

# RESOURCE BASINS – A STRATEGIC CHALLENGE FOR THE BUILDING INDUSTRY

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## ABSTRACT

The point of departure of this paper are assertion statements about advantages and unsuitable elements of the use of partnering in the construction industry today. Next, the view is turned towards the manufacturing industry for inspiration on how a learning environment is formed by making strategic partnering suitable for the nature of the construction industry.

It is argued that effectiveness and efficiency in the construction industry can be improved by giving the partnering cooperation a strategic focus which involves the development of competing Resource Basins, i.e. groups of long term cooperating companies in the supply chain, or rather, in the supply network. The suggested way to form a learning environment combines some of the advantages from the production philosophies Supply Chain Management, Agile Manufacturing and Extended Enterprise in connection with Virtual Enterprise with the characteristics of construction.

The idea is to establish a joint grounding in a group of companies. The solidarity and cooperation between the companies exist independently of specific projects. It forms a learning environment in the resource basin in which knowledge gained from different projects is collected and distributed to all the members of the resource basin. At the beginning of a specific project, i.e. a potential customer knocks at the door, the most suitable resources from the basin are assigned to the job. These resources form a project group for this project. This differs from a traditional project group in the building sector because these resources already are thoroughly familiar with each other, i.e. they have shared common cooperation values, and they have developed integrated logistic systems, quality systems, information systems, continuous improvement systems etc.

Finally, barriers and thoughts about how this learning environment can be brought into the construction industry are discussed.

## KEY WORDS

Strategic Partnering, Resource Basins, Supply Chain Management, Agile Manufacturing, Extended Enterprise and Virtual Enterprise.

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## INTRODUCTION

With the purpose of improving effectiveness and efficiency in the Danish construction industry several initiatives have been carried out in the last decade, and new initiatives are still continuously occurring.

A large part of these initiatives focus on the work at the construction site, but several tendencies point towards the need for more focus on the early stages in the building process. Partnering, which has appeared in the Danish construction industry during the past few years, is a cooperation concept that indeed takes in the preliminary stages in building projects.

Partnering or partnership concepts have been used in the mechanical and electronics industries for several years. In these areas partnering generally tends towards long-term strategic cooperation among the companies in the value chain with possibilities for ongoing integration improvements of e.g. quality, logistic, information management systems and product and process development. In contrast to this, the partnering approach in the Danish building industry, also involving product and process development, has so far mainly been practiced isolated in individual project organizations, i.e. the cooperation dissolved when the building was completed. It seems that the building sector compared to the mechanical industry is more reluctant to establish more permanent and strategic cooperation teams by which the teams from project to project could make better use of the ongoing organizational learning and continuous improvements in a trustful and win-win atmosphere.

This is one of the main conclusions in a list of tendencies in partnering in the Danish building industry. Seen in a large perspective, the following conclusions can be made about the use of partnering in the Danish Construction industry today:

- The gained experience with partnering is mainly positive.
- The attitude towards partnering is in general sympathetic.
- The collaborators often change, with each new project the team composition is new. This causes:
  - Consumption of time and resources to find the team spirit and set the rules of the game in the beginning of every new project.
  - Difficulty in gaining experience about the cooperation.
  - Partnering to develop once more at every new project leads to conclude, that partnering still is and, if the tendency goes on, always will be in the experimental stage.

Therefore, master student Malene Moeller in her final master project with specialization in "Building Management" in the spring 2003 decided to work on how the Danish building industry could further develop the partnering aspect inspired by some of the modern production philosophies used in the mechanical industry. Among others, Moeller's work leads to the concept of Resource Basins, which shows how learning environments can be formed in the Danish construction industry.

## RESOURCE BASINS

The concept of Resource Basins is about how to improve the use of partnering in the building industry today. The concept introduces a way to give the partnering aspect a more strategic approach. The concept is developed with respect to the characteristics of the building industry mentioned earlier, and especially three production philosophies have given inspiration to the idea about resource basins:

- Supply Chain Management (SCM).
- Agile Manufacturing (AM).
- Virtual Organization (VO), Virtual Enterprise (VE) and Extended Enterprise (EE).

These production philosophies are especially relevant because they all focus on:

- Collaboration among companies.
- The company in a network among other companies.
- Viewing the production process in a holistic perspective.
- The customer - understood in a broad sense.

Furthermore, these three production philosophies cover the trends of today and the nearest future. All together these points make them interesting in connection with thoughts about improvement of the use of partnering towards development of learning environments in the building industry today. In the following part the general traits of SCM, AM and VO are briefly introduced.

## SUPPLY CHAIN MANAGEMENT (SCM)

Bejder and Wandahl (2004) explain the idea of SCM in this way: The Supply Chain Management (SCM) philosophy, which implicitly involves the partnering concept, appeared in the mid-eighties. The newest management literature concludes that SCM is more than a careful implementation of logistics between organisations. A general definition is:

*Supply Chain Management is the integration of business processes from end user through original suppliers that provide products, services and information that add value for costumers (Lambert 1994).*

Today, the customer puts up increasing demands for product quality as well as service. Therefore, one of the essential reasons for adopting the SCM concept is to put the organisations in the supply chain in a position to differentiate themselves in the eyes of the customers and, thereby, produce and sell with a higher profit. Leading companies in the mechanical industry have recognized that competition today is not company against company but rather supply chain against supply chain.

Overall, it can be stated that the SCM way of thinking optimizes the interplay in and between the individual links in the supply chain. Therefore, it is very important to have all the links involved in appropriate cooperation because a chain is no stronger than its weakest link.

The integration focus must be on the whole chain, contrary to the situation when the individual company solely focuses on its own conditions which often leads to sub-optimization.

If the SCM way of thinking should be carried out in practice, an increased cooperation between the parties involved in the supply chain is required. To achieve this increased cooperation a long-term relationship of trust must be established. Furthermore, openness concerning budget and realized profit, respect for contracts, set up of shared objectives of quality must be some of the keywords. Therefore, the parties involved must pass through a number of cooperation adjustment levels. Bhote (1989) describes a development process through four stages:

*Stage 1: Confrontation with the supplier.*

*Stage 2: Arms-length relationship, where adversarial attitudes gradually give way to a cautious, tentative assessment of working relationship.*

*Stage 3: A congruence in mutual goals, a coming together.*

*Stage 4: A full-blown partnership between customers and supplier, a marriage "made in heaven".*

Bhote (1989) also emphasizes that the customer company does not necessarily cooperate with all suppliers at the same stage. The stage depends on the products and services the supplier provides, e.g., there is a difference between whether the supplier provides data programs adapted to the individual user, or the supplier provides nails and screws.

A supply chain can be briefly described as follows:

- The supply chain is understood as a supply network more precisely than a single supply chain.
- The collaboration is based on long term relationships developed over time.
- The objective is to achieve flexibility and ability to react rapidly to market demand and thereby be an attractive competitor in time and cost.
- The collaboration focuses on optimizing the logistics through integrating processes and on avoiding non-value making processes.
- The supply network is dynamic but the changes appear in a slow pace.

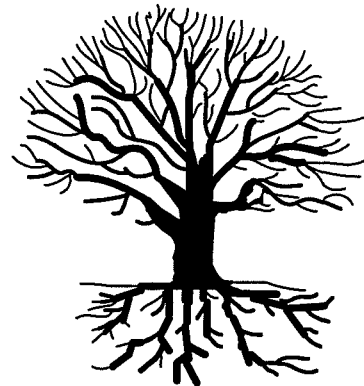


Figure 1: The tree as an illustration of the supply network. The trunk illustrates the company from where the supply network is viewed. The roots illustrate suppliers and the branches illustrate the customers.

## AGILE MANUFACTURING (AM)

AM is roughly presented as covering the ability quickly to adapt the company or parts of it to changes in conditions. More in depth, the definition of AM can be expressed as follows:

*“Agility is a comprehensive response to the business challenges of profiting from rapidly changing, continually fragmenting, global markets for high-quality, high-performance, customer-configured goods and services” (Goldman, 1995)*

- **Marketing:** AM is characterized by capturing customer requirements and devising individualized combinations of products and services.
- **Manufacturing:** AM is characterized by being able to manufacture goods and services to the customers in random lot sizes.
- **Design:** AM is a holistic method which integrates supplier relations, production processes, business processes, customer relations, use and if necessary the disposal of the product.
- **Organization:** In AM the companies are characterized by their ability to put together new productive capacity from the existing resources inside and outside the company.
- **Management:** AM is a shift in management from command and control to management by motivation, support and trust.
- **Employees:** In AM well-informed, competent and innovative employees are the ultimate differentiation between successful and unsuccessful companies.

To achieve AM there are four fundamental strategic dimensions on which the companies must focus. These are (Goldman, 1995):

- Enrichment of the customers.
- Co-operation as a means to increase competitiveness.
- Organizing for handling changes and uncertainty.
- Focus on the significance in influence from employees and knowledge.

In figure 2, a comparison between mass production and AM gives a further angle in the understanding of AM.

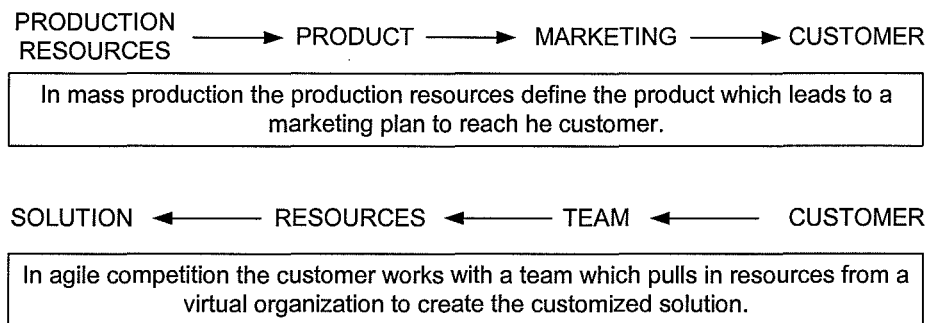


Figure 2: From focus on production under mass production to focus on customers in AM (Goldman, 1995).

In summary, AM is characterized by offering individualized products. In AM the customers are no longer just a part of the statistics but individual persons with each their own demands and needs. Therefore, AM aims at mass production of one-of-a-kind products. The organization structure in AM companies is dynamic and the best form is continuously chosen in each specific case. This also includes continuous adjustment of the best resources regardless of if the resources are to be found inside or outside the company. Cooperation in AM is often for a short period and these temporary relations are supported by flexible and intelligent technology. The employees are in AM understood as the core competencies and are thereby highly valued. The competition object in AM is the ability to reorganize and to continuously be prepared for any change.

### **VIRTUAL ORGANIZATION (VO)**

Virtual organizations can be defined as temporary networks that are supported by ICT (Information and Communication Technology). They often arise as opportunistic alliances of core competencies. The aim of a company involved in such alliances might be to achieve rapidly specific competencies in order to fulfill demands from a customer.

Virtual organizations will for example in connection with AM make the companies able to obtain competitive advantages. A production philosophy that connects elements from the virtual organization with elements from a more strategic kind of organization and cooperation is presented below.

### **Virtual Enterprise (VE) in connection with Extended Enterprise (EE)**

Another production philosophy, which has also been introduced in the mechanical and electronic industries in recent years, and which also involves the partnering aspect, is Virtual Enterprise (VE) in connection with Extended Enterprise (EE). VE arises in the nineties in line with the development in the information technology. In this way, it is a development towards a virtual organizing of companies with the help of IT.

Extended Enterprise (EE) is perceived as the overriding concept in connection with VE, i.e. VE is rather defined as the way by which the EE concept is carried out (Gobbi, et al. 1999). Ip-Shing (1997) defines EE as:

*Extended Enterprise is the concept of manufacturing business operations that looks at all the participants in the manufacturing of a product. The significance of the Extended Enterprise as distinct from the conventional subcontracting relationship is in the extending of information flows that facilitate the tightening of manufacturing design and production. The opportunities of using the specialists' skills and knowledge of the supplying partners in enhancing the design of the new products are immense. The supplying partners own the processes and are at the forefront of the particular field of expertise.*

Thus, EE aims at the creation of a closer cooperation at all levels, a network that makes it possible to use specialist knowledge and experience which is placed at the sub-suppliers. This can be seen in connection with the following definition of VE:

*The concept of VE is a network of enterprises that constitute a temporary alliance, in order to share their costs, skills, and resources, in supporting the necessary activities towards the exploitation of fast-changing opportunities for product or service requests and competitiveness in a global market. In foreseeable future, the manufacturing process is not carried out by a single enterprise; rather every enterprise is just a node in the VE that adds some value to the product chain. Therefore, virtual enterprises materialize by careful selection of skills and assets from different companies and their syntheses into a single business entity (Garita 1997).*

In this way, EE forms the overriding "Resource Basin" from which a temporary VE is established. This is done when the EE network receives an order from a customer. When the VE has created and produced the solution for the customer, the VE will be dissolved. But at the same time, it is secured that experience gained is communicated to all the members of the VE and back to the entire EE Resource Basin. Gobbi (1999) makes the following conclusion for a VE:

*A VE is a customer solutions delivery system created by a temporary and reconfigurable ICT enabled aggregation of core competencies.*

The development towards VE can be observed from three sides; the project, the market and the production. All aspects have taken part in connecting suppliers, distributors and the customer closer together in a strategic partnering-like cooperation. It is also essential that the product delivered is no longer a product or service in a general sense. It is rather bundles of yields covering specific needs. Thus, it might be tailored, holistic solutions produced in a fraction of the time made without VE and produced with much smaller cost.

In summary, nine strategic reasons as the motivation for companies to be involved in a EE network and thereby participate in VEs can be given (Nagel 1995; Woods 2000):

- Sharing of infrastructure, R&D, risk and cost;
- Focus is turned towards linking of core competencies;
- Reduction of "Concept-to-Cash" time;
- Reduction of "Time to Market" time;

- Gain access to markets and share markets or customers;
- Be changed from selling products into selling holistic solutions;
- Improve the capability to produce “the right thing”;
- Minimize cost; and
- Improve sale.

### **RESOURCE BASINS IN THE CONSTRUCTION INDUSTRY (DEFINITION AND CONTENT)**

Inspired on some of the above mentioned production philosophies, a framework for a strategic solution on how to develop learning environments by improvement of the use of partnering in the Danish construction industry was set based on the concept of Resource Basins. An illustration of the concept is given in figure 3.

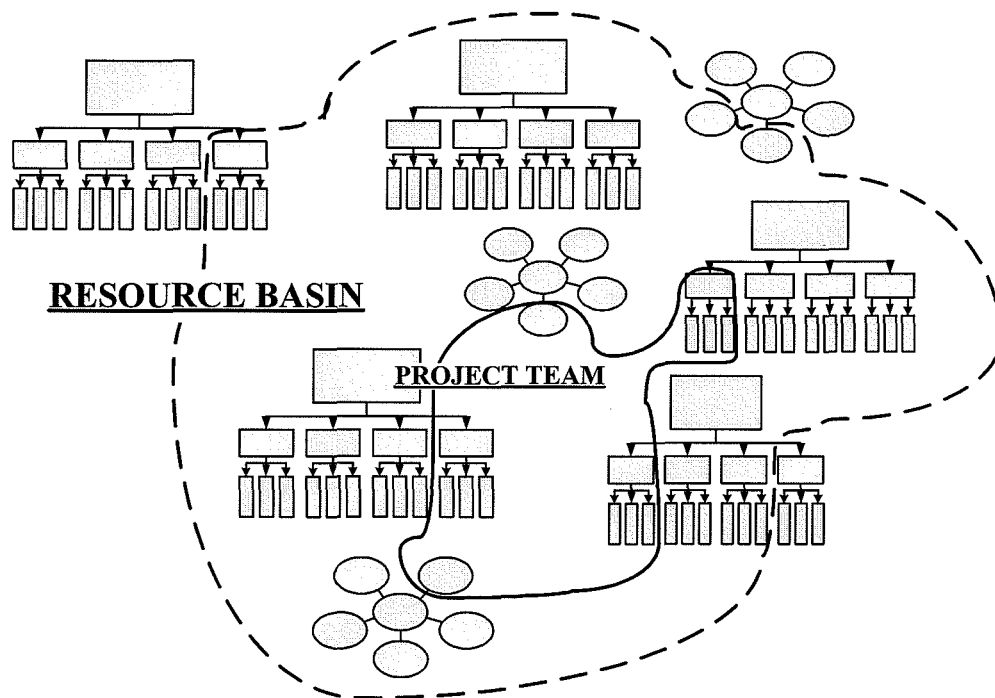


Figure 3: Illustration of the concept Resource Basins.

The Resource Basins concept is a framework for the relationship between legally independent units. With Resource Basins a joint grounding reference is established which forms a framework for cooperation, pre-qualifying of possible collaborators and for gaining and communicating experience internally in the specific Resource Basin.

From the establishment of a Resource Basin, it is likely that any co-operation internally in the Resource Basin rests on confidence and reliability from take-off to the final settlement. In this way, the current situation in the Danish building industry today is avoided, in which usually each new partnering cooperation starts from scratch. In Resource Basins, experience



counting co-operation is continuously gained and reused resulting in continuous improvements.

As illustrated in figure 3 the project team for each specific job is put together on the basis of the Resource Basin. Among the resources in the basin the best for the task form a project team. This project team is acting on behalf of the Resource Basin and its common shared values. Subsequent, the finalizing of the job the experience gained is brought back to the Resource Basin and the project team is dissolved.

However, it is important to have clear guidelines about collaboration, financial matters and areas of focus in the specific Resource Basin. Some examples of areas for which such guidelines should be made, if the goal is to create a learning environment, are presented below.

- Within Collaboration:
  - About product and process values, systems and structures.
  - About tools and procedures for solving disputes.
  - About communication.
  - About exchanging and general handling of information and knowledge.
- Within financial matters:
  - About basis for distribution.
  - About frank and honest accounts.
  - About division of risks.
- Within special areas of focus:
  - About which core competencies the Resource Basin is concentrated.

It is furthermore very important that new members in a Resource Basin know and accept the guidelines of this specific Resource Basin. Companies or employees who do not accept or act according to the guidelines in a Resource Basin should not be a part of it at all.

However, in the development of a learning environment it is also important to realize that a framework does not change the world by itself. The success of a Resource Basin depends on the behavior of the companies and employees inside the framework. This makes it important also to focus on other elements. Some elements might overlap, but it is the holistic approach that is important. Some important elements are presented and treated more thoroughly:

- Grounding for cooperation
- Focus on product and process values of the client and end users.
- Focus on the process.
- Involvement of customers and end-users.

- Core competencies.
- Information and Communication Technology (ICT).

### **Grounding for cooperation**

Included in the guidelines of the Resource Basins are among other things cooperation values decided on and accepted by all members. These values set the agenda for the collaboration inside the Resource Basin and also in managing each specific project. This is also known as “Value-Based Management”. The paper “Partnering combined with Value-Based Management in a building project organisation – an action research experiment” (Bejder & Wandahl 2004) describes how process values can be used as a supplementary management tool. More events in the building process described indicate that the team members developed an extra control tool/system which is more at the cutting edge of problem solving – i.e. more proactive – compared to the normal control systems, e.g. systems for controlling time, cost, quality etc.

### **Focus on product and process values of the client and users**

To be part of the competition in future it is moreover important to focus on which values the project teams can create and deliver to the customers compared to values appreciated by the customers. “Value Management” must be in focus starting from the individual customer and the end users. It is important to realize and take action according to the understanding of value being more than just the final product. Values are also included in the process perceived by the client and users and in the way this is presented to them. Values no longer equal expenses but reach much further and are an individual concept.

### **Focus on the process**

To achieve competitive production, the project teams must focus on a holistic optimization of the process rather than on sub-optimizing each single activity which for many years have been the way to optimize in the building industry. Besides, it is important to include the focus on the total lifecycles of the buildings, e.g. concerning financial aspects, environmental protection and flexibility of the building in the period of use.

### **Involvement of customers and end-users**

In relation to the new approach to values and to the process, another important factor is to involve customers and end-users in the processes in a different way. Another way to achieve greater competitiveness could be to aim at:

- Customers’ and end users’ way of understanding value.
- Remembering that each way of understanding value is individual.
- Supporting the customers in their decision processes.

This is important because the customers’ understanding of the delivered value also influences on the financial result of a specific project and furthermore because reputation and publicity is influenced by the customers. Satisfied customers are in this way valuable in more than one context.

## **Core competencies**

Core competencies are an area within which Resource Basins hold the opportunity to improve their competitiveness, i.e. a way that enables the Resource Basins to differentiate themselves from the competitors. Through focus on one or more core competencies the Resource Basins will be able to provide better service and quality to the customers. Areas in which the Resource Basins can develop core competencies could be:

- Postponement of decisions in the process.
- Customer service.
- End-user involvement.
- Process focus
- Activities on the construction site.
- Unsuspected expenses.
- ICT.
- Servicing inexperienced building owners.
- Special commodity groups.
- Special geographic areas.

For instance, most customers would be interested in an optimized process focusing on how the decisions could be made as late as possible. Besides, customers would be interested in a process where all the work on the construction site is optimized in a better way, i.e. by the use of lean construction. Some customers might value a Resource Basin which use a high level of ICT to support the customers in their decisions.

## **Information and Communication Technology (ICT)**

ICT could also be used in a broader sense in the Resource Basins, e.g. for:

- More effective communication.
- Handling information, among others gathering and distribution of experience.
- Supporting customer and end-user decisions.
- Simulating solutions.

As regards using ICT to simulate solutions, it should be done both to simulate the final result and to simulate the actual process. In this way it could be possible to secure for the customer that the project will fulfill the expectations; i.e. the right things will be made; and to secure that it is possible to produce the building in an efficient way; i.e. the building will be built in the right way.

## **THE DEVELOPMENT OF RESOURCE BASINS**

With the Resource Basins concept it is expected that business will become more effective, by saving resources and developing effective competitive skills in collaboration with the members of the basin. Resource Basins seem to be an opportunity for developing and making projects among companions without totally integration of all the companies in a new big company. This leaves freedom and the ability quickly to adjust the project teams to the market demands.

But, how should the Resource Basins concept be implemented in real life. The solution demands that some barriers should be overcome. The attitudes in the organizations need to be changed to make the solution a success and this cannot be achieved overnight. Anyway, a first step must be that the players in the building sector recognize a need for change and several factors indicate that this stage has been reached now.

However, the necessary framework for the development of the learning environment within the Resource Basin concept seem to be well established, and the development effort can, for instance, be initiated by building owners demanding building processes delivered by teams. Further, a “bottom-up” change in attitude is on its way with the prevalence of the use of e.g. the Last Planner System, and in general there is a broad interest in the building sector minded on improving the processes. Among others a group of companies in Northern Jutland has started a process with the aim to create a Resource Basin. Their approach will shortly be presented in the next passage

### **Build-in-the North**

In the paper “Activation of hidden resources – Experience from a development initiative in a regional area in Denmark” (Olsen et al., 2004) a regional development initiative, BY-GiNORD (in English: Build-in-the North) is described. About 75 committed practitioners from the building sector (owners, architects, consulting engineers, contractors, suppliers etc.) in the region have discussed new ideas and methods for improving the construction process. These discussions also focus on the participants’ everyday problems and their experience from practice. So far arrangements have been planned for testing some of the ideas on regional building projects in the coming phase of BYGiNORD.

Based upon the intention to make the involved parties achieve a more holistic view of the construction process and to create learning environments the committee formulated three themes each with a set of Terms of Reference. One of the themes was: “Co-operating supply teams and the future production on the building site”. A group of approximately 15 persons decided to work on this theme and in the autumn 2003 the group presented their suggestions/ideas for how to establish Resource Basins in real life. These suggestions can be seen on the website: [www.byginord.dk](http://www.byginord.dk) (in Danish).

In the beginning of 2004 some of the members of the group together began the establishment of their own Basin and at present they are working on the Mission and Vision of the resource Basin together with more practical aspects like what can they offer the coming clients, organizational aspects and how the terms and conditions shall be for the members. This also involves considerations about whether there should be different levels of membership of the Resource Basin. The development of the Resource Basin is carried out with academic

support from Aalborg University, Department of Production and the Resource Basin group plan to present themselves to the public this summer.

## **CONCLUDING REMARKS AND COMING CHALLENGES**

In the closing part of the White Paper from stage one of the BYGiNORD initiative it is concluded that there are many steps to be taken. But the development can be initiated immediately and with purposive effort the development is on the way. If the effort is continued and continuously being targeted learning environments in Resource Basins could be a reality in the nearest future - a reality which involves more effective involvement of customers and future users, better processes, better quality and better financial results for the Resource Basin as well as for the clients. The possibilities exist and with a joint effort the conclusion must be that building processes of tomorrow will be optimized resulting in advantages for players as well as for customers and end users.

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