

Re-Engineering of Trading Process and Re-Design for Implementation Electronic Process for Trading Companies

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Abstract—Indeed, the electronic facilities, on which all modern system based, plays a basic rule for designing practical systems for companies' especially commercial and trading companies. This paper focuses on trading process and new facilities and tools for doing trading works through Internet and the influence of Electronic tools on process. We first conceptualize main process for a trading company and based on designed process, suggested electronic system with considering rules and conditions for e-commerce and trading companies. We tried to draw a practical system with supplier-based perspective using interaction approach. Second, we introduced new electronic tools and facilities in order to perform process of trading activities and new approach of development of business relationships, and re-design process. For evaluation of designed system, we had a trial in SIFCO as a trading company for steel materials and assessed the data in result of implementation system and finally we measured performance of system with considering two criteria: Time and Accuracy.

Index Terms—trading company, trading process, e-commerce, re-engineering

I. INTRODUCTION

Standardization and automation of processes are top priority on larger companies' e-business agenda. Establishing a common understanding of collaborative processes showed the highest productivity gains. The paper looks at derived requirements and best practices from a set of hand on examples of trading organization.

Trading is a branch of commerce and is the combination of procurement and selling. The main process of trading included Planning, Marketing, Procurement, Selling and Finance.

First of all, in this article, after evaluation of literature survey, we draw process of trading and assessment of process. Then we introduce the new tools and facilities for improve process in virtual spaces. After that, we re-engineer the process of trading with help us modern facilities in virtual space. Finally, we evaluate the e-process for trading with considering two criteria: Time and Accuracy.

II. LITERATURE SURVEY

Trading is an integral part of B2B processes and an essential part of any organization's ability to function effectively but has only recently emerged as an important topic within the fast-growing B2B e-commerce market [1]. An e-trade B2B system is an open system that enables the organization to reach and transact with suppliers and customers in virtual markets [2].

For many years stock markets were physical locations where buyers and sellers met and negotiated. [3] Exchange trading would typically happen on the floor of an exchange, where traders in brightly colored jackets (to identify which firm they worked for) would shout and gesticulate at one another—a process known as open outcry or pit trading (the exchange floors were often pit-shaped – circular, sloping downwards to the center, so that the traders could see one another). With the improvement in communications technology in the late 20th century, the need for a physical location became less important and traders started to transact from remote locations in what became known as electronic trading [3]. Electronic trading made transactions easier to complete, monitor, clear, and settle and this helped spur on its development [4]. One of the earliest examples of widespread electronic trading was on Globex, the CME Group's electronic trading platform conceived in 1987 and launched fully in 1992. [5]. This allowed access to a variety of financial markets such as treasuries, foreign exchange and commodities. The Chicago Board of Trade (CBOT) [6] and [7] produced a rival system that was based on Oak Trading Systems' Oak platform branded 'E Open Outcry,' an electronic trading platform that allowed for trading to take place alongside that took place in the CBOT pits. Set up in 1971 [8], NASDAQ was the world's first electronic stock market, though it originally operated as an electronic bulletin board [9], rather than offering straight-through processing (STP) [9].

By 2011 investment firms on both the buy side and sell side were increasing their spending on technology for electronic trading. [10] With the result that many floor traders and brokers were removed from the trading process. Traders also increasingly started to rely on algorithms to analyze market conditions and then execute their orders automatically. [11] The move to electronic trading compared to floor trading continued to increase with many of the major exchanges around the world

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moving from floor trading to completely electronic trading. [12].

Trading in the financial markets can broadly be split into two groups [13]:

- Business-to-business (B2B) trading, often conducted on exchanges, where large investment banks and brokers trade directly with one another, transacting large amounts of securities, and
- Business-to-consumer (B2C) trading, where retail (e.g. individuals buying and selling relatively small amounts of stocks and shares) and institutional clients (e.g. hedge funds, fund managers or insurance companies, trading far larger amounts of securities) buy and sell from brokers or "dealers", who act as middle-men between the clients and the B2B markets [14].

While the majority of retail trading in the United States happens over the Internet, retail trading volumes are dwarfed by institutional, inter-dealer and exchange trading [15]. However, in developing economies,

especially in Asia, retail trading constitutes a significant portion of overall trading volume. For instruments which are not exchange-traded (e.g. US treasury bonds), the inter-dealer market substitutes for the exchange. This is where dealers trade directly with one another or through inter-dealer brokers (i.e. companies like GFI Group and BGC Partners. They acted as middle-men between dealers such as investment banks) [16]. This type of trading traditionally took place over the phone but brokers moved to offering electronic trading services instead. Similarly, B2C trading traditionally happened over the phone and, while some still does, more brokers are allowing their clients to place orders using electronic systems [17]. Many retail (or "discount") brokers (e.g. Charles Schwab, E-Trade) went online during the late 1990s and most retail stock-broking probably takes place over the web now [18].

This knowledge allows for effective negotiations with suppliers. Organizations should address key functional areas such as those presented in Fig. 1 [19].

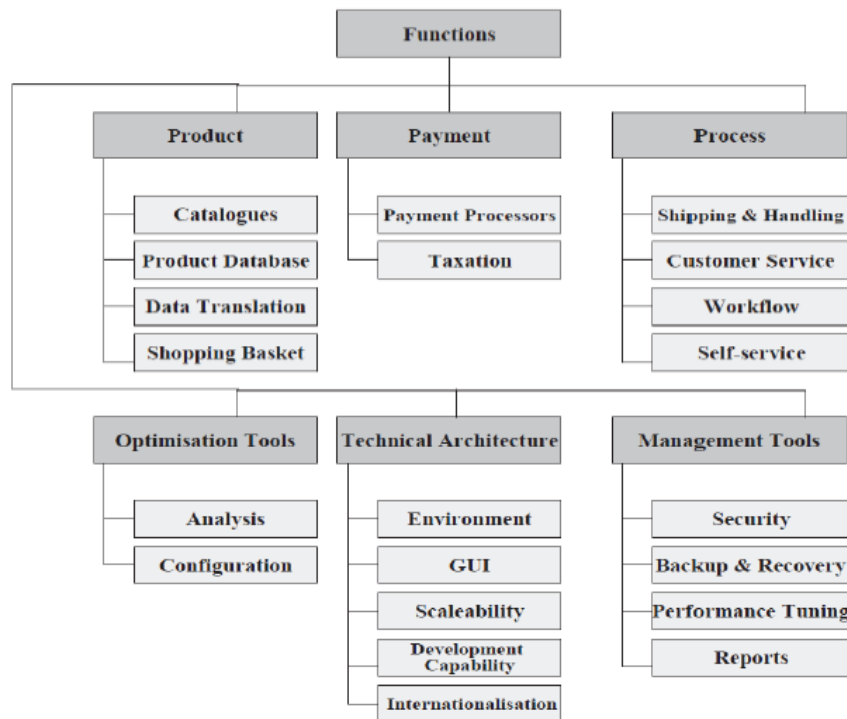


Figure 1. Taxonomy of functions in e-business applications.

The Fig. 1 shows the main categories for designing e-process based on functional activities. Overall, this chart is led to categorized organization activities in accepted way.

III. CASE STUDY

A. Methodological Approach

The case study presented in this paper examines the analysis of the Trade process and definition of functional specifications of new e-trade system, undertaken by the SIFCO Management Department. The objective of the analysis is the identification of potential problematic areas and the design of the new process in order to define

the appropriate functional specifications and maximize the possibilities of a successful implementation of a new e-Tender system. The methodology was supported by the use of specialized process modeling and workflow tools [20]. Both qualitative and quantitative analyses were used in order to successfully identify the existing problematic areas. A set of performance indicators was defined including mean cycle times, transaction volumes (quantities, values, number of requests and tenders) and organizational units' capacities [21]. The results of the analysis guided to the re-engineering suggestions in three levels of changes and to the design of the new process with the use of process charts. The functional specifications definition was based on the new system

design and the overall findings of the analysis [22]. The methodology followed is presented in Fig. 2.

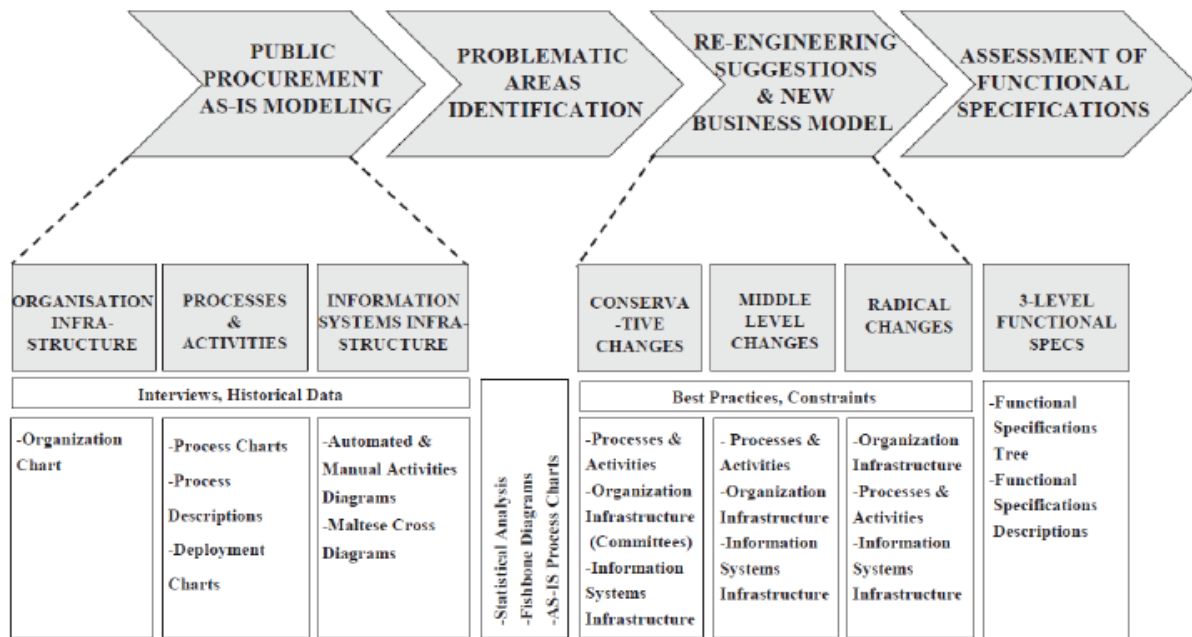


Figure 2. The methodology for the assessment of the functional specifications.

The Fig. 2 illustrates the methodology for evaluation of functional which is used in trading process. According to present status and what we want to design, the gap recognizes and problematic area specify. After solving problems, the re-engineering process will be done.

The methodology followed in SIFCO's procurement system is not far from what describes as business process improvement (BPI) [23], emphasizing on quality and productivity improvement, bureaucracy elimination, process simplification and processing time reduction.

B. Tender System's Overview

The Tender process was designed in 5 processes which are as per below:

- Trading Plan (TP);
- Marketing;
- Finance;
- Procurement
- Selling.

The Fig. 3 illustrates the relation and interaction between main processes of trading [24].



Figure 3. The main process of trading.

Fig. 3 demonstrates the main processes for trading activities and also the relations and interactive.

C. Objectives Definition of the New System

The definition of the required functional specifications should be in line with a well-defined set of objectives. [25] The Members of boards of SIFCO and Managing director should generate these objectives, after taking into account the critical success factors (CSFs) and the key

performance indicators (KPIs) of e-trader systems. Case studies concerning the introduction of similar systems in other companies helped in the definition of the following CSFs:

- Time of trading process;
- Accuracy of Data and Information.

The above CSFs were coupled by a set of KPIs that should be monitored [26], the most important of which are the following:

- Efficient processes without excessive idle times;
- Existence of monitoring and evaluation systems that permit the continuous improvement of the processes;
- Adequate training of the employees in order to enable them takes advantage of the new system;
- Tender lead times.
- Percentage of purchasing with accepted quality (in accordance with the predefined technical specifications).
- Productivity of resources (both human resources and information systems).
- Budget accuracy (deviation of the actual purchasing compared with the related budget).
- Cost (including all the relevant cost categories, together with the cost of the purchased goods or services).

The combination of the recognized CSFs and KPIs, supported by the clear vision of the SIFCO's Managers, enabled the definition of the objectives of the Tendering system:

- The purchasing of quality goods and integrated services.
- The realization of short activity lead times of the trading process.
- The minimization of cost, such as restrictions in reducing the workforce, or changing the organization chart.

D. Analysis of the Existing Tendering Process

The analysis of the existing trading process was the first stage of the methodology followed. [27] The analysis focused on two important areas: at first, organizational structure and then, processes and activities.

- Existing organizational structure: The organizational chart was supported by the description of the main activities undertaken by each organizational unit, their staff levels and the committees held on a regular basis. The Fig. 4 shows the organization units in trading process accordingly.

The Fig. 4 shows the main partners who are participate in trading process and their responsibilities.

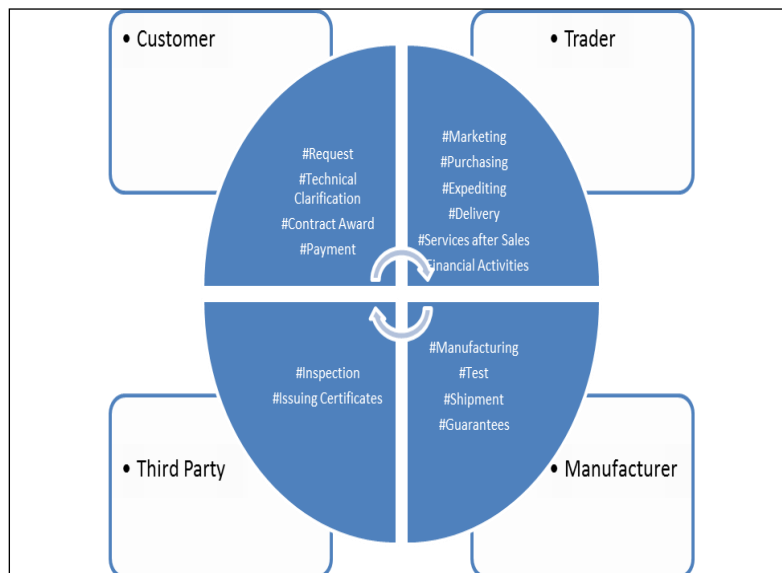


Figure 4. The organization units in trading process.

- Processes and activities: Based on information collected after the completion of interviews held with employees of all management levels, past reports generated by the Planning department (historical data) and previous analysis on the trading system, five main processes, 20 sub-process were identified. The five main processes are depicted in Fig. 5, which represents the first level analysis of the trading process. Each process was further analyzed and was graphically illustrated with the use of process charts, which in

our case were sub-process charts (second level of process analysis).

Fig. 5 illustrates the process chart and the sub-process according to functional categories. Moreover, a detailed sub-process description was created for each one of the sub-processes including their objectives, their application areas, inputs, outputs, the involved departments, the supporting information systems used for the completion of the sub-process and a detailed description of the tasks for each activity of the sub-process (third level of process analysis) [28].

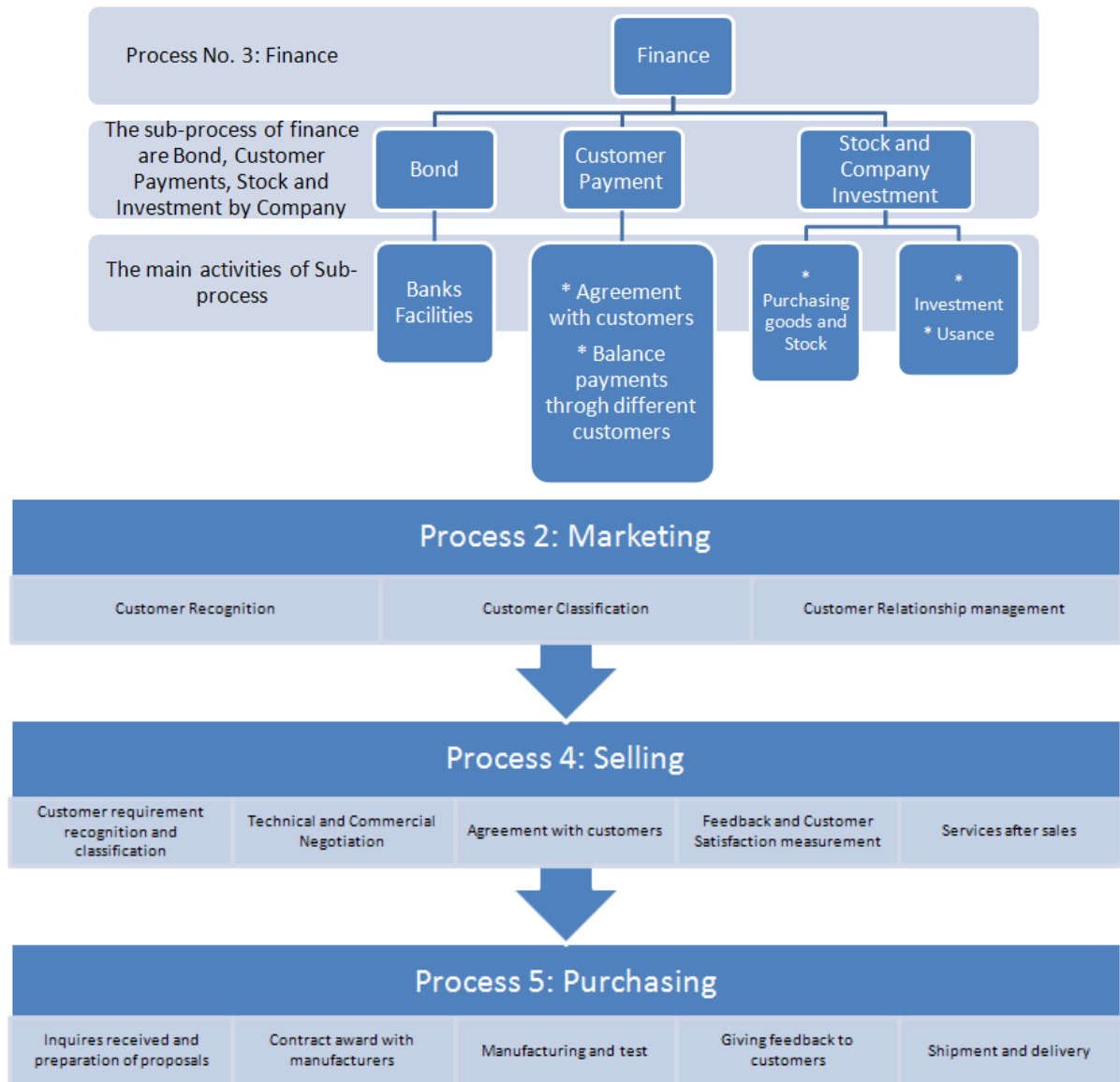


Figure 5. The sub-process of trading process.

E. Problematic Areas Identification

The new process design was based on the analysis results and the identification of problematic areas that could be improved by the introduction of an electronic system. The basic steps of the analysis of the problematic areas are the following:

- Qualitative analysis based on the tools used in the process analysis.
- Visualization of problems' causes and effects with the use of fishbone diagrams.

The most important findings of the qualitative analysis can be summarized as follows:

- Heavy work load at specific organisational units.
- Delays due to mistakes at the customer requisitions.
- Iteration of the set of activities of "delivery of recommendation" and "consolatory response" of the selling and purchasing Department.
- Delays on the technical evaluations of proposals.

- Process segmentation into various departments and committees.
- High ratio of checking and controls that causes delays.
- Variations, exceptions and special cases of the tendering sub-processes.
- Issue of multiple copies of the documents.
- Extremely large number of documents and transactions.
- Multiple filling (iteration and dissemination of the information).
- Difficulty in searching information from manually maintained and massive archives.
- Deficiency of document standardization.
- Same data entry to different applications (mainly for purchasing and selling).
- Manual and iterated data entry to applications.
- Information technology supporting a very small percentage of activities. Most of the activities are carried out manually.

The most important findings of the quantitative analysis can be summarized as follows:

- The tender lead times are long. A large percentage of the delay is due to idle time between the activities of the process. In particular,
- The lead time in the case of the open procedure procurement is 6–7 months (average value).
- The lead time in the case of the restricted procedure procurement is 11–12 months (average value).
- The maximum values of the procurement process (both of the open and the restricted procedure) extend to 2 years' time.

The sub-processes acting as bottlenecks in the process are the following:

- The technical evaluation which accounts for 40% of the total tender time in the case of open procedure procurement.
- The pre-selection of suppliers who are invited for submitting proposals accounts for 54% of the total tender time in the case of restricted procedure procurement.

The activities with the longest lead times are the following:

- The examination of suppliers' requests for participation to restricted tenders, which accounts for 24% of the total restricted tender time.
- The technical proposals evaluation from the technical committees, which accounts for 13% of the total time for open tenders and 8% for restricted tenders.
- One hundred documents (average value) are used internally and externally in each tender process.
- Forty-six thousands documents (average value) are used for the tenders in 1 years' time.

F. New Process Design and Expected Benefits

The purpose of the new process design was to improve the identified problematic areas. Based on the findings presented above, new process charts and descriptions were developed for the e-trading model. A summary of key points that were introduced by the new process is as follows:

- Single location filing.
- Electronic document flow and control. This includes a common database for all the organizational units and all the sub-process of the purchasing process, integrated document management system, automatic information transfer, authorization and permissions with different access levels.
- Document standardization and simplification.
- Rationalization of the number of documents used.
- Elimination of non-value-added activities in the cases where there is no legal constraints.
- Information technology support for most of the activities, but not for all of them.
- Reduction of supply costs: The estimation of the study concerning the existing costs of supply (of purchased goods) is a 1% cost reduction.

G. Functional Specifications Definition

The design of the new Trading process supported the definition of the functional specifications of the solution. The most important features of the specified system are summarized as follows:

- Fully electronic activities of the trading process;
- Manual execution of activities where soft issues are involved (such as negotiations with the customers and suppliers, qualitative evaluation and decision taking). In these activities, the e-trade system will only play a supportive role.
- Interaction and communication with the external entities (governmental agencies, suppliers) through the Internet. The appropriate authorization definitions will determine the access of the external entities into the system.
- The tendering process could be carried out in a decentralized manner by the customers that hold the largest percentage of the authorized procured quantities, using sectional tendering sub-systems, integrated to the central tendering system.
- Interfaces with other existing governmental information systems.

The different solutions of the system cover specific needs of trading system at present or in the future.

IV. CONCLUSIONS

The structured approach of the study of the SIFCO trading system, presented in this paper, enabled the identification of problematic areas and supported the design of the new e-trade system, facilitating the definition of the necessary functional specifications for the selection of the appropriate solution. The methodology presented in this paper identified and analyzed three alternative scenarios, which were ranked according to the degree of the innovation they entail. The analysis of the prerequisite business processes was coupled with the design of new processes supported by new business models of e-trade. The selected "conservative" scenario was enriched by functionalities offered by the two or more "innovative" scenarios.

The study revealed the difficulties in reengineering the SIFCO Company as sample and identified the most important barriers in the adoption of e-trading business models. The thorough analysis of the existing legislative framework was identified to be one of the most important CSFs in the design of the new trading processes. This explains the approach followed which placed a large amount of effort in the careful analysis of the existing trade process for the design of the new business processes and the adoption of selected e-business models. The designed functional specifications express the strategic view of the SIFCO for the trade of the future, taking into account the supply chain developments and also Customer relationship management and the existing practices in the suppliers and customers all over the world. The expected benefits of cost reduction, improved efficiency, effectiveness and absolute transparency will result from the simplified processes, the electronic

support of the activities, the continuous performance measurement and the definition of clear roles and responsibilities. The defined functional specifications intend to successfully express the specific needs both in services and change management that will support the new Process.

The coordinator of trading system will be the SIFCO responsibilities, while the users (internal customers) will be the qualified. The suppliers (even SMEs sited outside the capital) will be encouraged to participate in tenders with simplified procedures and shorter lead times. Furthermore, taking into account that procurement and selling are key areas of the Internal Market, both in terms of its economic importance and as an instrument of direct economic influence for Member States' administrations; the new Trade system will help in SIFCO competition.

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