Rewind to spring 2001, when Pinault, who built a business empire on everything from timber to fashion (he owns brands including Gucci and Yves St-Laurent), left his eldest son François-Henri running the group in order to focus on his art collection – 2,500 pieces by celebrity artists such as Jeff Koons, Cindy Sherman, Cy Twombly, Takashi Murakami and the Chapman brothers, alongside rising stars including Matthew Day Jackson, Adel Abdessemed, Nate Lowman and Kai Althoff. But there was a problem: the art had no home.

Pinault needed somewhere to base his foundation and exhibit the collection. Initially, he chose a location just outside Paris, near where Renault used to have its factories. But negotiations with the French state were tough, and not eased by Pinault's friendship with the president at the time, Jacques Chirac. After three years going nowhere, Pinault threw in the towel.

Then, in 2005, he heard that the impressive 18th-century Palazzo Grassi in Venice was looking for an owner. Pinault didn't think twice, and even poached the French culture minister and former Pompidou Centre director, Jean-Jacques Aillagon, to become his man in Italy. The space opened in spring 2006 with a shock for regulars who had attended its impeccably curated exhibitions of Italian renaissance architecture in 1997: Jeff Koons's monumental inflatable Balloon Dog (Magenta) tethered to a floating island in the canal. Even so, Palazzo Grassi was only phase one of Pinault's grand designs: he needed yet more space. So he found himself competing with the Peggy Guggenheim Foundation – which owns the famous museum nearby – to acquire the abandoned Dogana. It was with some inevitability that, in spring 2007, the city authorities chose Pinault. "Only he could muster the team and invest the necessary amount of money to turn around the restoration so quickly," says Gingeras.

Indeed, it took Pinault's team only 18 months to complete work, despite many technical challenges. The Dogana fills a narrow triangular spit of land right at the nose of Venice's Dorsoduro, the island that forms the western quarter of Venice, on the mouth of the Grand Canal. The site barely had any room for scaffolding, let alone 120 workers. So a temporary port was erected and floating bridges raised; even a canteen was hoisted on stilts.

The project was masterminded by renowned Japanese architect Tadao Ando, who had worked with Pinault twice before. The Dogana's unique history was inspiring, he tells me from his Tokyo office, but presented difficulties too. "I was impressed by its simple and rational structure," he explains. "I studied the history of the building and referred to several historical drawings that helped us understand the construction, as well as the different renovations through the centuries."

In order to rediscover the original space, Ando removed all the partitions and interior walls that were added over the last 400 years. What was revealed was a triangle, 105 metres by 75, with a beautiful wooden roof above it. "Some parts of the building could be researched and investigated only after the removing process, so we had to adjust the project step by step and be extremely flexible – and all this on a very tight schedule," he says. "We were only able to proceed with authorisation from the Venetian authorities, who had to agree on every step." Ando and his team also made the building waterproof – an obvious necessity in the most canal-bound city in the world, where "acqua alta" is a regular hazard – and added concrete flooring. The building's famous tower, which is crowned by two statues of Atlas holding a bronze globe, surmounted by a statue of Fortune, was restored to its copper-and-gold glory. The whole lot cost something in the region of €20m, and, together with the Palazzo Grassi, it has made Pinault the owner of the biggest permanent space dedicated to contemporary art in Venice.

So, what about the art? From the end of this week visitors will be able to see Mapping the Studio, the Dogana and Grassi's first dual exhibition, which has been curated by Gingeras with Francesco Bonami. As its title reveals, the show will explore those most intimate of places, artists' studios. "Pinault loves creative spaces," explains Gingeras. "The first thing he does when he touches down in New York is go to his favourite studios in Brooklyn. He spends most of his time there."

Pinault is no Charles Saatchi, Gingeras says. "He favours artists he likes and has followed for a long time; he doesn't try to be encyclopedic. We do go to new galleries and shows, but 70% of the art he buys is from artists he knows."

Mapping the Studio follows no chronology, Gingeras explains. "It has been conceived as one exhibition split between our two spaces. The atmosphere of Grassi and Dogana may be very different, but visitors will intuitively feel the continuity."

In honour of the occasion, Pinault has commissioned six new works, mainly monumental sculptures. British artist Mark Handforth has created Man on the Moon, a suspended crescent featuring a human figure who seems to have crashed there moments before, which will remain in the Dogana permanently. "This piece is both hopeful and optimistic. It should add playfulness to the place's own magic," says Gingeras.

There is also a sculpture by American artist Charles Ray, yet to be unveiled, which will sit on the very tip of the site. "It has the potential to become a new symbol for Venice, like the lions in St Mark's square," Gingeras says. "I expect to see it on every new postcard."
Art aside, one thing that really will define the Dogana, says Gingeras, is its light, much of which is reflected from the water that surrounds it on three sides. “I have worked at the Pompidou Centre, at Moma in New York and at Tate Modern, but I have never encountered such incredible light. It is absolutely perfect for monumental paintings with a warm palette.”

Wonderful as all this is – and there’s no denying that the space is beautiful – the project has more than a hint of self-promotion about it, as if Pinault were asking his curators to devise an exhibition showing the world what a great art collector he is. But can collecting ever be considered an art? Gingeras is quite clear: “Of course not: you can’t compare the act of acquiring with the art of creating. Exhibiting art may be a craft or a skill, but it’s certainly not comparable to art itself. Having said that, I don’t see why private collectors should disappear behind their collection. They are not an institution; they don’t have to be self-effacing.” Perhaps, then, they can be allowed to do a bit of showing off.

But this isn’t a vanity project, Gingeras insists. “I know many art collectors who started collecting during the hedge-fund years, and who sold everything when the world markets turned sour. They have no consideration for the art. Pinault is not one of them, he is a true patron of the arts.

“The good thing about the recession is that we will now be able to concentrate on art, on what matters. The bullshit we had to deal with before is over.”