

## **The mindset of an engineer**

A note by the Managing Director of the Gusto shipyard during the shipbuilding crisis in the late seventies, Dr Ir L.A. van Gunsteren

August 2019

## 1. Introduction

The working group *History of the shipyard Gusto* has adopted as its mission to collect and file information on the history of the shipyard Gusto in Schiedam, which has been founded in 1905 and was closed in the late seventies. As I have been managing director of the yard from April 1, 1975 until October 15, 1976, I feel that I should comply with their request to former employees to supply relevant historical material.

Let me first summarise the conclusion of my analysis of the closure of the yard as given in my previous essay for the working group (De noodlottige sluiting van de werf Gusto eind zeventiger jaren).

The overall conclusion is that, in essence, the demise of the Gusto-yard must be attributed to Ruud Lubbers, minister of Economic Affairs at that time and Dick Smit, President of IHC Holland, the owner of the yard. Lubbers wanted its closure as part of his plan for the restructuring of the Dutch shipbuilding industry, which ultimately has cost the state Dfl. 8 billion without any returns.

The merger of offshore companies intended by Lubbers had later on to be called off on advice of the Committee Langman and only very little is left of the RSV-concern from that time.

Lubbers was prepared to grand Dfl. 120 million taxpayers' money to IHC Holland provided IHC would go along with his merger plan. Dick Smit considered this to be an offer he could not refuse in view of the precarious financial situation of IHC Holland. Lubbers wanted to buy and Smit, having little emotional ties with Gusto, was prepared to sell. Nothing could stop them anymore from closing the deal.

So what, one may wonder? Closure means that there is one shipyard less in the country to care about. That could have been a sound reasoning if Gusto were an ordinary shipyard. But Gusto was far more than that: it was also a *centre of maritime technological innovation*.

The merger of all Dutch offshore companies as pursued by Lubbers would put an end to that competitive advantage and that is not a minor error. It is a blunder with far reaching consequences.

To establish a company culture, the set of norms and values governing behaviour, with the characteristics of an innovative climate takes a generation. To destroy it, by contrast, one or two years suffice as we have seen in the case of Gusto.

## 2. Innovation

Innovation is the central issue in our economic prosperity. Ministers, like Lubbers, Van Aardenne, Balkende etc., they all acknowledge that. The problem is that, apparently, they are not aware of the complexity of the process of technological innovation.

Innovation requires creativity that cannot be imposed top-down. It is useless to order some one to be creative. The motivation to be creative has to come from

within. All one can do is making circumstances conducive to innovation and hoping that then innovation will indeed follow.

The following three factors in particular are relevant for the creation of an innovative climate:

- Location: *Cluster* (Porter 1990 and 1998).
- Organisational structure: *Adhocracy* (Toffler 1980 pp. 401-402; Mintzberg 1979, pp.431; Van Gunsteren 2003, pp.169-199).
- Human resource management: *Right to "fail" and make "mistakes"* (Van Gunsteren 2003, page 171).

*Clusters* are critical masses -in one place- of unusual competitive success in particular fields, in the case of *Gusto Maritime Technological Innovation*. The enduring competitive advantages in a global economy lie in local things - knowledge, relationships, motivation- that distant rivals cannot match. (Porter 1998). Clusters affect competition by: 1) Increasing the productivity of companies based in the area, 2) Driving the direction and pace of innovation, and 3) stimulating the formation of new businesses, which expands and strengthens the cluster itself. A cluster allows each member to benefit as if it had greater scale or as if it had joined with others formally, without requiring it to sacrifice its flexibility.

*Adhocracy* is a type of organisation in which actual power is not necessarily vested in the highest placed executive. Power shifts depend on the problem at hand. The expert who has particular expertise on the subject is tacitly allowed to take the lead. At other stages, when other skills are required, someone else will play the leading role. The formal structure of the innovative organisation must be sufficiently loose to allow the shifting of power when the situation so requires. (Van Gunsteren 2003, pp. 170-171).

*The right to "fail" and make "mistakes"*, sometimes referred to as *intra-preneurship*, is a characteristic feature of the innovative organisation. If appreciation depends on solid results one tends to play it safe, whereas an essence of innovation is to keep trying. It is not the ultimate result that should be rewarded but the genuine, whole-hearted ambitious attempt to achieve a breakthrough. The company culture must be characterised by a tolerance for uncertainty and an acceptance of apparent failures. An equally important prerequisite is that a feeling for the dynamics of innovation is well anchored in the top of the organisation (Van Gunsteren 2003, page 171).

The table below shows a comparison of the envisaged merger of offshore companies with *Gusto*, *Schiedam* and *Lips*, *Drunen*, which both have been successful in regard to technological innovation.

Comparison on aspects conducive to innovation:

<b>Aspect:</b>	<b>Conducive to innovation:</b>	Gusto, Schiedam	Lips, Drunen	RSV, Rozenburg
Location	Within maritime Cluster	++	+	+
Organisational Structure	Adhocracy	+	+	--
HR management	Right to "fail" and make "mistakes"	+	+	--

In addition, the prerequisite of having a feeling for the dynamics of innovation at the top of the organisation is lacking in the envisaged setup of RSV Rozenburg Offshore.

No wonder that the merger plan of Lubbers became a failure.

The result of the prevailing ignorance of politicians concerning the dynamics of innovation is that their measures to stimulate innovation invariably turn out to be counterproductive. Direct subsidies to sunset industries distort normal market conditions and take away incentives to improve productivity by means of their own efforts and innovation. It weakens their competitiveness, as we have seen in cases like General Motors and RSV. Market forces, not government decisions and favours granted by its representatives, should determine who survives in difficult times.

What governments can do to help sunset industries to survive and adapt to changed circumstances is to contribute to the upgrading of clusters that already exist. They must take care of education and training, provide physical infrastructure and set the rules of competition to the benefit of everybody and not only those who can exercise political pressure to acquire direct subsidies.

Universities have a stake in the competitiveness of local businesses that can provide meaningful apprenticeships and cases for empirical research. Local businesses have a stake in a nearby university as a source of useful information and as an opportunity to recruit top-talent graduates. The Gusto-yard, located near two universities - the TU-Delft and the Erasmus University in Rotterdam-, has extensively collaborated with both of them (Van Loon, 2017).

The wealthier the economy, the more it will require innovation to support rising wages and to replace jobs eliminated by improvements in efficiency and the migration of standard production to low-cost areas.

The strategic concept of License Giver-License Taker – the Sulzer concept (Huibregtzen, 2017; Van Gunsteren, 1982) – enables the License Giver to pay higher wages than companies can afford that do not have design leadership. Gusto had design leadership in various offshore products: drill ships, jack-up mechanisms, heave compensators, pipe laying semi-sub. Income from License

fees of these products would have been amply sufficient to pay the wages of the few hundred blue collar workers that are enough to sustain the company's own production in the shipyard and the machine shop.

The approach of making the level of wages irrelevant should have been adopted instead of endless complaining about the high level of wages in The Netherlands and accepting that nobody can be laid-off.

### 3. The mindset of an engineer

*The scientist explores what is; the engineer creates what not has been.*

*Theodore von Karman*

Engineers are not one of a kind. We can distinguish three types of engineers:

1. Scientist
2. Development engineer
3. Consultant engineer

They all play games and pursue their associated payoffs. (E. Berne, 1964).

The games played by the three different types of engineers and their payoffs are summarised in the table below.

	<b>Game:</b>	<b>Payoff:</b>
<b>Scientist</b>	Exploring what is	Paper in a refereed journal
<b>Development engineer</b>	Creating a new thing	Proof that it works
<b>Consultant engineer</b>	Pleasing his client	Token of appreciation from his client

Looking back at my career, I have become aware that I am not a scientist and certainly not a people-pleasing consultant; although I have spent quit some efforts in those domains. I am a development engineer, a creating inventor and innovator as meant by von Karman.

The mindset of a development engineer is directed towards the successful creation of a new artefact like designing and building a ship, a jack-up, a semi-sub, a cutter dredger, a bridge etc. Individuals, not only academically educated engineers but also foremen and other employees, having that mindset find pleasure and satisfaction in contributing to the realisation of those products.

Employees having the mindset of an engineer tend to perform and collaborate well since they have the intrinsic desire to contribute, directly or indirectly, to the successful launching of the products.

Many employees of Gusto had such a mindset of an engineer, which has been the basis of its innovative capability.

#### **4. Why I joined Gusto**

How did I end up in Schiedam and not in Paris or Japan?

After my employment at Lips came to an end in January 1975, three options emerged for a new job:

1. Kobe Steel, Japan
2. ICL, Paris
3. IHC Gusto, Schiedam

Let me describe what they entailed and what I decided to do.

##### *Kobe Steel, Japan*

I was at that time the spokesman of all European propeller manufacturers in the international standard organisation, ISO-TC8, for the quality standards of marine propellers.

A meeting, extending over three days, took place in Paris, February 17-19, 1975. On the first day, the leader of the Japanese delegation asked me to confirm that I was no longer employed by Lips. The next day, he approached me again and told me that he had contacted his headquarters in Japan and was authorised to invite me to come to Japan to upgrade their propeller design capability. They would pay me whatever I would regard to be appropriate.

I knew I had to take this serious. For instance, we had given a guarantee against cavitation erosion in an order the Japanese had deliberately let to us because they thought that cavitation erosion was unavoidable. When the ship was in Capetown a couple of month later, they sent a diver down to inspect the propeller. The blades turned out to be completely free from erosion. Through incidents like this, they knew that I could indeed significantly upgrade their design capability.

The related computer programmes were at my disposal. One of my former collaborators had taken the initiative to give me the listings of all our FORTRAN computer programmes, not only our main design programme for ordinary open wheels, but also the computer programmes I had written for my Ph D dissertation (Contra rotating propellers, ducted propellers, calculation of pressure distribution of blade sections, slipstream deformation, etc.). I was quite confident that I would not disappoint them.

The downside of this golden opportunity, however, was that it would cost me my marriage because my wife, who considered Japan to be a country not for women, refused to move to Japan. For this reason, I let this opportunity go.

##### *ICL, Paris*

I was asked to become the manager of a specialised unit of 25 employees, located in Paris. The unit had three tasks: 1) Helping the European country organisations with problems they cannot solve themselves. 2) Checking that those country organisations do not promise impossible things, and 3) Making the specifications for the next generation of computers. My boss would be the President of ICL

France, who had been a leader in the *Maquis* (the French resistance in the second world war). Our characters would match well.

This time, I was not so confident that I could meet expectations. I told them that my knowledge of computers was insufficient for the three tasks mentioned before. They ensured me, however, that my learning ability would enable me to catch up within a few months. I was not so sure. I had always been interested in computers as a means to an end, not in computer technology itself. This consideration made me decide to let this opportunity also go.

### *IHC Gusto, Schiedam*

The Gusto option fitted perfectly with my mindset of an engineer. I was confident that I would be able to meet expectations.

The decisive interview with Dick Smit, President of IHC Holland, to persuade me to accept the position of General Manager of IHC Gusto BV took place at his home and was attended by his wife.

He pointed out that the problem of the Gusto-yard was two-fold:

1. Projects completion always too late;
2. At cost above budget.

Since overruns in time and money are interconnected, this actually is one problem: completion on time; then cost will almost automatically remain within budget.

My task would be to resolve this problem. I was confident that I would succeed provided the right tools would be made available. Who continues to work with a spade while competitors are using bulldozers, ends up in bankruptcy.

For the productivity of a shipyard the following factors are of particular importance:

1. *Building under a roof*; no idle time due to bad weather (rain, wind, heat).
2. *Lifting capacity of cranes*; reaping the benefits of prefab by enabling the transport of heavy sections.
3. *Having (at least) two assembling places*; Two lifts or telephone cells instead of one reduces waiting times by more than half (waiting time as a function of the number of lifts or telephone cells follows a Poisson distribution).

A tour over the premises of the Gusto-yard sufficed to conclude that the first two factors were problematic.

I pointed out that I could only restore profitability provided considerable investments would be made in the infrastructure of the yard. What are the intentions of IHC Holland in regard to investments in layout and equipment of the yard? Dick Smit responded: *We cannot afford to modernise all of our yards at the same time. We have to do so one after another. The first one, Smit Kinderdijk, has been completed. Gusto will be next. Studies on how to proceed are already ongoing.*

And indeed, already on April 25, 1975 could I attend a meeting to discuss the so-called *Structuurplan* with Naval Consult.

I am convinced that Dick Smit meant at that point in time what he promised. A year later, however, he was compelled to accept the offer of Lubbers (and Molkenboer) in the interest of the whole IHC Holland. This made it impossible for him to live up to our understanding at the start of my employment by IHC.

## **5. No Gexit for the Gusto yard**

Dick Smit's decision to expel Gusto from the IHC community in the interest of the whole IHC Holland is understandable and he was entitled to take that decision. It then should be up to the personnel, however, to decide what to do next: 1) Merge into RSV, or 2) Arrange a management buy-out, in terms of today's actuality a *Gexit*, or 3) Leave the Company and start elsewhere, which actually happened with the start-up of MSC.

A management buy-out is often a good solution in situations of *incompatibilité des humeurs*. I have been involved in several successful management buy-outs, during my time at Boskalis as well as in my consultancy later on.

If a Gexit had been possible I would have signed for it without any hesitation, but the circumstances were unfortunately against it.

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