

l'École de Paris

du management 

<http://www.ecole.org>

Industrial adventures seminar

*organised with help from the UIMM and
the Fabrique de l'industrie and thanks to
the sponsors of the École de Paris :*

Algoé²
ANRT
CEA
Chaire "management de l'innovation"
de l'École polytechnique
Chambre de Commerce
et d'Industrie de Paris
CNES
Conseil Supérieur de l'Ordre
des Experts Comptables
Crédit Agricole SA
Danone
EADS
EDF
ESCP Europe
Fondation Charles Léopold Mayer
pour le Progrès de l'Homme
Fondation Crédit Coopératif
Groupe ESSEC
HR VALLEY²
HRA Pharma
IDRH
IdVectoR¹
La Fabrique de l'industrie
La Poste
Lafarge
Mairie de Paris
MINES ParisTech
Ministère de l'Économie,
de l'Industrie et du Numérique,
direction générale des entreprises
NEOMA Business School
OCP SA
Orange
PSA Peugeot Citroën
Renault
Saint-Gobain
SNCF
Thales
Total
UIMM
Ylios

¹ pour le séminaire
Ressources technologiques et innovation
² pour le séminaire Vie des affaires

(liste at october 1st 2014)

CHANGING MARKETS : FROM CRAFTSMANSHIP TO INDUSTRY

by

Dominique Dubois
President, Carboman, Multiplast

April 15th, 2014
Report by Élisabeth Bourguinat
Translation by Rachel Marlin

Overview

Since the 1980s, Multiplast made a name for itself as a result of its remarkable track record in ocean racing with boats made from composite materials. Having won the Jules Verne Trophy five times, the company monopolised the boat racing market. However, this market is subject to geopolitical and economic vagaries, and both the Gulf Wars in 1991 and 1997 and the subprime crisis in 2007 endangered market dynamics. Furthermore, social and fiscal instability in France made clients think twice about ordering boats. Subsequently, Multiplast decided to diversify on a large-scale and started supplying structures made from composite materials to companies in the aeronautical, transport and defence sectors. This is a major change from small-scale craft production to large-scale industry, and is an important break with tradition. Multiplast has overcome the obstacles in its way by joining forces with Décision SA, an unusual company which manufactured both the Swiss boat which won the America's Cup twice, and Bertrand Piccard's solar-powered aircraft, Solar Impulse.

*The 'Association des Amis de l'École de Paris du management' organises discussions and distributes the minutes ;
these are the sole property of their authors.*

The Association can also distribute the comments arising from these documents.

TALK : Dominique Dubois

Multiplast was created in 1981 by a brilliant architect, Gilles Ollier, who designed exceptional racing boats. His first catamaran, ordered by Jet Services, was a boat which was about twelve metres long and was made from glass, epoxy and foam. Because no shipyard wanted to build this boat, Gilles Ollier rented a hangar in Carquefou, on the outskirts of Nantes, and built the boat himself. The size of the catamarans that he subsequently built increased, and soon it became increasingly difficult to launch them from Carquefou. The city of Vannes offered Multiplast a site on the Gulf of Morbihan and the company moved there. Until 1990, Multiplast continued to build catamarans designed exclusively by Gilles Ollier, which was very successful : these boats won almost all the races.

Ten years later, a new type of boat appeared, the trimaran, and it started winning races. However, Gilles Ollier was only known for his catamarans. Multiplast decided to change course and became more open to other possibilities outside the company. Gilles Ollier took a back seat, and Multiplast started building boats designed by other architects such as Nigel Irens and Vincent Lauriot-Prévost.

First steps into industry

In 1999, having completed the construction of three 30-metre catamarans built to take part in the round-the-world race organised by Bruno Peyron, the manufacturing team was laid off for six months. Tobacco companies and alcohol manufacturers were banned from advertising and as a result they could not sponsor races, and consequently there were fewer orders for boats.

By chance, Thales consulted Multiplast about making a flight simulator for a combat helicopter. The brief was to build a sphere 7.30 metres wide which was intended to simulate flight in the helicopter. The tolerance was +/- 1.5 mm and the sphere had to be very rigid so that the simulation effect was not blurred. Thales invited tenders from four other companies, but in the end it chose Multiplast. This was Multiplast's first order in the industrial sector. It was all the more commendable because at the time we only had a hangar 5 metres high. Because of this, the sphere had to be made in quarters and was assembled outside, under a tent. Following this first order, Multiplast made a further ten flight simulators. Eight of them were for the flight training school in Le Luc in France, and the last two were made two years ago for a client in Lucerne, Switzerland.

Public works, aeronautics and shipbuilding

I am a civil engineer and having worked for nine years in a major French construction company, I set up my own business. I bought several companies in the Nantes region. In 2005, I felt that the building sector was starting to decline and so I sold these companies to the Léon Grosse group. I suddenly found myself with a large amount of money and no work. I looked for an area which involved technology and was likely to expand. I also wanted to avoid the competitive atmosphere that I had come across in the construction industry where simple bricklayers saw themselves as would-be entrepreneurs, and managed to win contracts without any difficulty, as a result of the ten-year warranty insurance system which exists in this sector.

I chose a company in the aeronautical sector, Qualité Services Atlantique, which made adjustments and controls for a sole client, Airbus. All twenty-four employees worked only manually. They were able to straighten parts which were five metres long using wooden mallets, and kept to a tolerance of two-tenths of a millimetre. I helped this company to develop for ten years before selling it recently to the Mécachrome group.

The boom of composites

When I bought Qualité Services Atlantique in 2005, the Airbus 380 had just been launched and 15 % of it was made from composite materials. Production will soon start for the A350, 57 % of which is also made from composite materials. Boeing's 787 Dreamliner is 75 % composite, and in the future it is likely that the Airbus 320 will have an even greater amount of carbon. This means that all the companies which today are focussed on aluminium, titanium and other hard materials, will have to resort to using composite materials very soon.

I realised that if my company continued working exclusively with aluminium, it would become worthless in a very short period of time. So I started looking for a company which manufactured parts made from composite materials for the aeronautical industry. I found two sorts of companies : those which were more expensive than I could afford ; and other smaller ones which were deeply in debt. Manufacture of the A380 had fallen so much behind that the subcontractors were forced to make huge investments and had run out of cash.

Therefore, I tried to find second-tier suppliers which were capable of eventually becoming first-tier companies. My insurer (who was also Multiplast's insurer) had talked to me about Gilles Ollier's shipyard. Negotiations took two-and-a-half years but in the end, in 2009, I bought Multiplast.

The racing boat market

Ten years ago, there were about ten shipyards which were capable of producing top-of-the-range racing boats. In 2009, there were only four. Today, we are one of two companies capable of constructing racing boats.

This situation can be explained by the technical requirements in this sector by comparison with the Formula 1 sector. Today, if one built a Formula 1 car based on a model designed ten years ago, it would finish the race four or five laps behind the winner. In the same way, an old boat has never won a Volvo Ocean Race or an America's Cup. A racing boat is designed for a single race, and when the next race comes around, it is already out of date.

The small number of shipyards may also be explained by the reduced size of the market. Multiplast makes two of the five or six boats which race in the Vendée Globe competition which takes place every four years. We also build a boat for the America's Cup every four years as long as we have the necessary budget : for the last two races, no boat was made in France. We build a maxi-trimaran every year for the Route du Rhum, and also monotypes, in other words, identical series of boats which mean that we can make economies of scale in terms of costs for the design, moulds and equipment. The Solitaire du Figaro race and the ORMA (Ocean Racing Multihull Association) have also chosen MOD 70s, 70-foot long trimarans.

This is the same solution that we found for the Volvo Ocean Race whose prototypes cost approximately 10 million Euros each. Not surprisingly, there was a worrying fall in the number of orders. In the first years of this race, there were about twenty competitors and in the second-to-last race, there were only six including a Chinese boat which used a model from the previous generation. Volvo agreed to allow monotypes to race and put out a call for tender for the construction of seven monotypes, costing 5 million Euros each, which should be built in 22 months.

No shipyard in the world was capable of meeting this challenge. In order to achieve it, we worked with three companies : Persico, an Italian boat company which had already built a boat for Abu Dhabi, one of the sponsors of the race ; Décision SA, a Swiss boat-making company which took part in the Whitbread Round the World Race and constructed large Mistral (in other words, the first big boat racing series) ; and, finally, Green Marine, an English boat-making company, which seemed a good choice because for the Volvo Ocean

Race which is very Anglo-Saxon, it is better for the world leader to be British. The reason why we won the tender was because of our ability to create a group of different talents. The seven boats will be built for two races and there will be no new orders for the next six years.

In total, our order book only includes six or seven boats a year, with a budget of approximately 15 million Euros. We cannot hope to find renewed engines for growth in this sector, especially because there is increasingly fierce competition from shipyards not only in Europe, but also in South Africa, the United Arab Emirates, New Zealand and China where, for example, there is a company employing 250 people which is the subsidiary of an Australian company.

Carbon fibre

According to a quotation attributed to Seneca, 'if one does not know to which port one is sailing, no wind is favourable.' When I bought Multiplast in 2009, my ambition was to get the company into the aeronautics market and thereby benefit from the growth of the world market for carbon fibre which has an annual growth of 15 %.

The success of carbon fibre can be explained by its excellent performance and characteristics. It is four times more resistant than aluminium, and four times lighter. Today, the hull of a racing boat is made from two films of carbon (weighing 1.2kg per square metre) linked by a honeycomb core 20 mm to 30 mm thick. In total, it does not weigh more than 4 kg per square metre. For the C Class World Championships, the hull is made of two films weighing 120g per square metre linked with a honeycomb 3 mm thick. The rigid wings of the America's Cup Class boats are made from fine lace weighing 17g of carbon per square metre.

This material is very expensive. Industrial serial parts for some thicknesses may cost between 400 and 500 Euros per kg. For very advanced technology products in the aeronautical sector, it can cost as much as 10,000 Euros per kg. The advantage of carbon is that it is possible to achieve performances which have never been possible with traditional materials.

Gearing up to industry

Clients who buy our racing boats know that one has to take risks in order to win. The performances which we managed to achieve with these products are very useful to us as they have enabled us to find new markets in the industry. However, to develop our industrial activities, we had to fulfil a certain number of criteria.

The first criterion consisted of implementing quality control. The person in charge of my aeronautical company in Nantes agreed to move to Vannes. Because he knew a great deal about aeronautics, he set up a quality management system at Multiplast which met Airbus' expectations. We are currently in the phase of ISO standards certification.

We have also had to adapt to industrial standards in terms of hygiene, safety and the environment (HSE). I had the floors of the workshops painted with anti-dust paint so that manufacturers visiting the company would find this work environment familiar. We have also set up selective waste sorting. I suggested that the person in charge of HSE at the Nantes site moves to Vannes so that he could establish a HSE scheme which conforms to manufacturers' expectations.

We have also set up a methods department because the cases we handle are increasingly complex. In some cases, the technical documentation weighs more than the part we are manufacturing !

In order to work in this industry, we have had to familiarise ourselves with Dassault's CATIA software. We hired a person who already knew how to operate this programme, and who is in charge of buying the version which is most appropriate for our projects.

A final difficulty had to be overcome. It is very hard for us to find qualified workers. The hull of a 30-foot trimaran is made from two pieces. If, unfortunately, a worker forgets to apply a protective film between two layers of carbon before the part is put in the oven, it will be worthless. This is a risk which we cannot take. This is why, apart from the management and control systems put in place at all levels, we value a high-quality workforce and have created our own training centre.

The results

Changing from being an extremely precise craftsman to a very skilled industrial manufacturer requires a significant investment in terms of labour, process, means and structure. However, it is well worth it.

At present we produce not only prototypes and tools for Airbus, but also for six different divisions of Thales (radar, underwater radomes for frigates, parts for drones, tools for the ExoMars satellite, and so on). We are also taking part in a research and development programme with a French cruise ship manufacturer. Additionally, we make objects for Baccarat such as carbon chandeliers.

Industry now represents 40 % of our activity, whereas our turnover in shipbuilding has remained the same. We have increased the number of employees from 49 in 2009 to approximately 100 today.

We must now expand internationally and to achieve this, the best method, in my opinion, is to buy companies abroad or to create partnerships. We have done just this with the Swiss shipyard Décision SA whose path is similar to that of Multiplast. Having made racing yachts for the Vendée Globe and the America's Cup, Décision manufactured the composite structure of the Solar Impulse aircraft, and has created carbon watch boxes for luxury brands.

All the companies have now been brought together in the Carboman S.A group which owns 100 % of both Décision and Multiplast. I am president of this group and I own 50 % of its shares. The second most important shareholder owns 45 %, and the former president of Décision, 5 %. Together we are going to attempt to crack the British and German markets, and this task will probably be easier from Switzerland than from France.

DISCUSSION

Is there top-of-the-range pleasure boating ?

Question : *To expand your market, perhaps you could look for wealthy clients who would like to buy themselves racing boats.*

Dominique Dubois : François Bich (who owns Bic cigarette lighters) has just bought the former Orange II catamaran which won the Trophée Jules Verne (in the record time for a crewed round-the-world sail) from Bruno Peyron, and asked us to transform it into a yacht. However, this kind of order is extremely unusual.

Q. : *Why not build top-of-the-range pleasure boats ?*

D. D. : You cannot ask someone who builds Formula 1 racing cars to produce production-line cars. At best, he could perhaps build a McLaren or a Bugatti, and there are not many clients who want these sorts of cars either. The large yachts are generally made in countries where the costs are low. I prefer to try to exploit our advanced technologies in industry. For example, we work with Thales Alenia Space to apply thin layers on satellite panels. We can bring more added value to this sector, or the military drones sector, rather than in the pleasure boat sector.

Large parts

Q. : *Why do you not make the drones yourself ?*

D. D. : We do not have any architects who are able to design drones and even if we did, we would not have a network to sell them.

Q. : *As well as the military drone market, there is a large civil market.*

D. D. : These are devices which are 30 cms long and which anyone can manufacture. Our speciality is the construction of large parts, as long as 48 metres. In 2010, we had an oven made which was 32 metres long, 7 metres wide and 4.5 metres high. It is the largest oven in Europe and it costs 2,000 Euros just to heat up. We are also in the process of buying an autoclave which will be 1.5 metres wide and 13 metres long.

Q. : *The natural gas-fuelled hybrid car sector seems to have a bright future. Would you consider the manufacture of tanks for these cars ?*

D. D. : We have just bought an automated carbon fibre placement machine, but even with this equipment, our activity is still essentially manual and therefore we cannot consider working for the car industry. However, we are carrying out studies with the EMC2 competitiveness cluster and the Jules Verne IRT Institute (Institut de recherche technologique) about the manufacture of large hydrogen tanks. Wind farms produce energy intermittently and this energy could be profitably used to make hydrogen by electrolysis. Then there is the question of storing hydrogen and we are studying the manufacture of tanks which are 12 to 15 metres long.

Carbon

Q. : *Is your access to carbon secure and sustainable ?*

D. D. : Twenty years ago, carbon had to be imported from Japan. Today, it can be easily found in Germany, England and France. We buy carbon thread in the form of fabric which is pre-impregnated with resins and which enable one to choose the exact proportion of resin required for each part of the boat so as not to make it unnecessarily heavy.

The difficulty lies in the fact that the price of carbon is linked to the dollar. To secure the final price of a boat, we have to pay 30 % of the cost of carbon when the order is placed. The price is then fixed during the time the boat is being built (which is approximately twelve to eighteen months) with the deliveries staggered according to our needs.

In the aeronautical industry, our clients ask us to commit to firm prices, often over eight or ten years. To fix the price, I work on the change in the price of carbon cloth over a period of fifteen years and on the change in labour costs over eighty years. I chart the trajectories and I set my prices at the top of the trajectory. I give my clients the choice between a firm price in Euros, a firm price in Dollars, or a price in Euros with the possibility of making a change. In general, they prefer the last option.

Distribution of costs

Q. : *What are the percentages of investment and recurrent expenses in the total manufacturing costs of a boat ?*

D. D. : Apart from the master cast, generally made from wood because it is too big to be made with a milling machine, we prepare the mould which is used to produce the final result. A mould costs approximately 2,000 Euros per square metre. With monotypes, the same moulds can be used to make several hulls, and this lowers the price.

Labour forms a very large proportion of the costs. For single parts, the 'prototype' worker cuts out carbon reinforcements manually and these have to be placed at specific points on the hull. This may take up to 200 hours of work per kg of carbon. For multiple parts (more than three copies), one can resort to kitting, in other words, one can ask all the subcontractors to cut out the carbon material to the exact size needed because of Computerised Numerical Control (CNC) machinery. They number the pieces in the order in which they have to be placed. Sometimes one has to superimpose as many as 70 layers. If there are more than six or seven parts, it is possible to make savings of approximately 25 % of labour costs using the kitting principle.

Referencing

Q. : *It is often difficult for an SME (small or medium-sized enterprise) to get referenced in a large group. How did you manage it ?*

D. D. : It really is very difficult. The first problem is to know the name of the correct person in the company : sending a brochure to the secretary is pointless.

Because of my company Qualité Services Atlantique, I managed to make contacts at Airbus, but I am still not referenced there. But that should not take too much longer now.

We had to wait two-and-a-half years for the Safran group. Our contact was the person in charge of the Belgian subsidiary who was known to the Safran boat's skipper, Marc Guillemot.

Investment

Q. : *What is the size of your investment ?*

D. D. : Our turnover was 7.6 million Euros in 2013 and it should be 9 million in 2014. Last year, we invested one million Euros which included our purchase of a 23-metre long paint booth and the costs to build the white room which will be where the carbon fibre placement machine will be located. Over the past four years, we have invested a total of 3 million Euros.

Q. : *How have you financed these investments ?*

D. D. : We borrow. The other solution is to open up the capital which is what I did when we merged with the Swiss company. If I want to keep a majority of the shares, I have to increase the capital, and in this case I am thinking of letting a French bank take shares in my holding company.

Q. : *Bankers, in principle, do not like taking risks. Why do you think they would trust you ?*

D. D. : I am not selling them something which represents a risk but an industry ! I would not have bought Multiplast if it was not already part of the industry. My career path undoubtedly helps to reassure them : Décision was my tenth acquisition. I draw up detailed development plans which is not normally what SMEs do. I tell them who my competitors are, what my objectives are, how I define them, what I expect of them, the way in which I intend to use the results before moving on to the next stage, and so on. I also show them the files of calls for tender to which I replied. Last year, these files had a value of more than 50 million Euros.

Q. : *Does Multiplast make a profit ?*

D. D. : Yes, as a result of research tax credit and tax credit for competitiveness and employment. It is a bit sad because if the costs were lower, our balance sheet would be in better shape, and would look more like that of our foreign rivals. With these two tax credits, we are like a man standing on a stool with a noose around his neck, not knowing when someone is about to kick the stool away from under his feet...

Recruitment

Q. : *What makes an engineer choose Multiplast rather than Airbus ?*

D. D. : The adventure, the pleasure, the story we tell, and also our work environment with a view of the Gulf of Morbihan and the beach close by. When we announce that we are about to construct a boat for the America's Cup, we receive two hundred job applications in two weeks sent from all over the world. At the end of the construction phase, we organise tests at sea with a member of the shipyard on board. It is not necessarily an engineer : lots of people are only too happy to volunteer ! Sailing on a thirty- or forty-foot trimaran is an absolute joy ; it is an unforgettable experience.

Q. : *I can understand that the manufacture of racing boats is something people dream about, but this must be less true of the industrial products which you manufacture ?*

D. D. : Before I arrived there were two "clans" in the company : those who built the boats, and those who worked in the industry. The former tended to have a rather confident swagger about them. The day that the orders for boats dried up, those who made the industrial parts had their revenge, and the others had to join the industrial activity.

Racing boats are a little 'rough' in terms of their finishing. Generally speaking, the linings remain visible, and because one constantly has to cut back on weight, the paint is sanded down to the point that the carbon begins to reappear. In comparison, the radar antennas are true works of art. As for the Baccarat chandeliers, their varnish is precisely monitored with respect to its glossiness. This is a large source of pride for those who make them. The same is true for the workers who built the 26 ball joints which were made for the giant telescopes which are part of the world programme installed on the high plateaux in Chile. They weighed 4.5 tonnes each and were extremely finely tuned with very weak tolerance.

Five years ago we would never have imagined that we would be looking at the calls for tender which we receive today. A huge part of the metal industry is in the process of changing towards using composites, in particular the rolling stock sector. The Japanese are already making trains from composite. However, they are finding it hard to sell them as there are quality issues, but we are working to resolve them. We have even been asked to help with the Ariane VI rocket ! Composite materials are much lighter than metal and I sincerely hope that the future booster rocket will be made with our technology.

Using the services of local SMEs

Q. : *Do you help small companies in the region to progress from making boats to going into industry, like you have done ?*

D. D. : The construction of a boat for the Vendée Globe represents 25 to 30,000 hours of labour, in other words, the equivalent of 20 full-time jobs in a year. Building a racing trimaran takes 50 to 60,000 hours. Up until the last day, activity is intense and then one launches the boat and the shipyard is empty. When the next project begins, one has to start by making the mould which is the carpenters' job, not the laminators'. It is difficult managing these various successive 'waves' of activity.

To help during busy times, we call upon local companies which generally have between five and eight employees. We manufacture the structural parts which are our responsibility, and we subcontract out to them the moulds, engine cowls, pieces of furniture, and so on. The person in charge of quality audits these companies and helps them to establish a system of quality control. This enables them to progress and it is beneficial for them and for us.

Arrival in the company

Q. : *You talk passionately and authoritatively about your profession, but when you arrived in 2009 from the construction and aeronautical sectors, you were a novice. How were you welcomed ?*

D. D. : The first question I was asked when I arrived was 'Do you sail ?', to which I replied 'yes'. I was then asked 'What sort of boat do you have ?' It so happens that I own a rather mythical boat, an old Swan 65, the twin of Sayula which won the very first Whitbread round-the-world race. I brought it to Brittany from the Mexican Pacific coast with some friends. This boat helped my image : owning it ensured my legitimacy not only within the company, but also to the people with whom we do business.

Presentation of the speaker :

Dominique Dubois : civil engineer. Having worked for nine years for a large construction group, he bought several small companies in the Nantes region which he sold to the Léon Grosse group in 2005. He then concentrated on sectors which had greater added value such as aeronautics, and bought Qualité Services Atlantique in 2005 which he has just sold to the Mécachrome group. In 2009, he bought Multiplast and this company has grown as a result of partnerships and acquisitions abroad.

Translation by Rachel Marlin (rjmarlin@gmail.com)