nationalist process as well as for the participation and involvement of Switzerland in European and international markets. Although some of these goals took time to accomplish, the idea of CSCS as a connecting bridge encouraged and legitimized the realization of the center in Ticino. The result was to provide the region, and Switzerland at large, with a strategic asset for its digital future.

A second key concept that emerged from our analysis is «decentralization». One aim of CSCS was to decentralize Switzerland's digital resources and assets. As political scientists and historians have aptly shown, decentralization is a key element both of Swiss federal policies and the country's economic choices.⁸⁰ Historically, decentralization has allowed cantons and local authorities to maximize and exploit their specific resources, responding to citizens' needs that local governments know much better than the federal government does. In our case, decentralization entailed the decision to create a new «center» in Ticino. At the same time, this decentralizing and re-centralizing effort also strengthened the established federal center in Zurich, especially at ETHZ. The tension between centralization and decentralization

⁸⁰ Sean Mueller, Adrian Vatter, *Federalism and Decentralisation in Switzerland*, in: Ferdinand Karlhofer, Günther Pallaver (eds.), *Federal Power-Sharing in Europe*, Baden-Baden 2017, pp. 39–64.

was clothed in irony. As contemporaries from Zurich observed, during its early days CSCS was stigmatized by the use of ambivalent nicknames, such as «a flower» or «a cathedral» in the desert. However, this choice did provide Ticino with a strategic institution for its growth. It also spurred local actors to request greater involvement in the founding process. The internal political conflicts that emerged during the dispute about location reflect a side effect of the digital federal strategy: centralization of political power in the hands of the federal government and ETHZ. This unbalanced distribution of power and responsibility for such a big project is quite normal in federal countries. Another key principle of federalism is subsidiarity, according to which processes that cannot be managed at the local level – for example, owing to economic or structural constraints – should be delegated to higher authorities and actors such as the federal government. It is clear that the creation of an expensive and complex institution such as CSCS could not be accomplished solely by the Ticinese actors. The federal government and ETHZ were essential to the fulfillment of this project. Furthermore, the tension between centralized control and local actors who asked to be involved in the design and construction phases of the building contributed, as we have said, to the formation of the Lega dei Ticinesi.

This juxtaposition between decentralization and centralization can be also read through the lens of political economy and sociotechnical analysis of networking. As media and technology historians have shown, even if network architectures like the Internet and the web have been depicted as decentralized infrastructures, the economic, technological, and political control over them often operates at a central level.⁸¹

Tensions aside, CSCS was also an act of «solidarity» with Ticino. Solidarity is a key principle in any federal association as it entails the faith (from the Latin *fede*) of those allies, whether states or cantons, who tend to support each other in order to strengthen (to make more *solid*) the cohesion and

⁸¹ See, for example, the work by Vincent Mosco, *The Digital Sublime: Myth, Power, and Cyberspace*, New York 2005. On the tension between centralization and decentralization in network histories, see Francesca Musiani and Valérie Schafer, *Le modèle internet en question (années 1970–2010)*, in: *Flux*, 2011, 3(85–86): 62–71; Paolo Bory, *The Internet Myth: University of Westminster Press, London 2020*, pp. 7–30.

development of the entire nation. The history of CSCS tells us that this act of solidarity took some decades to bear fruit and involved many institutions that had to find a coordinated strategy to achieve such an important milestone toward digital federalism. ETHZ, the federal government, the ETH Council, the Ticino parliament, SBB, professional associations, and opposition parties – all these actors were involved and contributed, for better or worse, to the collective effort to build the center. Although the first decades of this history were plagued with political and economic issues, CSCS eventually became a key reference within the Swiss and European scientific communities. In this regard, further research is essential to understand how the center «survived» its crisis during the 1990s and why and how Swiss actors have maintained their trust in this strategic asset.

Overall, the sources analyzed in this paper show what a complex and compelling concept digital federalism is. This idea is rooted in the mutual trust and cooperation among political and economic actors as well as in the delicate handling of the tensions between local, regional, and national forces. The history of CSCS is exemplary in this sense.

The many facets of digital federalism emerging from this narrative represent the stratification and multiplicity of the Swiss cultural, economic, and political environment. Most importantly, notwithstanding the weak points, these facets reveal the peculiar strength of the Swiss federal system, which contributed to the founding of a key institution for the digital future of the country.