VSS
Experimental Car by Subsystems

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FONDAZIONE RENZO PIANO

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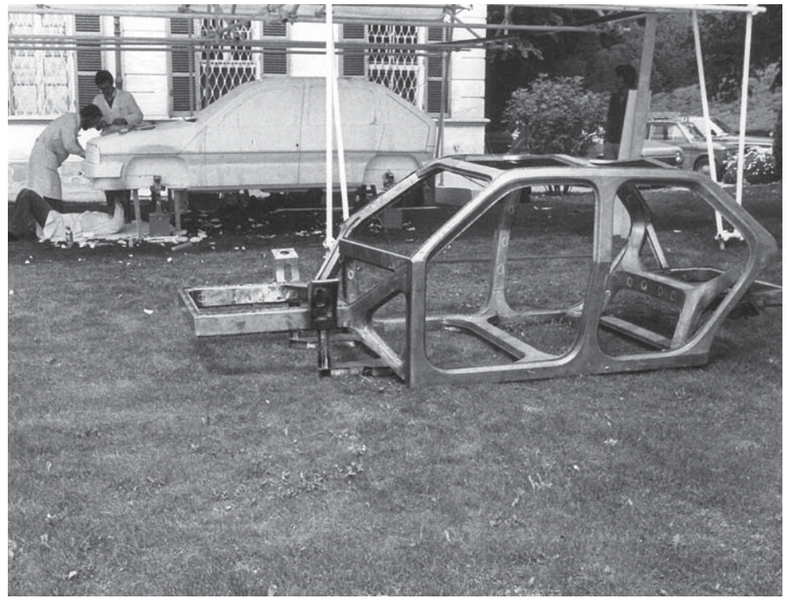
In 1978 Nicola Tufarelli, managing director at FIAT, contacted Renzo Piano and Peter Rice and commissioned them to study the prototype of a car that would renew the company's standards for the following decades. It was meant to be an innovative car that would take into account the new materials and most advanced production and assembly techniques, with the aim of reducing the weight of the vehicle by at least 20%.

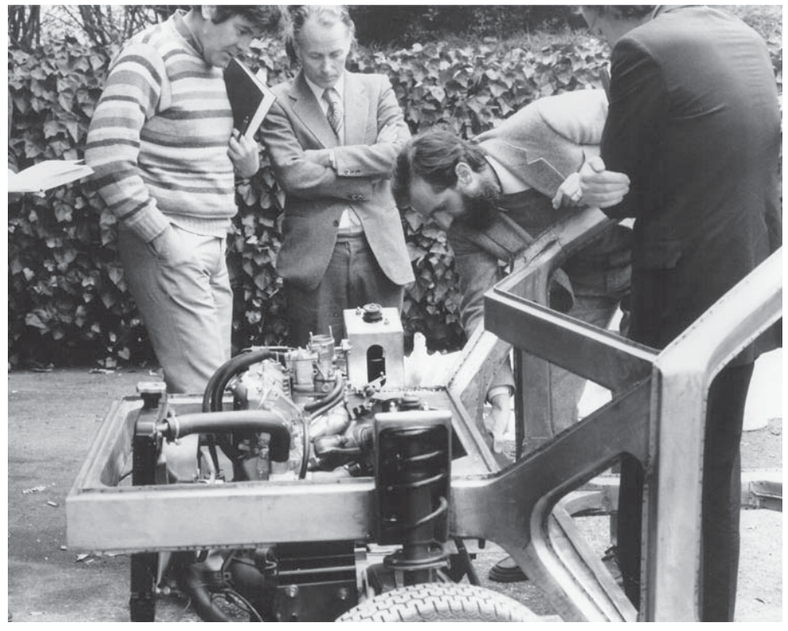
Why entrust this task to an architect and structural engineer, both of whom lacked previous experience in the design of automobiles, rather than one of the many successful automotive engineers FIAT could count on? Probably the choice was motivated by the belief that to get real innovation you had to draw on external resources, free from the technical constraints and production limitations affecting every car. Moreover, by building the Centre Pompidou, Renzo Piano and Peter Rice had shown they could design buildings like "machines": the careful study of materials underpinning the design of the components manufactured on assembly lines that were installed to form the final structure.

To develop the VSS (Experimental Car by Subsystems) Fiat set up the I.De.A. (Institute of Development in Automotive Engineering) administered by the car-designer Franco Mantegazza and directed by Piano, with Rice as vice president. The institute was housed in an 18th-century villa on the hills of Moncalieri, a short but significant distance from Lingotto, to stress its separate but synergic collaboration with the parent company.

Photos 1 and 3_*Renzo Piano, Peter Rice, Noriaki Okabe and Henry Bardsley at work on the VSS prototype.*

Photo 2_*The prototypes of the frame and body of the VSS in the garden at I.De.A.*





Piano and Rice started to tackle the problem by breaking down a traditional car into its components and studying them. They were convinced that to innovate production processes and significantly reduce the weight of the vehicle they had to separate the structural frame from the envelope. In developing the VSS, Piano applied the principles of prefabrication of parts, flexibility of space inside and use of plastics, all ideas already tested in his experimental structures from the sixties. This was in keeping with the principle that "the techniques of architecture are translated to an industrial scale, and vice versa the techniques of the automobile industry are recycled on an architectural scale". The VSS was designed on the same principles as a building, by conceptually and constructively separating the load-bearing structure from the lightweight infill panels.

Moving the structural functions and parts subjected to stress and strain to the chassis, carefully studied and designed by Rice, made it possible to discard the sheet-metal supporting shell, in use until then, and develop a decidedly lighter body made out of lightweight plastic. Polypropylene, polyurethanes, polyester, polycarbonates and nylon were tested to make individual pieces – the door element, the hood element, the upper body element etc. They could be modelled as various forms and, dismantled and reassembled to create the configurations of different cars on the same chassis.

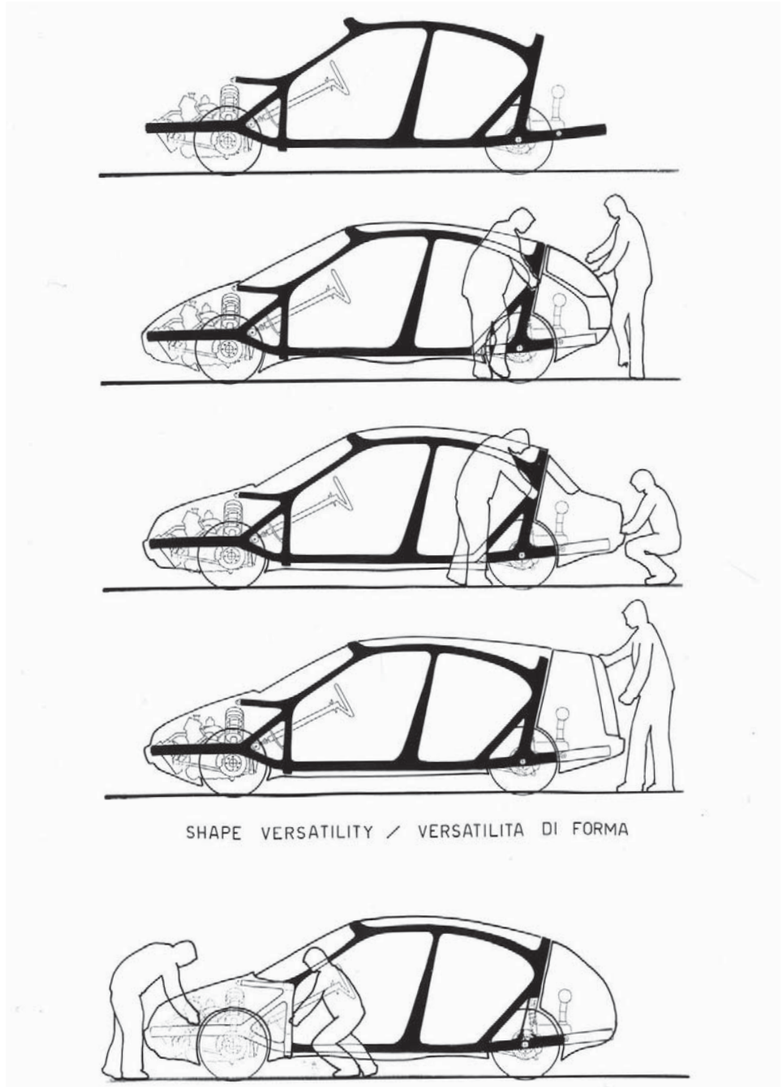
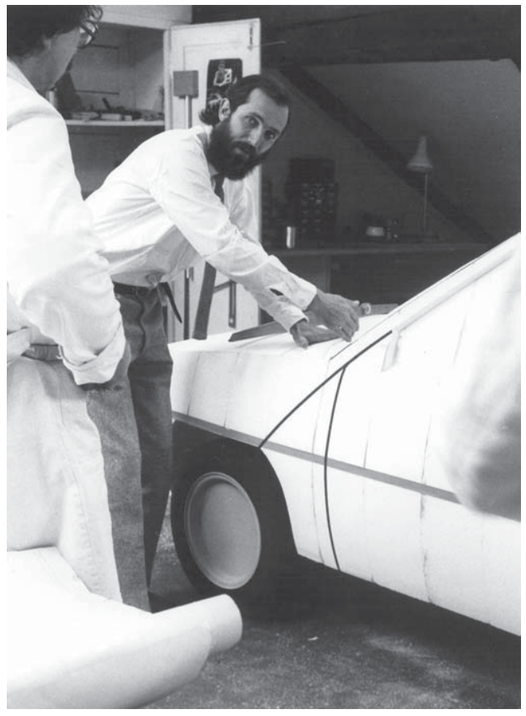


Photo 4_*Versatility of forms ensured by the VSS prototype.*

The discontinuity between the structure and the envelop also reduced noise, with the vibrations in the body being absorbed by elastic joints and transferred inside the passenger compartment. The separation between frame and body finally made it possible to revolutionize production of the vehicle by separating the modelling of the frame from the manufacture of the bodywork, which could be outsourced like small components and then assembled to obtain the car.

Between 1978 and 1979 Piano and Rice studied the form and structure of the VSS in detail , using models and the wind tunnel, working closely with Fiat's engineers and consultants. At the end of the assignment, the prototype was not produced and marketed, but ten years later, in 1988, Fiat launched the Tipo, which adopted many of the concepts initially developed in the VSS.



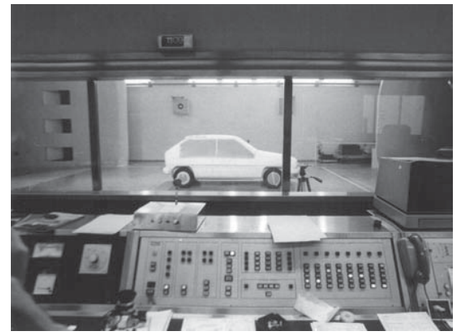


Photo 5_*Renzo Piano studying the form of the body of the VSS.*

Photo 6_*Prototype of the VSS in the wind tunnel.*

Photo 7_*The car's final configuration.*

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Photo 1, cover_Renzo Piano, Peter Rice, Noriaki Okabe and Henry Bardsley at work on the VSS prototype.
Fiat VSS experimental car/ R80, 1978/80
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Photo 2, pag. 3_The prototypes of the frame and body of the VSS in the garden at I.De.A. .
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Photo 5, pag. 7_Renzo Piano studying the form of the body of the VSS.
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Photo 6, pag. 7_Prototype of the VSS in the wind tunnel.
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Photo 7, pag. 7_The car's final configuration.
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