

Inspiration by Swarms

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For me swarms and most of all swarms of fishes are a fascinating phenomenon.

I am a designer and my area of research is design theory and most of all strategic design. The task of strategic design is to implement design as the corporate strategy.

During the last years the awareness for design has increased. More and more companies have realized that they can benefit a lot from design. At the same time the complexity of design has increased. To make best use of design it needs to be implemented strategically into the business strategy. Statistics have proved that design driven companies, which use design in a strategic way are more successful on the long run (Figs. 1 and 2).

Companies are unique and make different use of design. The Danish Design Center has created the design ladder to categorize the companies the way they use design.

Quite a number of companies have arrived at level four and are unsure how to proceed. The great challenge is to move to the next level. The big question is: How to do that? Unfortunately there is no recipe and no textbook for advice. The facts we have to take into account:

- our resources and energy sources are limited;
- the development of new technologies is proceeding fast;
- the use of new technologies changes consumption patterns equally fast.

It is in our hands to shape the future in way that our children and grandchildren can enjoy their lives in dignity and peace. The old methods and strategies are useless to design the future. The challenge is to consider the contradictory demands regarding available resources, customer demands, technological development, changes in life-style, politics and economy. New strategies are needed to create solutions, which balance the different demands (Fig. 3).

My provocative hypothesis is: Companies need to use design as swarm intelligence to climb from level four to level five!

That is not an easy task. Changes demand exchange! That is why the swarms come into play. The great challenge for companies is to deal with facts and figures, and with information and decisions in highly complex environments under changing conditions. That is the everyday life of schools of fish. For schools of fish that seems not be a problem at all.

In my holidays I like to dive in clear blue and warm waters with great visibility. For me it is extremely fascinating to observe the schools of fish. How they move, how they interact, how they react and how they organize themselves. The movement of schools of fish is pure joy for designers' eyes. The way they move is applied aesthetics. I want to share my experiences with you for a moment.

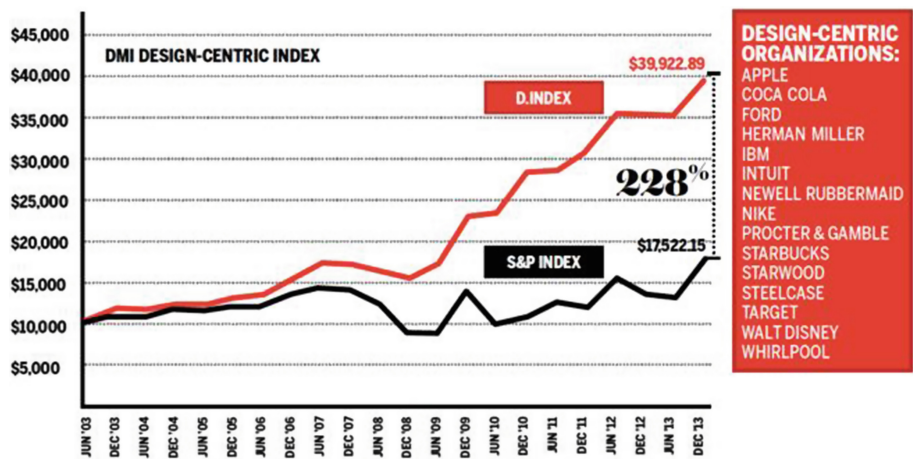


Fig. 1. Economic development of companies with a high design index compared to S&P (dmi journal)

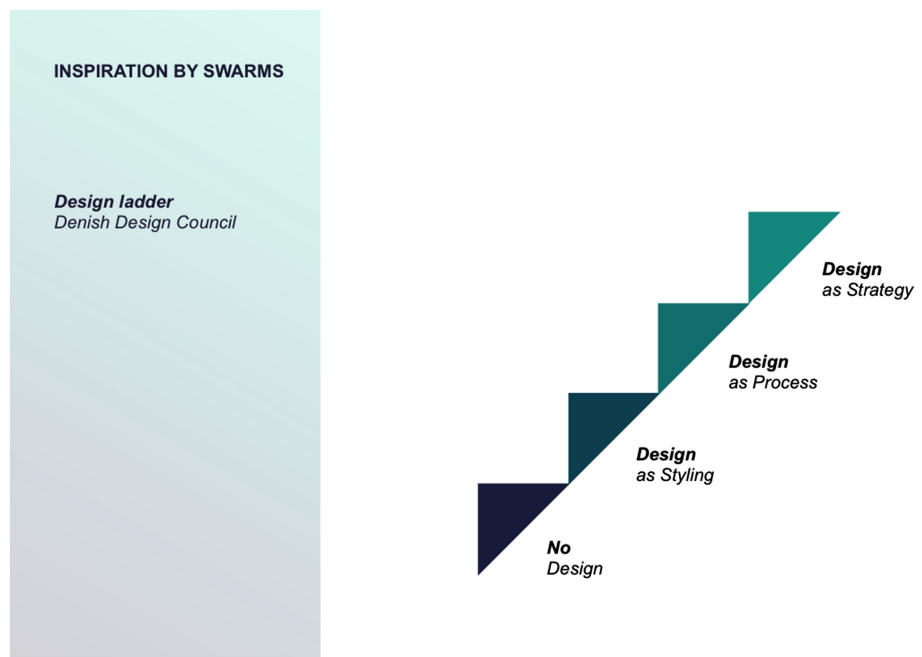


Fig. 2. Design ladder (developed by the Denish Design Center)

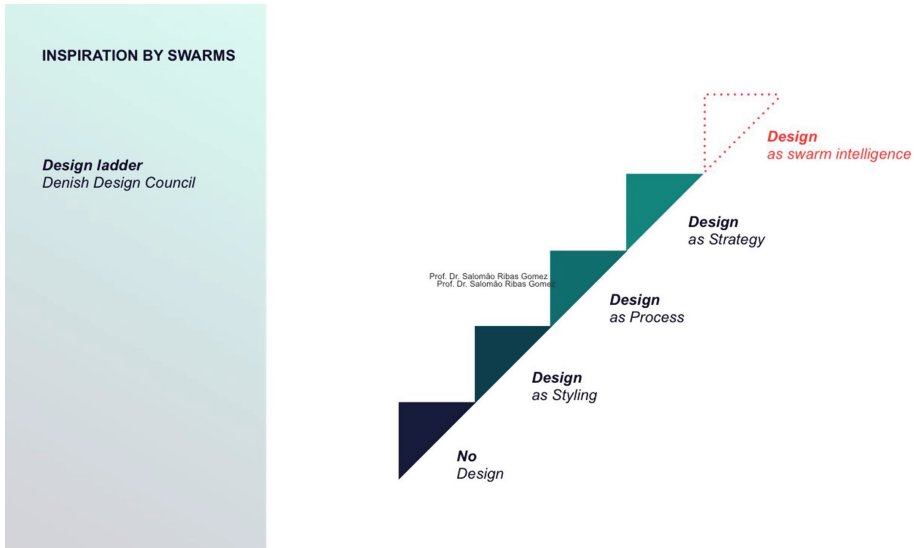


Fig. 3. Design ladder – future development

One of my greatest experiences was to swim into the center of a big school of fish. Immediately they made a big tunnel and I swam through the swarm, not getting touched by any fish. When I turned around the tunnel was already closed.

I asked myself: How do they do that? How does it work? Why do they never bump into each other? How can they move so elegantly all together? Who is the choreographer? How do they know? Who tells them where to go too? I was curious and I definitively wanted to understand the secret of their behavior.

Furthermore I wanted to understand the difference to human beings. Why does it not work the same way?

Of course sometimes it works and humans behave like a swarm, for example: after a concert some body stands up to applaud and another one stands up and finally all people stand up for standing ovations. Compared to schools of fish the reaction is quite slow. In other occasions the human swarms fail, like for example on the hadj in Mekka or at the love-parade in Duisburg some years ago. The crowd has killed many people – people were stepping on people. They did not do it deliberately, they did it because they were pushed by others and had no other chance. That would never happen to fishes.

Technology has learned so much from nature. Bionic is well known. One example: Shark skin is the most efficient surface in streams and therefore airplanes are equipped with a surface that is a technical imitation of shark skin to reduce energy consumption.

When technology can learn and benefit so much from nature. What can strategy learn from nature? What can human organization structures learn from schools of fish? This question was causing my interest even more when I read the book “The Fish Inside You”, written by the palaeontologist Neil Shubin [1]. He figured out that we all stem from fishes. Millions of years ago some fishes started to leave the water to discover Earth and they decided to live on Earth. They were already bearing inside all

beginnings of physical body elements, which characterize the diverse beings and creatures on Earth that have developed throughout the evolution process, like animals, birds and human beings.

I wanted to understand, how the fishes manage their being together. In the following I want to summarize, what I have learned from the swarms and I would like to point out the difference to human beings. Then I would like to give some examples where swarm intelligence is already in use and finally I will talk about my first ideas how I used swarm behavior as source of inspiration for a real case. The example is a company that intends to jump from level four to level five on the design ladder. I will work on this case again with our master students in the winter term 2016/17.

1 Swarm Behavior

Swarms exist since millions of years. Compared to swarms the life of companies is rather short. Swarms are self-organizing systems. They have no leader and no master-plan. This system seems to be very sustainable. I know you are all familiar with the rules of swarm behavior. Please excuse my repetition of basic knowledge, but I use it to point out the difference to human beings.

Craig Reynolds discovered that fishes follow only a few rules to be able to act as a swarm [2]:

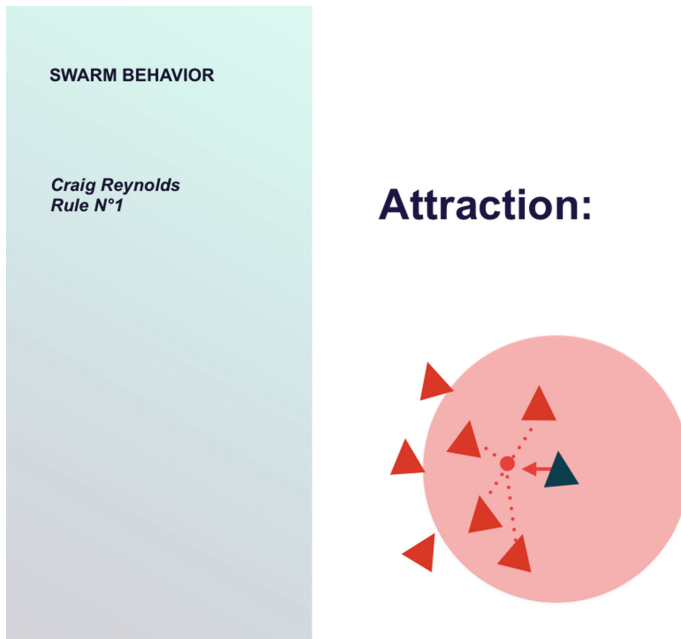
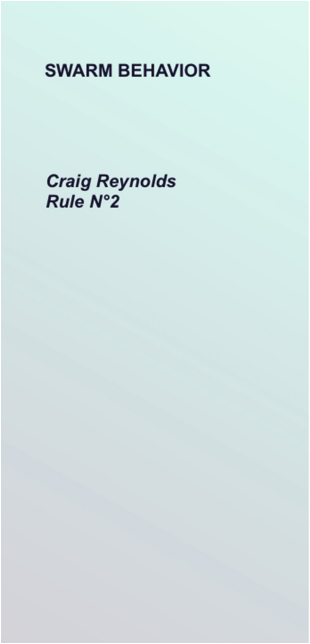


Fig. 4. Rule No. 1 ‘stay with the others’



Orientation:

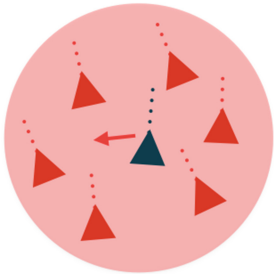
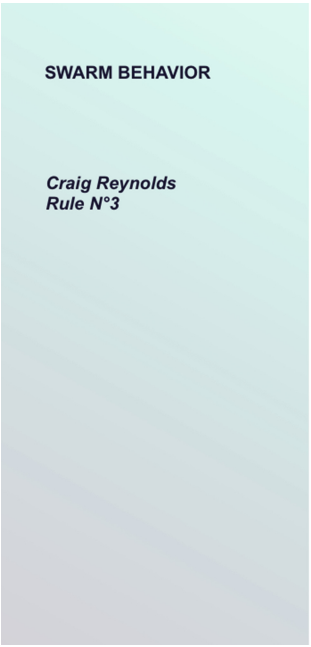


Fig. 5. Rule No. 2 ‘swim to the average of the direction of the others’



Rejection:

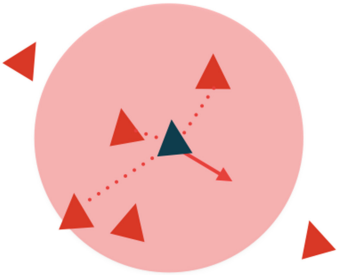


Fig. 6. Rule No. 3 ‘keep distance to the ones next to you’

Reynolds used this three rules to instruct his “boids” - boids symbolize fish in computer simulations. He also assumed that each fish has a rejection zone around and that the fish reacts as soon as someone enters this zone (Figs. 4, 5, 6 and 7).

The result of his experiment was, that the boids stayed together as a swarm. They were even able to evade obstacles and to stick together. (These insights are used to plan emergency escape routes for stadions and event halls.)

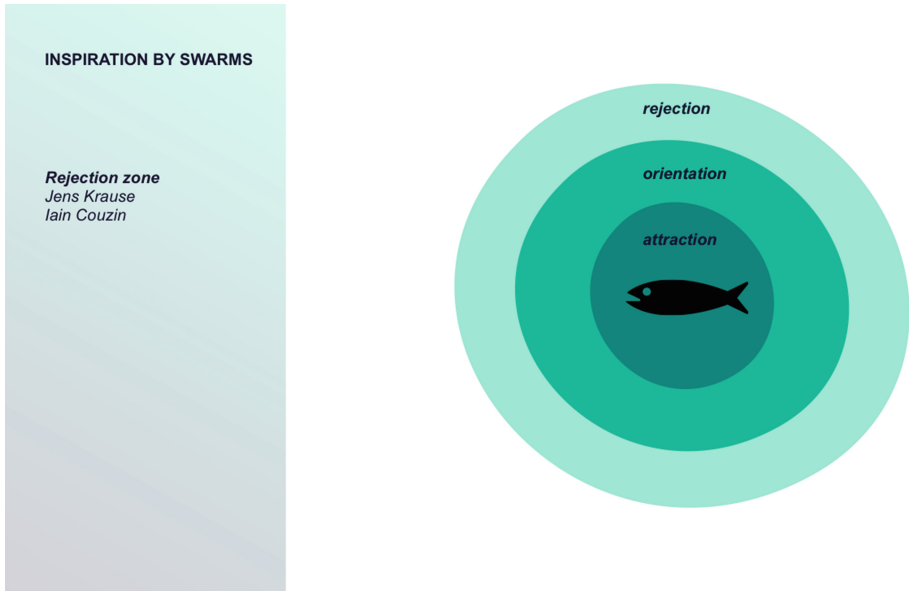


Fig. 7. Rejection zone

Jens Krause [3] confirmed these findings by stating that the rejection zone consists of different layers:

- attraction;
- orientation;
- rejection.

A fish is in the center of the rejection zone.

Iain Couzin [4] went a step further. He wanted to investigate the role of the distance between the fishes. Couzin varied the rejection zones in computer simulations.

The behavior of the swarm changed immediately when he reduced or enlarged the rejection zone. The variation of the rejection zone determined the transition from one formation to another. Transition happens because the swarm decides to search for food, to escape from an enemy, to hang around or to move to another place.

Schools of fish have obviously a very efficient way of communication. Fish swarms with thousands of fishes turn around in the same moment due to perfect communication

system. It is a miracle to observe these movements. I conclude: Communication in swarms of fish is very efficient – communication in swarms of people is rather poor.

Jens Krause wanted to find out, if people in a crowd move the same way as fishes or if they behave differently. He started an experiment on the fair ground in Cologne. Two hundred people participated voluntarily [5].

Two hundred people were instructed with rules similar to swarms:

- move with normal speed and stick to the group;
- keep the distance to persons next to you considering the length of an arm;
- don't talk and don't gesticulate.

When the participants did not receive any further instruction the participants started to walk in a circle – an inner circle in one direction and an outer circle in the other direction. The same behavior can be observed with barracudas. They swim in an inner and outer circle and sometimes they cross (Fig. 8).



Fig. 8. Swarm Experiment in the Cologne Fair organized by Jens Krause and reported in the TV program Quarks&Co by Ranga Yogeshwar

In the next step of the experiment three people were instructed to move to a certain destination. Some followed but the crowd remained together.

In the following 10 people – 5% of the group – got the instruction to move to a certain destination and the whole swarm of people followed them and met at that place.

In further research projects Jens Krause figured out that even in groups bigger than 200 beings 10 individuals are sufficient to guide the swarm to a certain destination [5].

Human beings can behave like swarms if they accept to follow similar rules.

But human beings are different from fish. Fishes depend on the well being of the swarm. Human beings are selfish, they are primarily interested in their own well-being.

The experiment of Jens Krause demonstrated further that the independence of decision is important for swarm behavior. If the participants would have had the chance to talk to each other, they probably would have behaved differently.

A comfort zone surrounds equal to fishes human beings. As long as the comfort zone is not disturbed human beings feel ok in a swarm. When the comfort zone is attacked, humans react different then swarms. Human beings are not able to communicate efficiently in huge groups. They panic and provoke terrible accidents like for example in the hadj.

Schools of fish communicate obviously very efficiently. In the ocean environment a lot of information is just white noise. It is easy to fail and to detect danger where no danger is. One single fish can fail easily, but the probability that many fishes make the same mistake is rather unlikely. This phenomenon is well known as the wisdom of the crowd [6]. That means in case of an enemy attack, a single fish would not particularly take a good decision, but the bigger the swarm, the bigger the probability that all fishes together take the right decision and escape.

How exactly the fishes communicate in a swarm remains a secret. Scientists have discovered the basic rules but they cannot fully explain the decentralized behavior of swarms:

- how do the fishes know where to go;
- how do the “ten” (5%) get the instructions for guiding.

In his book “Intelligence of the swarms” Peter Miller [7] describes other examples of swarm intelligence. Besides fishes he also discusses research on bees, termites, ants and starlings. They all have in common that a single living thing: a fish, a bird, an ant or a bee is quite stupid, but together they do great things. (We can build an analogy to our brain. A single brain cell is quite stupid but all together are quite smart.)

Termites are able to construct buildings that are in relation to their size enormous and related to size much bigger than men made buildings although human beings are intelligent and have advanced technologies at hand. Furthermore we have to consider that they build complete eco-systems including food production, ventilation, temperature regulation and so on. Because they care for the overall well being of the swarm.

Termites build a dynamic system and follow simple rules, like put your crumb of earth close to another crumb of earth. There is a constant exchange between the “swarm” and their environment and finally they achieve perfect living conditions. If the building gets damaged, the termites restore within a short time. They have flexible labor division and the single termite has to work in the position that is used at time. Catastrophes can damage the system but not destroy it. The swarm adapts to the change and reorganizes the system just by following their simple rules.

Scientists observed the decision making process of bees, which are looking for a new place to live after the swarm has split. The collective decision process consists of several steps: part of the bee swarm flies out and looks for options. When a bee found a place, she goes back to the others and dances. The duration and intensity of the dance represents her opinion on the quality of the place. When all bees are back the swarm decides on the quality of the dances where to live. One important characteristic is, that the bees act independently and are not influenced by the others.

Another phenomenon I want to mention are the enormous masses of starlings in Rome. They come every year and perform spectacular dances in the sky. Andrea Cavanga has observed the starlings for many years. With different cameras he filmed their performance again and again until he had enough material for his analysis. He used computer simulation to find out how they relate and communicate to each other. He came to the conclusion that each starling has fifteen to sixteen birds in its field of vision. But a single starling pays attention only to six or seven birds, which are close to him on the left and right side [8].

It is still an unknown secret, why the starlings do their artistic flights every night from November to March: If they do it just for fun or if they want to escape the falcons. Nobody knows.

Summing up, the basic characteristics of swarms are:

- Self-organization
- Simple rules
- Collective vigilance
- Resistance to failure
- Independence of meanings
- Diversity of skills
- Orientation/Adaption

2 Difference to Human Beings

Hans Hass [9] was one of the first behavioral scientist investigating the behavior of fish and he was one of the first under water filmmakers. He transferred his insights from the underwater world to the market. He wrote a book about his findings with the title “The Shark in Management”. And later on he worked as consultant for companies.

He stated that human beings differ from fish and other animals by their intelligence. Other than animals they are able to build great tools, which help them to multiply their production capacity, like nowadays computers, robots and so on. To market the multiplied production money was introduced. In his opinion the introduction of money was the start point for many problems. (Fishes have no money!) Money became the “must have”. The more money an individual owes the greater the power and the status. Like sharks many business people are hunting for money and take advantage when possible. Fraud and corruption are now part of our reality.

Human beings care for their personal advantage and not for the well being of the society. The environmental problems can be seen as a result of the activities of the sharks in management.

The experiments of Jens Krause have proved that human beings can organize themselves in a swarm, when they follow the rules. Unlike fishes human beings don’t have the instinct to serve the community. They think about their personal benefit.

We can observe that with public transport. Everybody wants to get on the train and conquer a seat and therefore tries to get on the train as soon as possible.

Only for Mothers with little kids and old people the crowd respects the rejection zone.

Companies use a hierarchical structure to organize the crowd. The communication is basically top down. The president decides and the decisions are passed through the different levels to the employees. Actually a lot of knowledge, information and expertise get lost in the communication processes from one level to another or from one silo to another. Anyhow this organization structure seemed to work well in the past (Fig. 9).

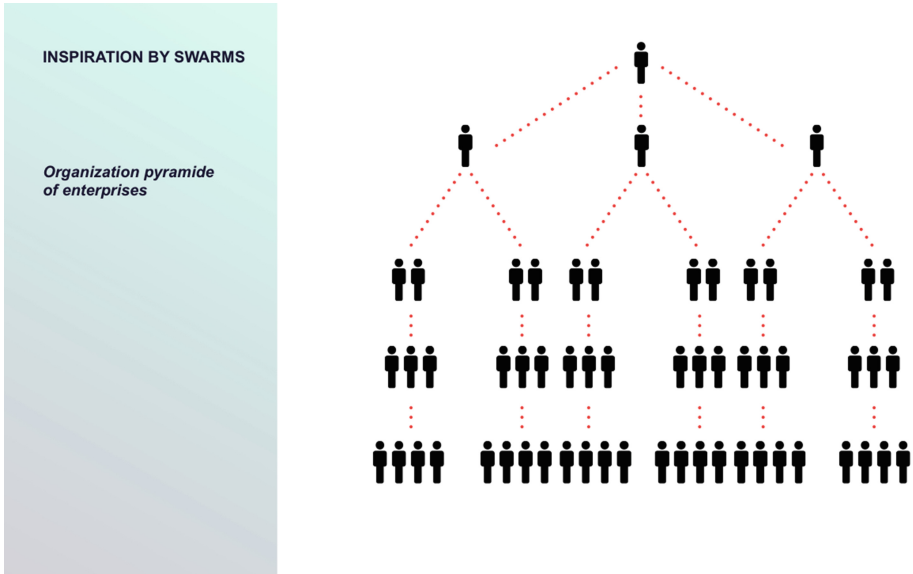


Fig. 9. Hierarchical organization structure of enterprises

More and more companies realize that they need to make better use of the skills, expertise and knowledge of their employees to be able to compete in the future. (Many years ago the president of a medium sized company commented that his company would be a smart company, if his company would knew, what his company knows. He was one of the first to build an intranet to make the knowledge of his employees accessible to all employees.)

The hierarchical structures of the past don't fit for the future. They do not work at all for companies that want to move to level five.

The communication from the bottom to the top is complicated in hierarchical structures. Mr. Gore realized that when he was an employee at Dupont [10]. He invented the fibre Gore-Tex and wanted to sell his invention to Dupont. He got lost in the hierarchy, nobody listened to him properly and nobody was interested in his project for whatever reason. Therefore he decided to build his own company – but without hierarchies. He created a company out of different self-organizing teams no bigger than 150 employees. If the company grows a new unit is installed. The employees have two rules: make money and have fun. The reputation of the employees is based on their performance and not on status.

Under certain conditions (team work in production, groups with special interests, spontaneous initiatives for help in case of catastrophes etc.) human beings have confirmed the advantages of self-organizing behavior. Contrary to swarms human beings cannot communicate as efficiently and transmit information to the whole group. Self-organization of people has a limit to size. When human beings organize themselves they need to interact with each other verbally. In groups no bigger than 150 human beings everybody gets to know each other and can establish direct communication without hierarchical borders.

Human beings are social creatures and they want to socialize. Niklas Luhmann [11] said social systems – human beings – are characterized by the exchange of communication and senses! Contrary to living beings in swarms human beings make use of their intelligence. They request and discuss information to understand the sense. Social relations have a strong impact on the interpretation of sense and consequently on human behavior. Human beings strive for positive reinforcement and prevent negative reinforcement from society. They do it consciously and also unconsciously.

They intend to be positively rewarded by their peer group by demonstrating that they belong to the group. To live in harmony with their fellows, human beings adapt to the people they are related to or want to be related to. Social groups are kept alive through the exchange of information, meanings and preferences. (The adaption to social groups may also happen unconsciously. Scientists in Massachusetts figured out, that people with a friend, a partner or a relative with adiposity are facing the probability to suffer from the same problem.)

Similar effects we can observe in the consumption behavior of people. If people join a party where many guests drinks beer they are more likely to drink beer as well. If they have friends that are vegetarian, they might probably think about eating less meat etc. For human beings the acceptance of their social groups, like family, friends, fellows, colleagues and relatives is important. In their everyday behavior they tend to swim with the stream, because they think that is a safe way.

In the business environment swimming with the stream can be a disaster. For example: the hedge fund analysts in 2008 were following the main stream, because they found it less risky to do what the others do. They were afraid to be blamed in case they act differently and fail. In the end they all failed. The financial crises showed that swimming with the stream does not prevent failure and when they group fails, the group fails great.

3 Learning from Swarm Behavior

- Self-organization:

Build groups without hierarchies and invite agile, enthusiastic and motivated members.

Limit the amount of participants.

Specify the objective.

Care for the well being of all stakeholders – the whole swarm (inside and outside).

- Diversity:

Combine individuals with diverse expertise, skills, knowledge and experiences (because diversity is highly important to generate good ideas – the more diversity of knowledge, the better the quality of the solution.)

- Interaction:

Set a few rules to structure the interaction of the group members.

- Independence:

Group members act independently from each other.
Diverse opinions and ideas are wanted.

- Be yourself:

The group members truly represent themselves and stick to their opinion and do not imitate others.

- Collective vigilance:

Group member are open and alert to new information.

- Interaction with the environment:

The group interacts and co-creates an exchange with stakeholders outside the company and with the environment (inside out – outside in).

- Support idea generation:

Provide a creative environment to stimulate the crowd.

- Dynamic system:

React to changes in the environment.

- Selection process:

Develop criteria and an effective process to reduce the generated ideas and options

- Decentralized control:

Accept the decisions taken by the team.

- Rejection zone (Attraction, orientation, rejection):

Consider that the variation of the rejection zone changes the behavior of the group, like time pressure, change of environmental conditions, different context etc.

- Management of uncertainty:

Acting like a swarm helps to manage uncertainty, a swarm is resistant towards failure, wrong decisions of a few are balanced by the group.

4 Examples

New knowledge is generated faster and faster and the Internet gives everybody access to new knowledge and also to new services. Consequently the lifestyle of people is changing. Access to use becomes more important than possession. The Internet makes new services possible, like sharing, bartering and co-creation of products and services. The use of new technologies provides so many completely new options, that companies need appropriate methods, structures and procedures to deal with it.

Swarm intelligence is already part of our everyday life. Internet, smart phones, social media, apps have changed our behavior: One example is car sharing, like for example car2go [12]. The management of the fleet is self-organizing by its software. Users have access to mobility through an app and a membership card. In many cities these cars are always around and accessible.

Another example is the use of the so-called “big data”.

Telephone companies receive signals from activated mobile phones and use the “big data” to communicate information on traffic jams in time to car drivers. With “big data” it is now possible to foresee twenty to thirty minutes in advance when people accumulate to a dense crowd and will probably be in danger shortly. Hopefully accidents like on the hadj and love parade can prevented in the future.

Companies that are thinking ahead act different to solve future problems and develop appropriate strategies: Working in silos of the hierarchical structures is not the way to deal with the future challenges. The growing complexity, the more specific expectations of the customers and the growing influence of the customers demand new approaches. The time of vertical operation is replaced by horizontal co-operation (Fig. 10).

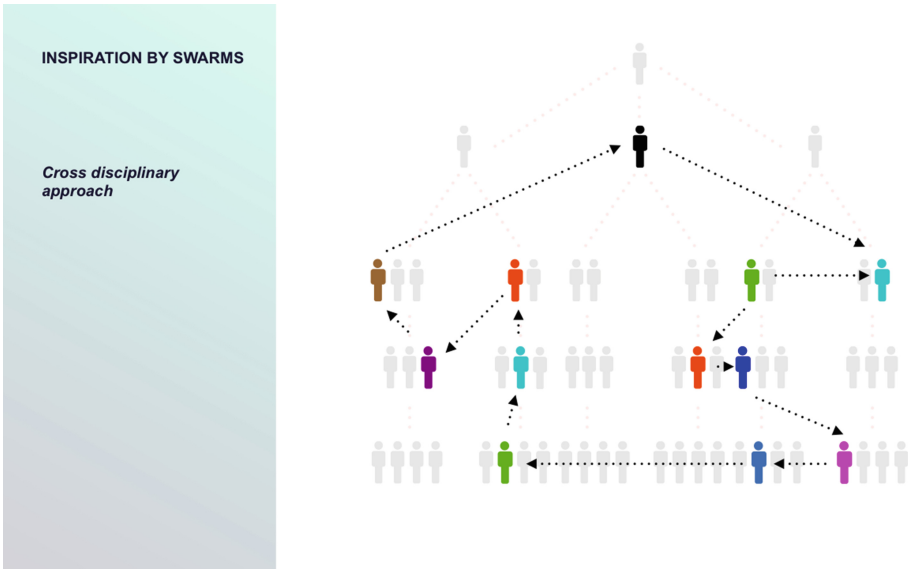


Fig. 10. Future oriented organization structures

The methods and strategies of design thinking are very popular, because their intention is to work across silos, across disciplines and across the company. Design thinking involves all stakeholders like suppliers, traders and most of all Users.

Now the silo workers got stuck with their business as usual and designers have a great time. The design awareness in companies has increased a lot. Design is been taken serious and is discussed on board level. The philosophy has changed from silo thinking to cross-disciplinary approaches with the task to create ideas, build a prototype, test it and fail fast. Fast failure doesn't affect the company, like the wrong decision of a single fish doesn't affect the swarm. Late failure can damage a company, like a bad decision of a swarm can destroy the swarm.

Failure is no longer seen as a taboo or something very negative instead it is seen as a rich source for learning.

Companies are still very much concentrated on their mission, their values, their products, their distribution channels, their marketing and communication but not that much in the interaction with the ones they are depending on: The end-users!

A remarkable fact on the International European Design Management Congress 201 in Amsterdam was the observation that there is a change in the mindset of companies. Philips is a leading company in design research and in design strategies. The new aim of the company is: Improve the life of three billion people! People first – that is a new way of thinking to shape the philosophy and culture of the company [13].

Another example was the brewery Heineken. They live on selling beer – the more they sell the better. From user research they have learned that moderate drinking is preferred. Therefore they started a campaign “This one is on us”! [14] In bars in Amsterdam you get a free glass of water with each bottle of beer and a special glass fixed to the bottle. The company communicates moderate drinking to support the well being of the customers. The care for the user comes into focus and corresponds to the care for the swarm. If the users are fine the Philips and Heineken will be fine as well. User research, customer insights, co-creation, living labs and open innovation are used to better exchange with the users.

Prof. Salomão from Florianópolis visited recently presented an interesting project at Wuppertal University, which made use of swarm intelligence: The Brand “Floripa”.

The task was to create a regional brand for the town Florianópolis in the south of Brazil. The project is a co-creation process and integrated inhabitants, visitors, officials and businesses into the process (Fig. 11).

The creation of a regional brand is a prestige job for design agencies. Prof. Salomão and his institute decided to work differently from the usual design agency processes. They integrated the crowd into a co-creation process:

- 40 decision and opinion makers were interviewed;
- 21 creative events with the community;
- 900 testimonials about the DNA and the purpose;
- 30.000+ engaged in person and virtually;
- 29 design students and professional engaged in the visual identity.

Three alternative solutions were elaborated by the design community of Florianópolis, students and professionals were working together.

Variations



Fig. 11. Co-creation of a brand carried out by Prof. Dr. Salomão Ribas Gomez at Universidade Federal de Santa Catarina in the city of Florianópolis, Brazil

The inhabitants of Florianópolis were asked to vote on the alternatives. More than 10.000 people took the opportunity to decide about their preferred solution.

I know the city quiet well and when I look at the result I can confirm that the crowd took the best decision. The selected alternative expresses the awareness of life in the city in a perfect way. The visual identity will be applied to signage systems, brochures, merchandise articles, public places and events and so on.

I am not sure, if the lord-mayor by himself would have taken the same best decision (Fig. 12).

There is a demand for new processes of co-operation and co-creation in complex processes. Another example I want to mention was elaborated by one of my doctoral students. His job is to manage the exhibitions of Mercedes Benz on international automobile fairs. Those of you who have visited such a fair may imagine that it is a very complex task.

All stakeholders involved have their special interests: the top management, the engineers, the marketing people, the designers, the people in charge of public relation, the sales department and finally the interests of visitors and prospect buyers have to be considered. The challenge is, how to manage the crowd of experts – the swarm. – They are supposed to stick to the company’s values and not to their individual vanity. My doctoral student did an intense empirical research and included all stake holders and their special interests. The final outcome is a tool similar to a compass that enables him to ask the right question at the right time to the right person to strengthen the co-operation of the team. (complexity broken down to simple rules to manage the swarm).

Mosaic



Fig. 12. Co-creation of a brand carried out by Prof. Dr. Salomão Ribas Gomez at Universidade Federal de Santa Catarina in the city of Florianópolis, Brazil

5 Swarm Intelligence as Inspiration for a Design Strategy Project

Like a swarm a company is not a closed system. Each swarm and each company is also part of a bigger system. The collective vigilance plays an important role. The interaction with the environment is not only important for swarms it is equally important for companies and decides about life and death.

Companies realize that design thinking enables them to prepare for the future and to reach level five of the design ladder. The permanent interaction with the users and the environment seems the best way to create a sustainable future.

Wera is a medium sized company producing screwdrivers of all types in high quality, excellent functionality and extremely user friendly. We started to work with them in the summer term 2013. That time they were on level three of the design ladder and intended to climb to level four.

Together with my assistants and with our master students I elaborated a design strategy and a brand strategy for the company. The management was highly motivated. Our co-operation was good and trustful, although or because we analyzed and benchmarked the company critically and we always told them truth.

They were happy with the result and used the handbooks to implement the strategies. In the last three years the company has changed not only its appearance but also the way they work together. They work together like a swarm, they share the same DNA and follow the rules and they are enthusiastic. The investments in design have paid off. Meanwhile they won a lot of design prizes and have doubled their turnover (Fig. 13 and 14).

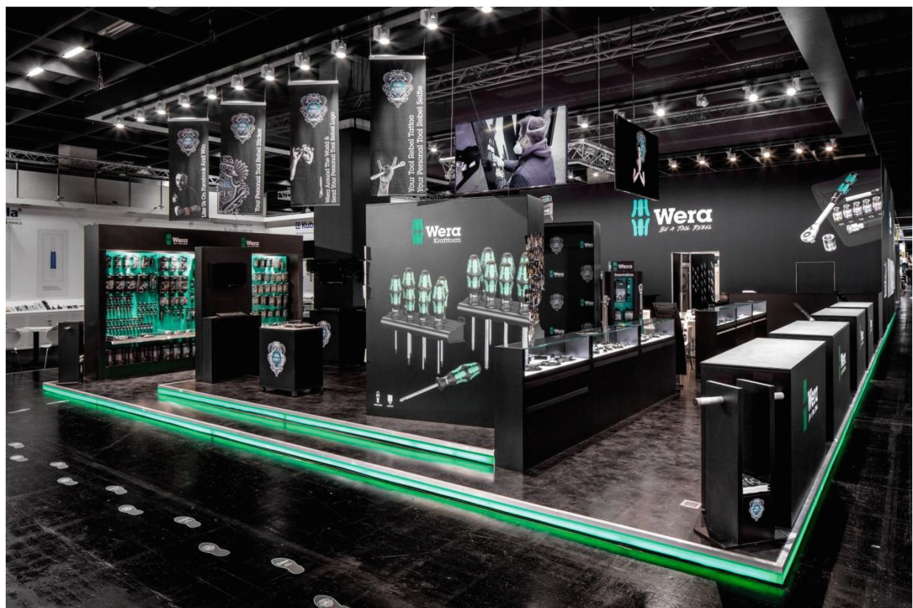


Fig. 13. Fair stand of Wera at “Internationale Eisenwarenmesse” in Cologne, March 2016

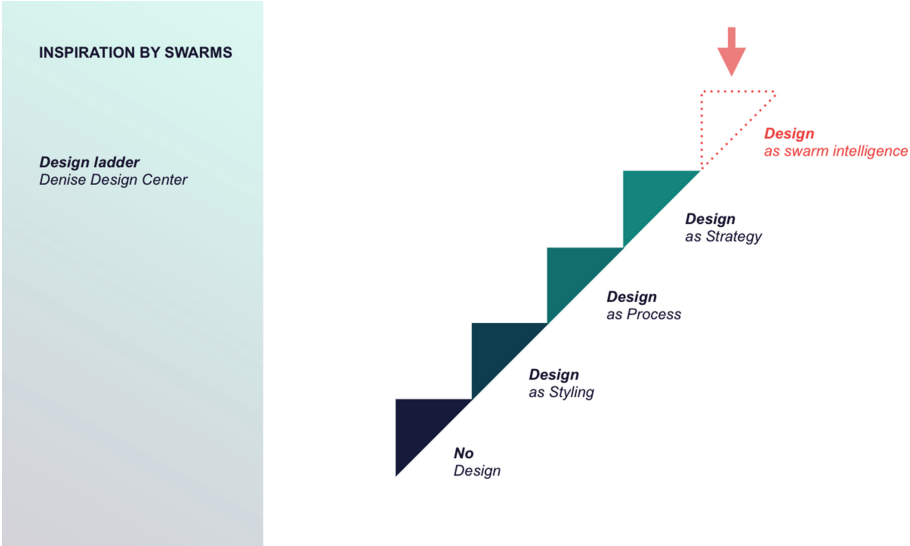


Fig. 14. Application of swarm theory to climb up the design ladder to level five

I visited their fair stand in April and I was surprised: the fair stand was totally crowded with people and the Wera employees on the fair stand were extremely busy to handle all requests of the visitors. In compare the fair stands of the competitors were

quite empty. Wera runs ahead of the competitors, but the company knows very well that the most important competitors will catch up soon. Therefore they decided to improve further. Their desired goal is to become a public brand, like aspirin. (In almost every country of the world aspirin is a synonym for a painkiller, even if it is not the original.)

They definitively want to reach level five of the design ladder!

To reach level five they need to operate differently and they need to interact with the environment directly - like swarms do. New technologies provide great options to interact direct and fast. Close and good relation to the environment and the customers will be their key for future survival. In my opinion future success will be determined by:

1. transparent interactions with users and all the other stakeholders;
2. demonstrations of environmentally and socially responsive and sustainable activities of companies.

My proposal for the process considers what I have learned of swarm behavior:

1. Change your mindset (DNA) from offering to caring

Workshop with the top management to discuss the new aim.

We want to figure out:

What works well and what does not work so well?

What are the problems?

What are the challenges the company is facing today?

What are the aims and objectives of the company for the future?

Result: Clear definition of the future perspective.

2. Design thinking process

Organization of cross-disciplinary workshops as self-organizing groups.

We have to:

Provide the rules how to interact and a friendly setting.

Invite the participants, like employees of all departments, representatives of the different distribution channels and end users from different production companies.

Guarantee diversity, independence and be yourself.

Results: identification of existing problems, generation of ideas how to solve the problems the different stakeholder are facing right now, creation of as many ideas as possible.

3. Orientation

We have to:

Structure the ideas and prepare the selection process.

Consider the aim of the company as the basis for the selection criteria.

4. Evaluation

We have to organize a cross-disciplinary workshop to evaluate and select the most promising ideas (wisdom of the crowd, swarm behavior).

5. Testing

Rapid prototyping of selected ideas and test them in real life experiments (interaction with the environment).

6. Learn from failure and improve

Cross-disciplinary workshop to rethink the experiment and to find solution for improvement (swarm decision to balance the wrong decision of an individual).

7. Design process

8. Implementation

When the project succeeds the company will not only act as a swarm internally, the company will act as swarm in the ocean. The company will sustain shark attacks because the employees (swarm) are alert to changes in the environment and react spontaneously, they observe the behavior of other swarms (competitors) and most important they interact with users and retailers in co-creation processes.

The main motive to join a swarm is the fear to be eaten by an enemy.

The same fear exists in companies, they are afraid to be swallowed by the competition. I am convinced: When they learn from swarm behavior they will be stronger, climb to level five and have better chances for long lasting success in the market.

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