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AN ENTERPRISE SOLUTION IN PRACTICE: ISSUES AND CHALLENGES

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ABSTRACT

Today's fierce competition demands an enterprise solution that could integrate all functional parts of an organizations and subsequently disseminate the necessary data to the managers. Despite numerous implementation cases of such total solutions around the globe, it is still an excruciating and risky practice to embed corresponding solutions into a new case. Our paper presents a unique experience of development and deployment of a customized solution in a specific circumstance whose high rate of failure in the implementation phase has been emphasized by previous studies. To embody the sense of adventure, the paper structure is laid out based on the narrative arc of story-telling approach. It starts with providing an exposition and enumerating the rising actions as well as introducing the hero who incites the incident. The paper continues with elaborating the major crisis faced during on implementing such a solution while marking a thrilling climax of surmounting the challenges. Finally, it leads to a happy denouement since a complementary project associated with that enterprise solution is ordered to be accomplished by the hero.

***KEYWORDS*:** Enterprise Solution, Product Development, Business Process.

1. INTRODUCTION

This paper is a showcase of years' trial-and-error besides failure and success to propel and localize the digital transformation in a giant information technology-based project. In fact, the digital transformation provides a platform for industrial communities to change the existing processes or create the new ones in order to come up with the ever-increasing competition among businesses for meeting customer demands. Particularly, large-scale companies are looking for a comprehensive view over their processes to quickly grasp the latest status of different business functions in real-time ranging from raw material supply to end-user delivery. In this regard, companies have invested in the enterprise solutions powered by one of the derivatives of digital transformation namely, information systems. These solutions have been evolved from material requirement planning (MRP) and manufacturing resource planning (MRP-II) to enterprise resource planning (ERP) and business process management software (BPMS) through the years (Nwankpa, 2015). As reported by Fortune 500, 80% of US companies are using ERP demonstrating the popularity of such an approach (Saenz de Ugarte et al., 2009). Despite its popularity and worthy logic, there are lots of unsuccessful stories in this field in a way that ERP implementation has been deemed as a far-reaching implication for the entire organization (Rafiei & Ricardez-Sandoval, 2020).

In developing countries such as Iran, the challenges associated with ERP projects are much more complicated. Babaei et al. (2015) enumerated organizational barriers, besides technological and individual criteria as the primal threats on implementing an ERP in a large Iranian Telecommunication organization. Asl

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et al. (2012) conducted a study on identifying the effective factors on selecting an ERP system using multi-criteria decision making approaches. Surprisingly, the result indicated that vendors' support service accessibility outweighed the cost of ERP product when addressing a large-scale organization. Meanwhile, Nikookar et al. (2010) emphasized that Iranian companies could not utilize the products of popular enterprise solutions' vendors such SAP, ORACLE, SAGE and so on due to the imposed embargo against the country. Therefore, these factors have a low accessibility for Iranian customers. Amid et al. (2012) identified and classified the ERP critical failures factors in Iran. They concluded that the Iranian ERP vendors were generally opt out of being involved in designing an ERP system from the beginning due to structural problems of Iranian organizations. Among the others, the rigorous bureaucracy of companies along with managerial volatility leading to shortsighted expectations of such an Enterprise solution were implied.

Under these circumstances, although starting an ERP project from scratch being consistent with Iranian organizational structures and barriers seems to be crucial, it would be certainly a risky project. It is a standard practice to report key aspects and consequences of such exploratory projects on the basis of a story (Malaurent & Avison, 2015). Here, the story of FANAP Enterprise Resource Planning is broken. To the best of our knowledge, this story is adventurous and unique since such a large-scale project has not been implemented by any other vendors in Iranian companies. The narrator of this story is FANAP Company which is regarded as information and communications technology (ICT) Holding of Pasargad Financial Group being used to delivering large-scale ICT projects in Iran. Once upon a time, one of the subsidiaries of Pasargad Financial Group, owning a full supply structure of the Mining Industry, has appealed for a digital solution framework transforming its isolated monitoring across its many plants to an integrated system. To proceed with the story, the terminology of Lichaw (2016) has been adopted. She believes that the storytelling in describing a product development should be expressed with respect to the key elements of the narrative arc, including, exposition, inciting incident, rising actions, crisis, climax, denouement and end sections.

In the same way, Fig. 1 maps out the specific plot points of the FANAP story. In summary, the exposition of the story refers to the initial condition of our customers forcing them to look for an integrated enterprise solution. As the inciting incident, FANAP Company decides to brave the implementation of a customized ERP project in the presence of lots of related unsuccessful stories. To do so, FANAP swings into rising actions by conducting an in-depth system analysis to explore the scope of project using a professional consultant. Subsequent to the development of an initial version of ERP, the deployment phase is accompanied by the crisis precipitation. This stems from owing to user-unfriendliness design of the product, change resistance of the customer's employees and incomplete integration of different customer's units. At the climax of the story, FANAP team realizes the causes of the crisis and resolves them through taking well-known and innovative approaches into account. In this regard, the agile software development and the constitution of the expertise teams are among the top maneuvers of FANAP. As the customer bonds with FANAP Company, the story reaches its denouement. This close cooperation significantly accelerates the project completion. Eventually, FANAP can cope with the mega-scale project and the customer signs a new deal concerning the artificial intelligence involvement in its customized ERP leading to a happy end.

The rest of the paper is organized as follows. Section 2 is related to FANAP's maneuvers in estimating and identifying the scope of the project which is equivalent to the concept of rising action in narrative term. Section 3 declares the issues and challenges of the project mapping onto the story crisis and climax. Section 4 concludes the paper and mentions why the denouement of the story has a happy ending.

2. RISING ACTIONS

We have three alternatives on the table to handle the ERP project. They include the integrating current software of the organization, integrating the best practice modules of popular vendors or applying our own methodology using guidelines of an external consultant firm (Kurbel, 2013). The first two options are not feasible due to the lack of interoperability the currently available software of our customer as well as the challenges of cooperating with the popular ERP vendors.

Thus, our attention has turned to the third option, namely, implementing a customized ERP based on our customer's requirements. However, we have initially tried to go ahead without the aid of any consultant. We

have conducted a comprehensive study on the processes' scope of our mega project coupled with assessing ERP features of the popular vendors. Our initial evaluation has indicated that the number of features could vary from 5000 to 6000 based on the technical constraints and requirements in practice. Further, going through the features' information about corresponding vendors, we discovered that lack of data has been the most tangible issue so far. For instance, it has been implied that quality control and inventory planning modules are interconnected. Our subsequent concern is to discover how such interconnection could be met. In other words, what fields are supposed to be shared between these modules to shape the desirable integration? Unfortunately, such pieces of information are not available and not described by those commercial vendors. The controversial finding over the number of processes as well a vague data about the integration have surged us to recruit a consultant with profound experience in mega software projects.

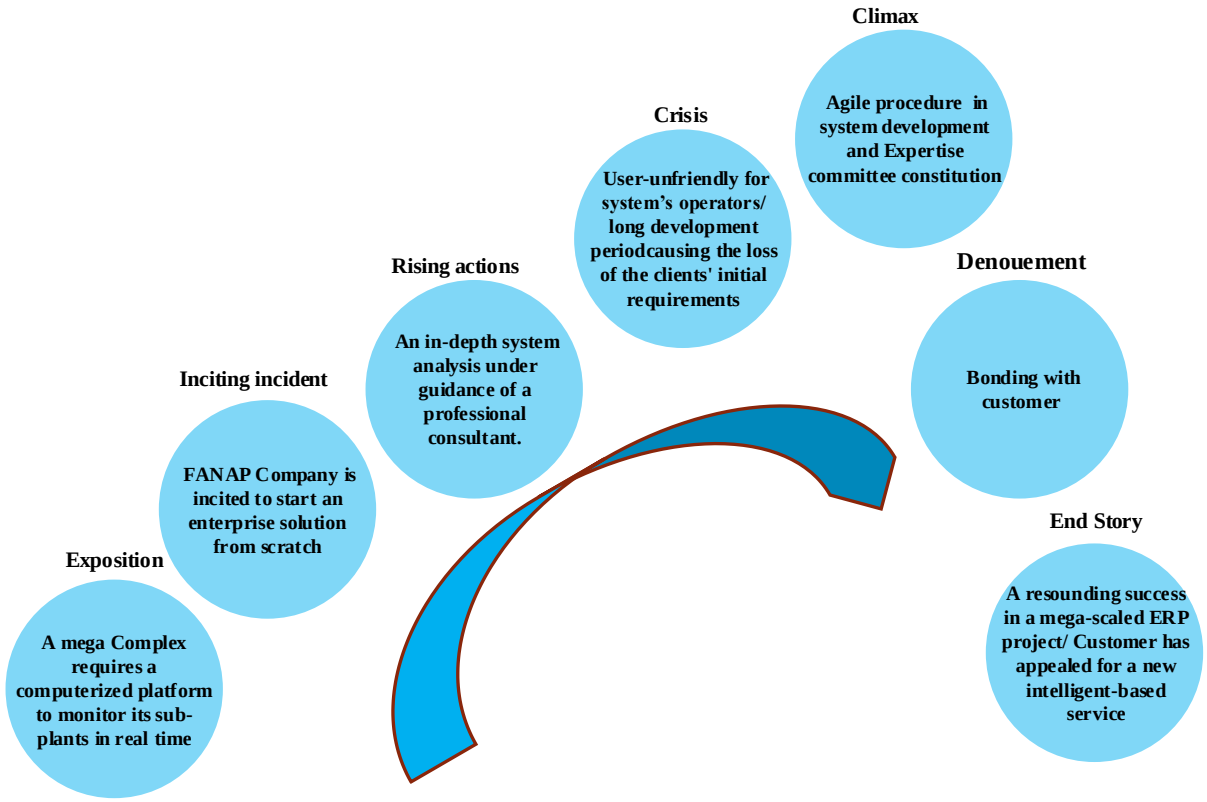

Fig. 1. Narrative arc of FANAP enterprise resource planning

Two potential candidates have been appointed. The potential consultants are denoted here as *A* and *B*. Consultant *A* has a process-oriented perspective over the ERP product while Consultant *B* deals with both technical and process-oriented aspects in a balanced way. In conclusion, we have selected Consultant *B* to highlight the required features to be considered in the customized ERP product. The consultant has suggested 5000 features that should be reflected in our product. These features have been set as the main criterion for assessing our invoice. However, after a short while, we have discovered that by passing the underlying features of Consultant *B*, we could not satisfy the requirements of our customer. In fact, those features have been too general to be coupled with the customer's requirements. Such a consequence has propelled us into finding a new consultant to be seriously involved in the project and supervises all actions of our team meticulously. Accordingly, FANAP and its customer, unanimously have selected a new consultant, entitled as Consultant *C*, to underpin the system analysis, design, implementation, and deployment phases of the customized ERP project. Consultant *C* has been interactively in touch with our implementation team, according to the following procedure. Our team has figured out the current condition and workflow of each ERP's module. Taking the current model into account, Consultant *C* has recommended its best practice regarding its first-hand experience.

Finally, the system analysis showed that the customized ERP should cover 13 software product groups, 38 software products, 203 business processes, and 5600 features witnessing the large-scale entity of the project. In particular, the product groups include Supply Chain Management, Manufacturing, Commercial Management, Maintenance Management, Quality Management, Financial Management, Legal Management, Human Capital Management, Performance Management, Human, Safety, Environment, & Community (HSEC), Business Platform Capabilities, Knowledge and Document Management, and Project Management.

3. CRISIS AND CLIMAX

Here we review the spectacular crisis and climax of our implementation process. In this regard, Section 3.1 describes a challenge with respect to the localization concept while Section 3.2 reviews key points during the analysis, development, and deployment phases. Section 3.3 also highlights the concept of managing the changes in the project.

3.1. Localization

Although the proposed business process involves the world-class successful experiences of ERP projects, it still needs to be customized based on the Iranian context. As a prime case, we focus on the safety system module and how Consultant *C* has tried to evolve the present condition. The system analysis shows that safety officers are currently centralized in HSEC office. In this condition, the safety officers intermittently inspect other departments to detect any sort of safety-based non-conformity and unsafe conditions to provide corrective actions. Actually, safety officers are not fully allocated and do not belong to any department. In this way, such departments endeavor to escape safety officers' notice as much as possible leading to a reduction of the HSEC office efficiency. Now, what is the alternative of Consultant *C*? Consultant *C*, indeed, has proposed the decentralization deployment of the safety officers expecting to activate self-safety culture in the mega complex of our customer. Therefore, a specific safety officer is assigned to any department in order to closely monitor safety issues and provide indispensable actions/consultation to avert a catastrophe.

Although this theory is on equal footing with the best practices associated with ERP products, it is not simply reconciled with our specific case. Precisely, following such a theory has caused us two major obstacles in practice. First, the head of safety department used to supervise almost 20 officers in the complex and the monthly income of a manager is a function of his employees' count. Now, under this new hierarchical deployment of the officers, almost no employee is managed by the head of safety department causing a drastic reduction in his income. The second dilemma pinpoints how such a theorem undermines the authority of officers since their commands are not regarded as the primary concern of their associated new managers. FANAP team has surmounted such interventions by considering a general staff for safety affairs aiming at policy making for the appointed officers in different organizational units. This has led the head to have more employees than the initial proposal of Consultant *C*. Furthermore, the safety officers' commands are propelled into action with the aid of this staff. But, how could FANAP resolve the setbacks for the safety department decentralization? FANAP distills from such an experience that the final business process cannot be lonely laid out based on the consultant recommendations even being borrowed from real world best practices. To delve deeply into the appropriate customization of the business process, a selected group of FANAP and its customer' influencers have been considered. Initially, this group had been comprised of FANAP's influencers in each module as well as twenty numbers of customer's top managers being denoted as implementation group. As it is later discussed and justified, the implementation group was substituted by the expertise team, including the executive staff instead of the top-layer ones.

3.2. Deployment

Now, the analysis of the business processes has been finalized as a result of the close coordination among FANAP system analysis team, Consultant *C* and the expertise committee. The next step is to examine closely the product development phase. Developers have started developing the ERP platform by respecting the transactional processes of the approved ideal model. But, does FANAP have any particular procedure in mind for being intimately connected with the customer during the development process? Underestimating the significance of communication with the customer throughout the development phase, the project authorities

thought that, there is no necessity to be in touch while both parties have unanimously approved the business processes and all details would be exactly reflected in computerized platform. Taking such reasoning into account, the development keeps progressing virtually isolated from refreshed customer's comments. In practice, the high volume of the developers' workload has led FANAP to divide the implementation phase into three versions. Meanwhile, even the first version has been gone far beyond the estimated baseline time. Anyhow, the development of the first phase has been accomplished. Let's go ahead and deploy the first product version by dispatching the FANAP's executive staff to the customer's Complex.

As it gets to go live, the darkness comes and the story's crisis provokes. There is, indeed, a long interval between our last official visit leading to approving the business processes and the first phase of product deployment. Subsequently, the customer has overlooked myriad of the features' details, requirements and reasoning behind them. Further, the business processes have been wrapped up with top-layer managers of the complex while the executive managers are used to being the main users of the product. Those users have not been satisfied with the current format of the developed ERP product. Last but not least, the first version has not been well configured to make the users utterly needless of duplicating their data into the existing isolated databases. For instance, in the corresponding version, Warehouse Management System module has been covered while the Purchasing Management System has been ignored. This disintegration stops the warehouse employees to be fully involved in the warehouse module of the product since their input data are not available in the system, yet. Thus, the customer expressed its dissatisfaction over the service because they thought no improvement will be achieved by implementing the first version. How should FANAP react to put an end on such interrupting factors? FANAP and its customer solicits their staff to look for a comprehensive solution to hedge against the challenges in their first trial of the product deployment framework using brainstorming and analyzing the main roots of interruption.

To cut the long story short, we have realized that the main source of the occurred challenges is simply the lack of mutual significant cooperation between FANAP and the customer. Therefore, FANAP comes up with a workable and innovative solution, namely agile development procedure from isolated version to involve the customer in the agile process. The agile procedure is a project management approach to accelerate the process of developing a software with multiple deliveries to the customer (Curcio et al., 2019, Ghozali et al., 2019). Accordingly, FANAP's focus switches to the agile software development instead of developing a large chunk of ERP and then delivering it to the customer at once demanding so long in duration. Now, we break the workload into short term goals, called as sprints, which is approximately deliverable within two weeks based on the baseline plan. We also have contributed this terminology by involving the customers' influencers in our planning and re-planning sprints. In turn, the top layer managers have been replaced by a team of three executive and expert staff from the complex called the expertise team and devoted to each module. Henceforward, the cooperation between system analysts and developers coupled with the expertise committee notations have increasingly promoted the successful project accomplishment.

3.3. Change management

By progressing the project, the role of managing the behavior patterns of the complex's staff has gotten to the heart of the story, inevitably. One of the momentous steps in deploying the computerized platform is to lay the pedagogical phase where the staff are supposed to learn how to use the new system. An efficient change management should motivate, support or even force individuals to obey the new structure (Efe & Demirors, 2019). To achieve this in our case, some of our employees have been chosen as the change management committee to be located at the complex. here, we mention recall some measures that have been taken to settle resistance to change. At educational classes for customer's users, some of the employees had not certainly focused on the lectures. The committee reported this fact to the top level manager of the complex. In response, the manager called the employees reminding them of the importance of ERP in boosting their future career. On the other hand, the committee considered valuable bonuses to the best employees' sentences about ERP as well as the best descriptions about strengths/weaknesses of the deployed product. After a short while, these measures made a headway toward employees' determination and cooperation in facilitating ERP stabilization.

4. DENOUMENT AND CONCLUSION

This paper presented a showcase of a real-case enterprise resource planning (ERP) development project. The characters of the story were FANAP Company and its customer as well as a consultant company. Notably, both FANAP and its customer belong to Holding of Pasargad Financial Group, headquartered in Iran. Previous studies unanimously reported the barriers of an ERP implementation project in Iran such as short-sighted expectation of managers and the imposed embargo leading to the lack of popular related vendors support. Under these circumstances, there was a large-scale mining company appealing for an enterprise solution to hedge against rough data flow among its multiple complexes. Consequently, FANAP decided to brave it out and started developing a customized ERP from scratch. Conducting an in-depth analysis with the aid of a professional consultant and the customer's influencers, FANAP determined the scope of the project, including 203 business processes and 5600 software features. The analysis, design, development, and deployment of such huge workload faced critical challenges being later resolved by FANAP, its customer and the consultant. The greatest lessons learned of this interaction could be associated with the level of coordination between FANAP and its customer during the project accomplishment. At the beginning and during the development phase, the connections were almost faded away ending in the initial failure of the deployment phase. In response, as the collaborative agile system with expertise committee was involved, the cooperation significantly expanded, resulting in a considerable breakthrough in the project accomplishment. Such maneuvers brought about not only the customer's satisfaction, but also product endorsement by signing a new deal for involving the artificial intelligence in the customized industrial ERP.

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This paper briefly showcased the engineering achievement of the FANAP Company towards one of the largest-scale information technology-based projects in the Middle-east. Accordingly, the authors really appreciate all staff of FANAP Company who have realized the ambition of developing a customized enterprise resource planning product from scratch in Iran. We also wish to acknowledge the active support of Holding of Pasargad Financial Group.

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