

Published in Bike Europe, January 2001 issue. Design & Styling, 2 x A3 pages

Strong concepts needed for adding value

The Integrated Bicycle

By Henrik Jul Nielsen (MD NIELSEN INNOVATION) and Herman Tandberg (MD OGLE NOOR).

What is wrong with the European bicycle industry? If you take a quick view at the balance sheets of the majority of bicycle manufacturers, you will see a lot of red figures at the bottom line. If you take a closer look, and compare with other industries, you will see that there has been almost no investment in R&D for a long period. The investment in communications also has remained at unusually low levels. A look at the fixed assets shows that there has been little investment in tooling and production equipment for many years.

If you didn't know, you might think that you were looking at the financial data from a logistics company, whose only purpose is to import bicycle parts from Asia to Europe, put them on a bicycle frame (the frame is cheaper than individual packaging) and to distribute them to bicycle retailers.

Lessons from other industries

So, what's the problem? Apart from the fact that labor cost in Europe is higher than in many other parts of the world, one of the major problems is the product. The situation of our industry has many similarities with the Swiss watch industry in the late seventies and early eighties: The market was atomized, anybody could create new products with only a very low investment. There were no strong concepts in the market, and as a result only a very few could make money out of it. The Swiss industry had to react to the threat of the digital technology from Japan.

The answer was Swatch! The Swatch concept was built on "integration". Swatch created a strong marketing concept (ask yourself who would mourn if your product should disappear from the market - then you know how strong your concept really is!). The concept was realized with a simple product design targeted at large scale production. With this big-scale production it could raise sufficient money to invest in R&D, design and communication. Swatch made a U-turn with the Swiss watch industry.

An other lesson can be drawn from the computer industry. Building a new PC is just as easy as drawing one of the 10,000 new bicycle models (our estimate) which are plummeted each year on European market. It is like playing with Lego - you just take the bricks and put them together in a new way. But if you do not have a strong concept, how can you then create added value? An example of how integration and a strong design concept lead the way to success is Apple's iMac. The translucent iMac (1998) broke all conventions when it was launched. Apple was at that time in a bad shape. Computers had no strong identity due to the modularity/flexibility principle - which still reigns that industry - and the fact that a PC is sold more on the characteristics of its constituting parts than on the product itself. At long last, here was a computer that looked cool and had a strong identifiable character – 150,000 iMacs were sold over the weekend following its introduction !

Consequences of Integration

Can these examples be transferred to the bicycle industry? Is the industry ready for this kind of thought, or does it need an even stronger threat before it reacts? We will take a closer look at the consequences of the "Integration" thought.

The idea of integration is not new. As a matter of fact, over the years there have been many attempts. In the fifties, when most parts of the bicycle were still made in-house, it was easy to integrate for instance the lights with the mudguards. Today, specialist companies manufacture the parts and it has become more difficult for the bicycle manufacturers to regain control over the integration process.

The question is then: who shall control the process - the assemblers of the final product (as we see it in most other industries) ? - or the parts suppliers? Looking at the market today, it seems that parts suppliers such as Shimano and SRAM have taken the biggest steps forward. SRAM with the new "Smartbar" and Shimano with their concepts for an electronic integrated drivetrain (see Bike Europe Vol. 4, nr. 9, November, 2000). If these concepts succeed, there will not be much left for the bicycle manufacturers...

The bicycle manufacturers, who need strong concepts in order to create added value, should be leading this process. Nevertheless, it has been very difficult to find recent examples of such added value. The Urban Solutions Tango Car Bicycle is such an example, but it still has to prove itself as a commercial success as well.

All this leads to the following question: Will the revolution come from outside the bicycle industry?

Advantages of integration

The average bicycle is ten times more simple to manufacture than the average car - and still it is less reliable! How often do you need to adjust the brakes of your car, repair or inflate a flat tire, repair the wires of your light system? How often do you need to do these chores on your bicycle?

Reliability: A standard V-brake has 17 (!) parameters that have to be adjusted (degrees of freedom) before it works correctly. Furthermore, this has to be done at the assembly line, in the shop before handing over the bicycle to the consumer and probably again after two weeks use. If a V-brake was designed to fit just one bicycle (instead of all models on the market), the parameter figure could be reduced to 2 or 3. The number of parts and the assembly time would also come down. The reliability would go up and the price down. And finally the customer would be happier!

Cost and investment: More integration means higher initial investment but it should also mean lower unitary costs. This again means that you need a high volume in order to break-even. A strong concept should also mean higher added value and bigger margins. For instance, a serious project could mean investments of EUR 2 million in R&D and engineering, EUR 2 million in tooling and production and EUR 4 million in communications. If it would be possible to sell 500,000 units over a three year period, this means each unit will bear EUR 16 of amortization cost. If the increase in psychological value to the user is for instance EUR 100, there should be room for good margins, plus money for future investments.

Shift of business paradigm: For the large European bicycle groups this would mean quite a shift of business paradigm. Today, each group has approximately 1,000 models, sells approximately 1,000 units of each model and has almost no initial investment. Tomorrow each of them should have only 10 models, sell 100,000 of each with higher margins, get a

strong identity and regain control of their own business.

Strong concepts: Integration means that the concept itself shall be so strong, that it is the concept itself the customers ask for, and not the specifications of the derailleur or the brake or whatever... This again means that high professionalism in design and marketing is required. Finding the areas of the bicycle industry where investment means an increase of value perception is the big challenge. Often is it a good idea to create the product in a reverse process: Create the sales documentation first and then develop the bike. If you can't explain what you are going to sell then you can't design it.

Design freedom: More integration does also mean new materials and processes. Injection-molded plastic parts not only can make nice shapes, but also have the intrinsic possibility to build more functions into the same part. In an integrated city bike the luggage carrier can for instance be in fiber-reinforced thermoplastic. At no extra cost and with much fewer parts, the luggage carrier could provide attachment for a children's seat, pump, antitheft system, batteries for the electric system, casings for reflectors and light...

Weight: Sometimes the word integration is - erroneously - understood as covering structural parts with plastic shields. Doing this will of course increase the weight of the bicycle and make it look clumsy. Looking at many of the electric bicycles in the market, it becomes clear that the integration does not make sense unless it incorporates the structural parts.

An example of how integration can lead to lower weight is Cannondale's HeadShock's "Lefty", a single sided front fork which integrates disc-brake, suspension and headset. Cannondale claims that they have reduced the total number of parts and lowered the total weight with 200 grams.

How far can we get ?

In principle there are no limits to integration. Take for instance the modern garden chairs, which are often made in one piece of injection-molded polypropylene. This is a unique example. In the past, garden chairs were often made of wood, painted in several layers and screwed or nailed together. Thanks to integration, modern garden chairs do not need painting, are cheaper, lighter, more robust, they require no assembly and virtually no maintenance. On the bicycle, we will never be able to reduce the number of parts to one and it will never be 100% maintenance-free. But there is still a big margin for innovation in this direction. The major obstacle seems to be the financial risk and the extreme complexity of the industry. We have tried to set up some dogmas as guiding rules for good integration (see box) which can be used for inspiration. Looking forward, it will be interesting to see who will take the lead. It is our impression that the major parts suppliers have already got their feet in the starting blocks while the major bicycle manufacturers are still warming up. Ideally they should run hand in hand.

Photos and Text :



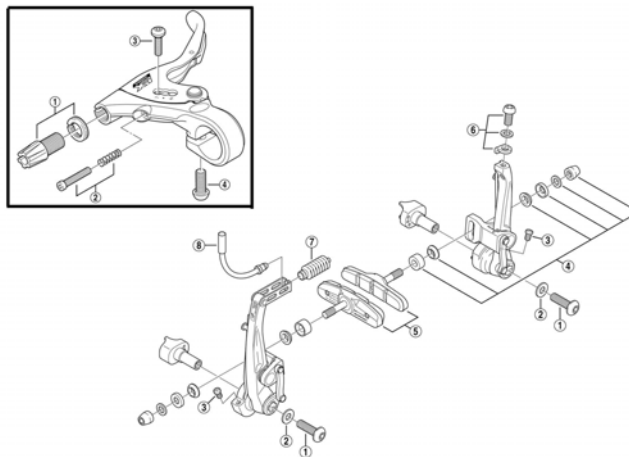
1. iMac: Apple's strong concept brings the focus back from the parts to the product itself.



2. Swatch. Thanks to its integrated design, the number of parts was reduced to 52 instead of more than 90 which was a quite normal average in the industry before 1982.



3. B&O. DVD, CD, VCR, TV, Radio... all in one unit and with a user-friendly and simple remote control. An example of how integration has been used to increase the value of the product.



4. Shimano Deore LX V-brakes. A normal V-brake is designed to fit any bicycle on the market. If it should only fit one model, the number of parameters to adjust (at the assembly line, when selling and after 2 weeks of use) could be reduced from 17 to two or three.



5. SRAM Smartbar. A good example of integration. But what is left for the bicycle manufacturers to develop when the parts suppliers make integrated designs with a stronger identity than the bike itself ?



6. Shimano Inter-L dynamo hub. Lower weight and higher reliability thanks to integration of the hub, dynamo, light sensor switch and compatibility with a roller brake.

Dognas for good integration:

- The number of parts shall be reduced
- Several functions shall be combined
- The weight shall be reduced
- The direct cost of the product shall be reduced
- The industry shall be simplified (reduced indirect cost)
- The performance of the product – as seen by the user - shall increase
- The reliability of the product shall increase
- The overall quality of the product shall increase
- The product shall “look” better
- The identity of the brand shall be clearly expressed

7. Dogmas for good Integration.



8. Raleigh Chopper (1972). A few integrated parts helped to give a strong identity to the legendary Chopper. More than 2 million were sold.



9. Cannondale road frame. By integrating the bearing system in the head tube, the conventional headset has been eliminated and the total weight reduced.



10. Campagnolo Ergopower. Integrated shifting and braking combined with composite materials gives an ultra light product.



11. DBS' Komby. The luggage carrier also serves as a mudguard, a dress guard, a box that holds a fitting bag. The handlebar has an integrated compartment for mobile phones.



12. Urban solutions Tango car bicycle. Integrating wires, lighting system, suspension, folding mechanism and drive train in the frame has not been an easy exercise. Probably the most integrated bicycle concept in Europe today.