Performance improvement of the software development project using the Value Management approach

Amel Ben Hadj Salem-Mhamdia[1], Bahia Bejar Ghadhab[2]

[1] Industrial Engineering Department, National Engineering University of Tunis, Tunis El Manar, 1059, Tunisia

[2] Industrial Engineering Department, National Engineering University of Tunis, Tunis El Manar, 1059, Tunisia

Abstract

Improving performance and delivering value for customers have become a central theme in business. The software industry has become an increasingly important sector for the economy growth in Tunisia. This study aims to show how using Value Management in the Tunisian software industry for project analysis gives new insight about true project value and performance. This new approach is considered as an appropriate tool for guiding the process of making decisions. It offers tools in order to analyze the service value from the customer and organization perspectives. The results showed that the VM allows to have better performance in the software development project by linking customer satisfaction and cost analysis. The present case shows to service managers how they can benchmark project function to reduce their costs and improve resource allocation taking into consideration what customers consider important during their overall service experience. It can identify best professional practices, orient decisions to improve service value

Keywords: Value Management (VM)*, Software development project, Performance improvement.*

1. Introduction

The need of performance measurement at different levels of decision-making in the service context is undoubtedly not something new [1]. The service industry is the fastest growing industry in the 21st century [2], including software industry [3]. The software industry is a very demanding and challenging sector characterized by vigorous competition, extensive dependence on intellectual capital and the need for continuous training in new technologies. Tunisian software development companies (SDC) is considered nowadays a strategic business unit (SBU). It grew steadily making its important growth areas in the information and communication technologies sector [3]. Furthermore, many software companies are dealing with significant drops in revenue, and have been forced to reduce labors and decrease research and development investments. So, business managers need to know how various investments, including product value improvement, branding strategies and relationship marketing strategies, relate to organization value increase [4], [5]. So, this paper offers to managers tools based on Value Management approach in order to increase value and performance of the organization [6]. This study investigates the performance improvement that is associated with the use of value management tools, and the conditions under which such improvement is achieved. The results of the implementation include the identification of the function and the activities, which are properly analyzed and evaluated. They show that there is indeed a positive relationship between Value Management and improvement performance. Via the discussion of the actual implementation, we illustrate first the performance metrics inherent to the value management approach and second how this approach contributes to the performance evaluation of the software development project. In this paper, a general overview of the value management and the project performance is presented. Then, the paper presents a Tunisian software development company case study to illustrate how the Value Management approach can improve business decisions in order to improve the performance of the organization.

2. Literature review

2.1 Software development and Performance

There is an established literature on methods to determine the performance of software development projects. Organizations are able to improve their software development methods by identifying high-performing projects and capitalizing on the best practices associated with these projects. A common method of benchmarking and examining the relative performance of software projects is through the use of the tools of value management. In the software management literature, project performance is seen as an achievement of the project management (PM) success, project success and product success and are aligned to the performance criteria of the individual stakeholders [7], [8], [9]. Project management (PM) success considers the achievement of the PM related objectives, inclusive of the traditional measures, i.e. time, cost and quality [10]. Project success considers the objectives of the project stakeholders [9], [11]. Product success considers the final product or outcome of the project and stakeholders' product satisfaction [11] such as the acceptance of a developed application by the client. Taking into consideration all these dimensions can facilitate the analysis and the improvement of the performance of software development projects. The focus is shifted from a single dimension to multiple dimensions suitable for multiple settings.

In this study, the customer satisfaction measure and the internal cost are used as the measure of the project performance in an exploratory study of software development projects.

2.2 Value Management Approach

VM was founded during the 1940s when, due to fewer available resources for non-war efforts, General Electric designed a concept where lowering costing inputs, through creative thinking, could result in a product with the same functionality [12]. Today, VM deals with both increased benefit and decreased cost, and is defined as a formalized open structure that focuses on function to remove causes of unnecessary cost, thereby delivering the best possible solution, as well as potentially exposing unforeseen solutions [13]. The value management (VM) is a structured, systematic and analytical process that seeks to achieve all the necessary functions at the lowest total cost consistent with required levels of quality and performance [14] The VM aims to maximize the overall performance of the organization [15]. It is also considered as an effective way for company to manage their services. The VM is based on fundamental principles that are: management by objectives (the concept of function), finding optimum solution, streamlining selection through indicators, a blend of skills with teamwork, cross-communication, development of people and groups. Value Management is also concerned with improving and sustaining a desirable balance between the needs of stakeholders and the resources needed to satisfy them. Stakeholder value judgments vary, and VM reconciles differing priorities to deliver best value for all stakeholders. Value management requires the best practice and innovative thinking at all levels in the organizations [16] valuable core competences [17], mission, strategy and systems [18] a supportive corporate culture that focuses on customers' expressed and latent needs [17], [19], [20], [21] and [22]. In fact, the VM allows achieving the goals of the organization. The functional analysis [24], [15] and the function analysis system technique (FAST) [23], [25] are the core of the VM approach. The functional analysis allows the identification of the attributes expected by the customer [26], [27], [24] as well as the organization performing these attributes. It is a semantic clarification in the service context of the definition of each service. The 'Function Analysis System Technique' is an important analysis tool. It is used to clarify the relationship between the functionalities expected by the customer and the activities and tasks developed by the organization it serves [23], [25]. It describes the item or system under study and permits the team to think through the functions that the item or system performs. FAST is a creative stimulus to explore innovative avenues for performing functions. The FAST diagram allows managers also to focus on essential functions to fulfill product requirements and to identify high cost functions to explore improvements. It can also be used to develop criteria in order to maintain high service quality levels and what can be done to improve the service. These criteria allow to measure the customer satisfaction.

In this study, we will use the internal and external functional analysis and the FAST diagram to identify the SDC activity in order to determine the performance of the project.

In value management, we distinguish two types of function: the external and internal functions. The terminology "external functions" designate the "front office" and refers to activities that the customer can see and where he can participate in the process and the delivery of the service act. The "internal functions" are also called "back office", it does not necessarily involve the customer in the production and delivery of the service but it can directly or indirectly influence perceptions if eventually it is linked to the service experience [28]. The link between "external" and "internal" functions or "back and front" offices refers also to the service blueprint in the service marketing literature and serves as a way to identify (the indicators) the critical path of the customer experience.

The identification of these critical paths provides key strategic knowledge for the service provider's decision to enhance the customer experience which in turn creates higher level of satisfaction and future positive behaviors [28], [29].

In this study, we identify the company's functions using the external functional analysis as a semantic clarification in the service context of the definition of each service. For this purpose, all customers' steps (from design to product delivery) are considered and for each step, service functions are identified as a reference for the customer satisfaction level. To serve the customer, the company implements a set of different activities and tasks that we identify by applying the "internal functional analysis [25].

To establish the relation between functions, activities and tasks, we used the Functional Analysis System Technique (FAST) diagram [30]. This diagram starts with the more global functions of the total system and then extends to specific functions of individual components. Hence, every external function is achieved thanks to activities developed within the enterprise. The identification of function, activities and products guarantees communication between all stakeholders [31].

2.3 The service value

The term "value" is used in many different cultures and contexts and it can have different meaning depending if the concept comes from the firm or the customer perspective [32]. To provide superior customer value is a difficult task but it can lead to long-term business success for all stakeholders not just to the stockholders [32], [33], [34], [35], [36], [37]. Customers who are satisfied are more likely to repurchase the product/services [35], [38], [39] and spread positive word of mouth [40], [41] Organizations that are successful in maintaining delivery of superior value build customer loyalty and customer retention and enhance the quality of the relational exchange between the service providers, the contact person and the customer [43].

Customer value is created when the customer perceives that the benefit of consuming products/services exceeds the sacrifices [44] Benefit is identified as quality, while sacrifice is represented as a price. Reference [45] defines customer value as ''an interactive relativistic preference experience''. Reference [46] identifies four diverse meanings of value: (1) ''value is low price, (2) value is whatever one wants in a product, (3) value is the quality that the consumer receives for the price paid, and (4) value is what the consumer gets for what they give''. In a parallel vein, Reference [42] suggests that value can be classified as values, desired values, and value judgments. The notion of value judgment is the customer's assessment of what has happened (benefits and sacrifices). This implies that value is a process of interpretation of what the customer feels concerning the product or service consumed, relative to the sacrifices (generally price or time). Reference [39] point out that customer value in the marketing literature is generally defined from the consumer's perspective. From the managerial perspective customer value has to be planned for, resources deployed to achieve the desired level and personnel put in place to implement the plan.

In the software industry value is delivered through a number of vehicles including quality of product, quality of the documentation, quality of the communication, time, speed of response, etc. Thus, value is a bundle of tangibles and intangibles and differs in configuration across individuals

In the present software development company case analysis, the service value management relies on the relationship between the satisfaction of many differing needs and resources used in doing so. The fewer resources or the greater the satisfaction would lead to greater value for the customer and the management. Internal and external stakeholders may all hold differing views of what represents value. The aim of Value Management is to reconcile these differences and enable an organisation to achieve the greatest progress towards its stated goals with the use of minimum resources [46]. Customer value in SDC services means that the whole system is a value-producing entity [22].

3. Methodology

In this research, case study methodology is adopted to show whether using Value Management for project analysis gives new insights about true project performance and value. Reference [47] stressed that a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and its context are not clearly evident; and in which multiple sources of evidence are used. This case study is conducted, in December 2010, in the Tunisian Software development company which employed 10 persons and has five projects. The application and analyze of the value management tools is done only on the three projects which information is available. Our data collection relied on direct observations of SDC activities, on document analysis in order to calculate the costs of the different activities of the project and on the questionnaires in order to measure the customer satisfaction.

For the analyze and interpretation of the results, a management group, composed of different disciplines which are project director, project team (developer, quality responsible, etc) and the SDC manager, are constituted.

4. Results

4.1 Function and activity cost analysis

We conducted interviews with professionals to define activities undertaken into a SDC. Then, we constructed the organizational diagram showing the relation between the customer point of view and the Organization structure axes (FAST: "Functional Analysis System Diagram") [30], [48] (Appendix). This makes clear connection between axes and cost allocation. Hence the cost for each function (FCi) is evaluated by summing the costs of the connected activities (designated "A1" to "A23").

This research study considered only the personnel costs of the employee operating in the SDC as indicator for the cost activity since the objective was to do an organizational benchmarking. Direct and indirect service personnel are considered. Those direct service personnel are essentially development and test engineer and project directors. The indirect ones are typically managers, accountants, and others who do not usually work directly with customers.

Table 1 shows the costs of the different SDC activities.

In our case the function cost is evaluated by the equation 1.

$$CF_i = \sum_{j=1}^{nai} Ca_j \qquad (1)$$

nai: number of activities associated to the function i.
Caj: the Cost of the activity j

Table 1: Activities and functions costs of the 3 projects

Function	Activities	Project 1	Project 2	Project 3
		Costs (%)		
Marketing and commercial		**2,13**	**2,10**	**1,70**
	A1	2,1	1,5	2,7
	A2	0,9	1,3	0,7
	A3	3,4	2,5	2
	A4	2,1	3,1	1,4
Project management		**24,90**	**13,30**	**26,60**
	A5	5,7	2,3	5,9
	A6	1,5	0,9	2,8
	A7	2,6	2,4	2,2
	A8	3,8	3,1	4,7
	A9	5,4	2,1	4,6
	A10	5,9	2,5	6,4
Development		**43,40**	**51,70**	**40,80**
	A11	12,8	15,6	11,6
	A12	16,9	22,5	18,6
	A13	13,7	13,6	10,6
Validation		**2,40**	**5,10**	**2,60**
	A14	1,2	3,5	1,9
	A15	1,2	1,6	0,7
Delivery		**16,00**	**12,40**	**17,70**

Function	Activities	Project 1	Project 2	Project 3
		Costs (%)		
	A16	5,4	7,2	5,4
	A17	3,9	2,5	2,7
	A18	6,7	2,7	9,6
Administration		**4,80**	**9,10**	**5,50**
	A19	0,8	1,2	1,3
	A20	1,1	2,4	1,6
	A21	0,8	1,5	0,2
	A22	1	2	0
	A23	1,1	2	2,4

4.2 Customer satisfaction analysis

Functions and criteria identified by the functional analysis were used to develop a questionnaire and measure customer satisfaction using a four-point Likert-type scale, ranging from 1 ("Non satisfied") to 4 ("very satisfied"). The developed measurement scale for customer satisfaction was finally valid, through a pre-test phase, and reliable with eight functions "dimensions" and 20 criteria "items" (table 1).

Table 2: Functions and related criteria

Function	criteria
Marketing and Commercial	Consulting, communication, availability, reactivity.
Project management	Service quality, Timeliness, availability, reactivity.
Development	Clarity of documentation, availability of product documentation, need and requirement satisfaction.
Validation	Quality of product, response speed.
Delivery	Quality service, availability of the team, competence, training effectiveness, timeless.
Administration	Availability, simplicity of the administrative procedure de

The questionnaire contains 3 parts. The first one is about general information of the respondent: project, phase of the project, respondent function, etc. The second one measures the satisfaction level with regard to the attributes expected by the customer (20 items). The third part contains questions allowing customer to indicate their overall satisfaction.

The questionnaire was administered by personal interviews to a sample of the nine customers of the projects during 1 month (3 customers from each project).

Table 3: Customer satisfaction results

Function		Satisfaction (%)		
		Project 1	Project 2	Project 3
F1	Marketing and commercial	83	89	90

Function		Satisfaction (%)		
		Project 1	Project 2	Project 3
F2	Project management	98	87	87
F3	Development	56	67	72
F4	Validation	56	65	70
F5	Delivery	54	65	58
F6	Administration	85	83	81

4.3 Value and performance analysis

Using only the costs results, manager could make error if they decide to reduce the costs without the consideration of customer point of view. In order to improve the decision making and to avoid this risk, we suggest that manager must consider simultaneously the customer point of view and the function costs. For this purpose, we developed a visual tool (diagram CS/C: figure 1) presenting these both points of view. In collaboration with the SDC manager, we fixed 80% as a target for customer satisfaction. For costs, the managers fixed 20% as extreme limit. Theses tow limits divided the diagram in four zones associated to three types of decisions (1-Benchmark 2-Improvement and/or innovation and 3 Innovation).
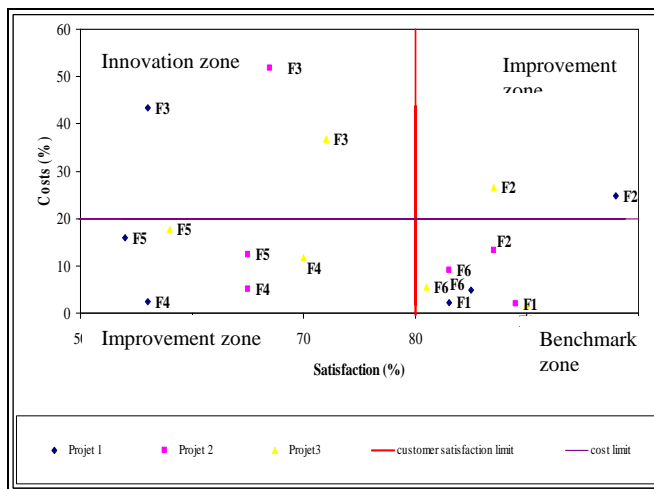

Fig. 1 Diagram CS/C

"Benchmark zone" groups project functions which have a high customer satisfaction and low cost. For this function, it is useful to apply a benchmarking taking into consideration the customer feed back and the production system details to extract the best practices. So, manager could standardize theses practices in the other project. In this study case three functions can be considered as 'Benchmark' ("Marketing and commercial" and

"Administration" for the three projects and "Project management" for the project 2).

Innovation zone contains functions that are not satisfying the customers and costly. Managers should implement innovation action in order to reduce the costs and improve the customer satisfaction. So, they should understand the attributes that drive guest's choices. The open innovation approach can be a useful to involve all stakeholders in order to create a continuous improvement and to innovate. For our case, the "development function" must be concerned by innovation action.

Improvement and or innovation decision concern two zones of the diagram CS/C: the first zone contains the function characterized by the low cost and the high customer satisfaction. The second zone regroups the functions which have a high cost and low customer satisfaction. In our study, the function "Project management", "validation" and "delivery" should be improved.

The function "project management" (for project 1and 3) is costly and appreciated by the customers. So managers have to analyze the cost structure and find the costly activities to make the best decisions. The benchmarking applied (project 2) gives alternatives to adopt for these functions.

For the function "Validation" and "delivery" (for the project 1, 2 and 3), the cost is low and customer satisfaction is low. Using the questionnaire, we found that customers are not satisfied with the product quality and the training effectiveness. So, managers must do further analysis for the hole process, from design to the delivery process, to find solutions. The best practices founded for the benchmark products can be helpful in this case.

The VM approach permits managers to identify what is being done with resources under their control. When the cost is high and the customer satisfaction is low, the activities related to the product become target for cost reduction and improvement. SDC management can use the result of VM to evaluate which function to retain and which activities to improve, according to market conditions and customer demand.

This study demonstrated that Value management produces distinctly different results that a traditional project cost analysis. The simultaneously consideration of the customer point of view and the cost allows us to determine that only two functions are efficient and four functions cause problems of the projects for the two point of view: customer point of view and manger point of view. Although, using only the cost results, we have found that only two functions (development and project management) showed the dissatisfaction of the management. So, basing on these findings, we note that decisions are different and more appropriate.

The results of this study suggest that analyzing simultaneously the customer satisfaction and the cost have significant benefits for project management. So, we can in the same time satisfy the manager and customer by the implementation of the improvement action and project.

Furthermore, costs can provide operators with the information that they need in order to determine whether they can afford to adjust their prices, according to competitive project or product offerings.

The proposed diagram (CS/C) helps manager to make decision and to orient and prioritize the improvement project. It allows managers to identify easily the costly activities and to implement action to analyze their cost structure. We can easily take decision to improve both customer satisfaction and the cost of the products taking into consideration the customer needs and the activity cost structure analysis. All the information gained from a VM study should be shared with the employees of the establishment to conduct activities in a more efficient manner. Once employees and management comprehend the potential opportunities of a value management system, they can manage the project and execute tasks in more profitable ways while delivering real value to the customer. Thus, all functions that are unprofitable should be improved. Taking such steps will help managers fully to realize the potential benefits of using a value management approach to invigorate the profit potential of their project.

The proposed study which uses a value management tools helps also to determine which products or services are profitable, which customers are the most valuable, whether processes are value added or not, and where efforts toward improvement should be made. It can be considered as a qualitative approach to identify the basics of a service orientation and how both parties perceive the service experience in a specific cultural context as well as delimitating subtle differences with customers.

5. Discussions and managerial implications

The results of this study show that value management approach in a software development project is a feasible way to gain detailed insight about the project's value. The use of VM tools allows managers to extract the best value combination taking into consideration both customer satisfaction and cost of the product. That improves the decision making process and orients managers to the prior improvement project for the best profit.

Using VM methods, a manager of a SDC can now analyze the true underlying profitability and customer satisfaction of a project, taking into consideration the entire project's cost structure and the customer point of view. This is not only true for a software development project, as was demonstrated in this study, but also for other types of projects. Armed with this knowledge, managers can take the necessary steps to alter their operation and reconfigure their project to improve the customer value and their facility's bottom line profitability.

6. Conclusions

In this study, we showed that a value management approach was successfully adapted to a software development project in Tunisia. The proposed model allowed to determine the costs and to analyze the customer satisfaction for each project function. This process resulted in the establishment of the costs of the different activities for all projects. Therefore, the study was able to provide value for the project function by calculating a cost and the customer satisfaction for the different projects.

The results of this study suggest that adopting a VM approach may have significant benefits for software project management. This combined approach allows to enhance the quality of decision making process. Although, it was applied to software development project, its implications can be broadly extended to virtually all types of projects.

Among the principal limitations of this study were the exploratory nature, the number of samples used (only a single SDC in Tunisia) and the period of the implementation of the value management tools (only one month). Management should also calculate costs for the other projects, in order to determine all the reasons for the overall high cost and low customer satisfaction. Nevertheless, despite these limitations, the study demonstrated that VM can develop effective function /project and orient managers by measuring value. It has been suggested as an appropriate tool for guiding and directing the process of making decision.

Appendix : FAST DIAGRAM

```
                                                          ┌──────────────────────────────┐
                                                          │ A1 – Find opportunity        │
                                                          └──────────────────────────────┘
                          ┌──────────────────┐            ┌──────────────────────────────┐
                          │ Manage the       │            │ A2 – Contact customer        │
                          │ Marketing and    │            └──────────────────────────────┘
                          │ commercial       │            ┌──────────────────────────────┐
                          │ function         │            │ A3 – Elaborate contract      │
                          └──────────────────┘            └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A4 – Prepare proposal        │
                                                          └──────────────────────────────┘

                                                          ┌──────────────────────────────┐
                                                          │ A5 – Kick off                │
                                                          └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A6 – Manage team             │
                                                          └──────────────────────────────┘
                          ┌──────────────────┐            ┌──────────────────────────────┐
                          │ Manage project   │            │ A7 – plan the project        │
                          └──────────────────┘            └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A8 – control and monitor the │
                                                          └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A9 – Manage risks            │
                                                          └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A10 – Manage the configuration│
                                                          └──────────────────────────────┘

                                                          ┌──────────────────────────────┐
                                                          │ A11 – Analyze requirement    │
                                                          └──────────────────────────────┘
    ┌──────────────┐      ┌──────────────────┐            ┌──────────────────────────────┐
    │ Satisfy the  │      │ Develop solution │            │ A12 – Design solution        │
    │ customer     │      └──────────────────┘            └──────────────────────────────┘
    └──────────────┘                                      ┌──────────────────────────────┐
                                                          │ A13 – Develop requirements   │
                                                          └──────────────────────────────┘

                          ┌──────────────────┐            ┌──────────────────────────────┐
                          │ Validate the     │            │ A14 – Check and revue the    │
                          │ product          │            └──────────────────────────────┘
                          └──────────────────┘            ┌──────────────────────────────┐
                                                          │ A15 – Validate the product   │
                                                          └──────────────────────────────┘

                                                          ┌──────────────────────────────┐
                                                          │ A16 – Install the product    │
                          ┌──────────────────┐            └──────────────────────────────┘
                          │ Deliver the      │            ┌──────────────────────────────┐
                          │ product          │            │ A17 – Train users            │
                          └──────────────────┘            └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A18 – Manage the maintenance │
                                                          └──────────────────────────────┘

                                                          ┌──────────────────────────────┐
                                                          │ A19 – Manage the payment     │
                                                          └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A20 – manage the human       │
                                                          └──────────────────────────────┘
                          ┌──────────────────┐            ┌──────────────────────────────┐
                          │ Manage the       │            │ A21– Manage the project      │
                          │ administrative   │            │      administrative monitoring│
                          │ work             │            └──────────────────────────────┘
                          └──────────────────┘            ┌──────────────────────────────┐
                                                          │ A22 – Contact suppliers      │
                                                          └──────────────────────────────┘
                                                          ┌──────────────────────────────┐
                                                          │ A23 – Manage the infrastructure│
                                                          └──────────────────────────────┘
```

[8] Barclay, C., 2008. Towards an integrated measurement of is project performance: the project performance scorecard. Information Systems Frontiers 10, 331–345.

[9] Collins, A., Baccarini, D., 2004. Project success—a survey. Journal of Construction Research 5 (2), 211–231.

[10] PMI, 2004. A Guide to Project Management Body of Knowledge, third ed Project Management Institute.

[11] Cooke-Davies, T., 2002. The ''real'' success factors on projects. International Journal of Project Management 20 (3), 185–190.

[12] Male, S., Kelly, J., Gronqvist, M and Graham, D, 2007. "Managing value as a management style for projects", International Journal of Project Management, vol. 25, pp 107–114.

[13] Koga, J., 2000. "Does Value Management have a place in Project Management?". SAVE International Conference Proceedings.

[14] Value management guideline, (January 2001), New South Wales Department of Public Works and Services Cataloguing-in-Publication data, page 5-6

[15] EN 1325-1. (1996) "Vocabulary for value management, value analysis and functional analysis" - Part 1: Value analysis and functional analysis, German version EN 1325-1

[16] Knox, S., (2002), "The boardroom agenda: developing the innovative organization. Corporate Governance", The International Journal of Effective Broad Performance, Vol. 2 N 1, pp.27–36.

[17] Walter, D. and Jones, P. (2001), "Value and value chains in healthcare: a quality management perspective". The TQM Magazine, Vol. 13 No. 5, pp. 319–333.

[18] Dummond, E.J., (2000),. "Value management: an underlying framework", International Journal of Operations & Production Management, Vol. 20 N 9, pp. 1062–1077.

[19] Mittal, B. and Sheth, J.N., (2001), "Value Space: Winning the Battle for Market Leadership". McGraw-Hill. New York.

[20] Narver, J.C., Slater, S.F. and McLachlan, D.L., (2004), "Responsive and proactive market orientation and new-product success", Journal of Product Innovation Management, Vol. 21 No. 5, pp. 334–347.

[21] Paulin., M., Ferguson, R.J. and Bergeron, J., (2006), "Service climate and organizational commitment: The importance of customer linkages", Journal of Business Research, Vol 59, pp. 906-915.

[22] Weinstein, A. and Pohlman, R.A., (1998), "Customer value: a new paradigm for marketing management", Advance in Business Studies, Vol. 6 N6 No. 10, pp. 89–97.

[23] Bejar, B., (2003) b, « Le couple (TQM. MV) au service de la formation de l'ingénieur génie industriel », in 5ème congrès International de Génie Industriel, Québec Canada, pp. 26-29.

[24] NF X 50-100 : Norme française : (1996) , « Analyse Fonctionnelle – Caractéristiques fondamentales ».

[25] Bejar, B., (2003), "L'implantation des méthodes ABC/ABM par les outils du Management par la Valeur", Revue Française de Gestion Industrielle, Vol. 22 No. 2, pp. 34-52.

[26] Miles, L.D., (1989),"Techniques of Value Analysis", 3rd Ed.,. McGraw Hill Book Company.

[27] Moriceau, P., (2000), « La norme européenne sur le management par la valeur », Revue la Valeur, N 84, pp. 15-17.

References

[1] Bititci U S, Cavalieri S and von Cieminski G, (2005),"Implementation of performance measurement systems: Private and public sectors", Editorial- Production Planning and Control, Vol 16, pp. 99-100, 2005

[2] Fatma and N.H. Timothy, (2005), "Patient satisfaction in a preoperative assessment clinic: an analysis using SERVQUAL dimensions", Total Quality Management Vol . 6 No.1, pp. 15–30

[3] World Banking Report, (2008), « Intégration mondiale de la Tunisie : Une nouvelle génération de réformes pour booster la croissance et l'emploi », Tunisia, pp 86-98.

[4] Day G.S, Fahey L. (1988), "Valuing marketing strategies", Journal of Marketing, vol.52, pp. 45-57.

[5] Rust R.T., Ambler T., Carpenter G.S., Kumar V., Srivastava R.K. (2004), "Measuring marketing productivity: current knowledge and future direction", Journal of Marketing, vol. 68, pp. 76-89

[6] Kaplan, R. S. and Norton, D. P., (1992), "The balanced scorecard: measures that drive performance". Harvard Business Review, Vol.70 No.1, pp. 71–79.

[7] Barclay, c., and Kweku-Muata Osei-B.(2010), "Project performance development framework: An approach for developing performance criteria & measures for information systems (IS) projects." International Journal of Production Economics 124, no. 1 PP. 272-292.

[28] Zeithamall V., Bitner M.J. and Gremler D.D., (2006), "Services Marketing", fourth ed. Irwin: McGraw-Hill.ram.

[29] Lovelock, C., Wirtz J. and Bansal, (2008), "Services Marketing: People. Technology and Strategy". Pearson Prentice Hall. Upper Saddle River. New Jersey.

[30] Demarle, D.J. and Shillito, M.L., (1984), Handbook of Industrial Engineering. Prude University. WILEY ed, USA.

[31] Ben Mzoughia M. and Bejar-Ghadhab B.,. « Modélisation de l'ABC/ABM dans une banque », ASAC.

[32] Kurtz, D.L. and K.E. Clow (1998), "Introduction to services marketing: consumption values", In Services Marketing, John Wiley, Cha. 1, pp. 32-47.

[33] Eggert, A. and W. Ulaga (2002), "Customer perceived value: a substitute for satisfaction in business markets", Journal of Business and Industrial Marketing, Vol. 17, No. 2/3, pp. 107–118

[34] McDougall, G.H.G. and T. Leveque (2000), "Customer satisfaction with services: putting perceived value into the equation", Journal of Services Marketing, Vol. 14, No. 5, pp. 392–410.

[35] Oh, H., (1999), "Service quality, customer satisfaction, and customer value: a holistic perspective", International Journal of Hospitality Management, Vol. 18, No. 1, pp. 67–82.

[36] Paulin, M. (2009), "La relation client hors service?", Revue Gestion, Vol. 33, No. 4, pp. 41-47.

[37] Woodruff, R. (1997), "Customer value: the next sources for competitive advantage", Journal of the Academy of Marketing Science, Vo. 25, No. 2, pp. 17–23.

[38] Baker, D. A.,Crompton, J.L., 2000. Quality, satisfaction and behavioural variables, Annals of Tourism Research, 27 (3), 785-804.

[39] Patterson, P. G., and Spreng, R. A. (1997). Modelling the Relationship between Perceived Value, Satisfaction and Repurchase Intentions in a Business-to-Business, Services Context: An Empirical Examination. International Journal of Service Industry Management, 8(5), 414–434.

[40] Ferguson, R.J., M. Paulin and E. Leiriao (2006), "Loyalty and positive word-of-mouth: Patients and hospital personnel as advocates of a customer-centric health care organization", Health Marketing Quarterly, Vol. 23, No. 3, pp. 59-78.

[41] Ferguson, R.J., M. Paulin and J. Bergeron (2010), "Customer Sociability and the Total Service Experience: Antecedents of Positive Word-of-mouth Intentions", Journal of Service Management, 21 (1), 25-44.

[42] Flint, D.J., R.B. Woodruff, and S.F. Gardial, 1997. Customer value change in industrial marketing relationships. Industrial Marketing Management 26, 163-175.

[43] Paulin, M., R.J. Ferguson and J. Bergeron (2006), "Service climate and organizational commitment: The importance of customer linkages", Journal of Business Research, Vol. 59, pp. 906-915.

[44] Slater S.F. & Narver J.C. (2000) The positive effect of a market-orientation on business Profitability : a balanced replication, Journal of Business Research, April, 48, 1, 69-73.

[45] HOLBROOK, M. B. [1999] " Introduction to consumer value " in HOLBROOK, M. B. [Ed.] Consumer Value. A framework for analysis and research, Coll. Routledge Interpretive Marketing Research, Routledge, London and New York, pp. 1-28.

[46] Value management standard EN 1325-2. (2004).

[47] Yin, R.K. (2003), Case Study Research :Research: Design and Methods, Sage, Thousand Oaks, CA.

[48] Ben Hadj Salem M A., Bahia B. (2010), "Building an activity based costing model in the software industry using a quality function deployment", The Second Canadian Quality Congress August 23-25, 2010, University of Toronto, Ontario, Canada.

First Author Amel Ben Hadj Salem-Mhamdia, graduated from the National Engineering University of Tunis- Industrial Engineering Department In Tunisia, where she successfully completed her masters degree. She is currently continued her studies on the doctoral level. She works as an assistant in the Industrial Engineering Department at ENIT.

Second Author Bahia Bejar Ghadhab. is an assistant professor in the Industrial Engineering Department at the ENIT. Responsible of the research unit' Value Management and Open Innovation' MaVOI. at ENIT. She is doctorate in science- Inorganic Chemistry in 1990. She had Habilitation in Industrial Engineering "TQM / MV" in 2004. She had European Certification: Facilitator and Trainer in Management by the Value (MV) issued by the French association for the value analysis (AFAV).