STAFFING ISSUES OF INFORMATION SYSTEMS FROM THE VIEWPOINT OF OPERATIONS MANAGEMENT OF SERVICES

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ABSTRACT: The essential ingredients of service triangle model are analyzed – the vision, or service strategy, for the product or service; the customer-oriented staff; the customer-friendly systems. The system approach is applied to the model and three basic support systems are identified – capacity planning, material planning, and information ones. A new service pyramid model of support systems is proposed. One common component is settled in the new model that is determined as back-office staff – managers and employees whose issues are discussed in the case of information system. Conclusions and recommendations for further applications are formulated.

KEY WORDS: Production / Operations Management, Service Triangle, Support Systems, Information System, Staff.

1. INTRODUCTION

ACCORDING to the most common understanding (Service industry, 2014): "… *Economists divide all economic activity into two broad categories, goods and services. Goods-producing industries are agriculture, mining, manufacturing, and construction; each of them creates some kind of tangible object. Service industries include everything else: banking, communications, wholesale and retail trade, all professional services such as engineering, computer software development, and medicine, nonprofit economic activity, all consumer services, and all government services, including defense and administration of justice ...".*

MOREOVER, the proportion of services in world economy grew steadily during the 20th century (Rowthorn & Ramaswamy, 1997) and in the first decade of 21st century service industry represents 63.3% (2013 est.) of the global GDP and employs 42.8% (2009 est.) of the labor force worldwide according to World Factbook 2013-14.

ROWTHORN & Ramaswamy (1997) approved the growth of service industry predicted by Bell (1977) who explained the main reason for that – goods production became increasingly mechanized, i.e. machinery allows a smaller workforce to produce more tangible goods, the service functions of distribution, management, finance, and sales become relatively more important.

SERVICE key characteristics, such as intangibility, perishability, inseparability, simultaneity, variability (Lovelock & Wirtz, 2011), many times confuse managers how to

manage their service enterprise. However, services have something common with tangible goods – they are produced and/or delivered by the production (operations) system. Hence, the study of operations management of services is quite vital.

CONSIDERING these arguments the objective of this paper is to investigate the operations system of services and on that basis to propose a new model for the place of staff within the service triangle model. To achieve this objective the following issues should be solved: (1) to analyze the relationship among the components of production system and the elements of service triangle model; (2) to discuss staffing issues of information systems as a support ones using the theory of operations management of services.

2. Materials and methods

THE analysis of operations system is made by study of some recent publications in the field of production / operations management like Barnes (2008), Chary (2009), Chase, Jacobs & Aquilano (2005), Evans & Collier (2007), Gaither & Frazier (2001), Greasley (2009), Heizer & Render (2010), Hill (2011), Jacobs & Chase (2012), Jacobs, Chase & Aquilano (2009), Knod & Schonberger (2001), Krajewski, Ritzman & Malhotra (2009), Meredith & Shafer (2006), Rowbotham, Azhashemi & Galloway (2007), Russell & Taylor (2010), Sampson & Singh (2008), Schonberger & Knod (2001), Schroeder (2007), Slack, Chambers & Johnston (2007), Stevenson (2008), Vonderembse & White (2007), Waters (2010) and Wild (2002). Service triangle as a concept is highlighted by the papers of Albrecht (1999) and Albrecht & Zemke (2001). The discussion on staffing issues of information system is based on research of Bulgarian enterprises for industrial services brightened in Nedyalkov (2010b).

3. Results and discussion
–*Relationship among components of production system and service triangle*

USUALLY production systems are described as „collection of all interrelated activities and operations involved in producing goods and services" (Sampson & Singh, 2008).
The analysis shows that production (operations) system can be determined as „system for transformation of inputs delivered by suppliers to outputs delivered to customers" shown on **Figure 1**.

HOWEVER, the transformation process needs support or a system for internal operations of repair and maintenance, delivery of consumable, etc. Furthermore, operations system needs management, thus information system.
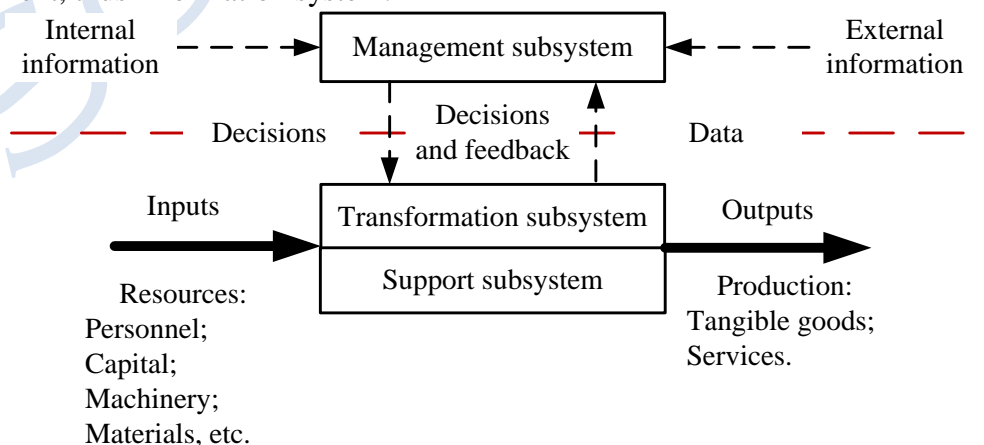

Figure 1: *Components of production / operations system*

OPERATIONS management of services or service management demands careful attention to all levels of the business operation – from the highest levels of strategy formulation, to the various levels and structures, to the delivery of the customer experience at the front-line (Albrecht, 1999) – a statement accepted also by Lovelock & Wirtz (2011).

ALBRECHT & Zemke (2001) propose a model that spans this full range of thinking calling it "The service triangle" (**Figure 1**). According to them „*The service triangle enables an organization's leaders to bring together the critical truths of its business strategy, the needs of its culture, and the design of its infrastructure into a unified concept for competitive success.*"

- By placing the **customer** at the center of the triangle, service enterprises are declaring that the customer value model will guide the decisions how the organization operates.

- The **strategy** spells out the organization's unique way of winning and keeping the customer's business, with its particular customer value package (that is the combination of things and experiences it offers the customer).

- The **people** part of service triangle refers to the entire culture of the organization, not just to the front-line „service delivery" people. The various departments in the organization treat one another as customers as well – concentrating more on contribution that completion. Ultimately, the way your employees feel is the way your customers will feel.

- The **systems** part of the triangle refers to the entire infrastructure of the organization. All organizational structures, functional relationships, physical facilities, information systems, procedures, rules, and regulations should be customer friendly in their design.

IT is proposed that the service triangle can be divided into three well-known levels: Strategic (S), Tactical (T) and Operational (O) as it is presented on **Figure 2**. The customers are in the center of that model again but there are different types of strategies, people and systems.

USING Albrecht (1999) description it is suggested that the **Strategy** can be divided into three parts (corporate, business, and functional). The strategy is developed by people that customer usually doesn't see, i.e. back-office managers (**Figure 2**).

THE **People** are proposed to be split into front-office – operational managers and service staff, and **Systems** that deliver back-office support as physical and information ones.

THE physical system has two major elements: (1) equipment that is maintained and repaired by technicians; (2) materials and spare parts that should be delivered and the inventory control typically done by the warehouseman (**Figure 2**).
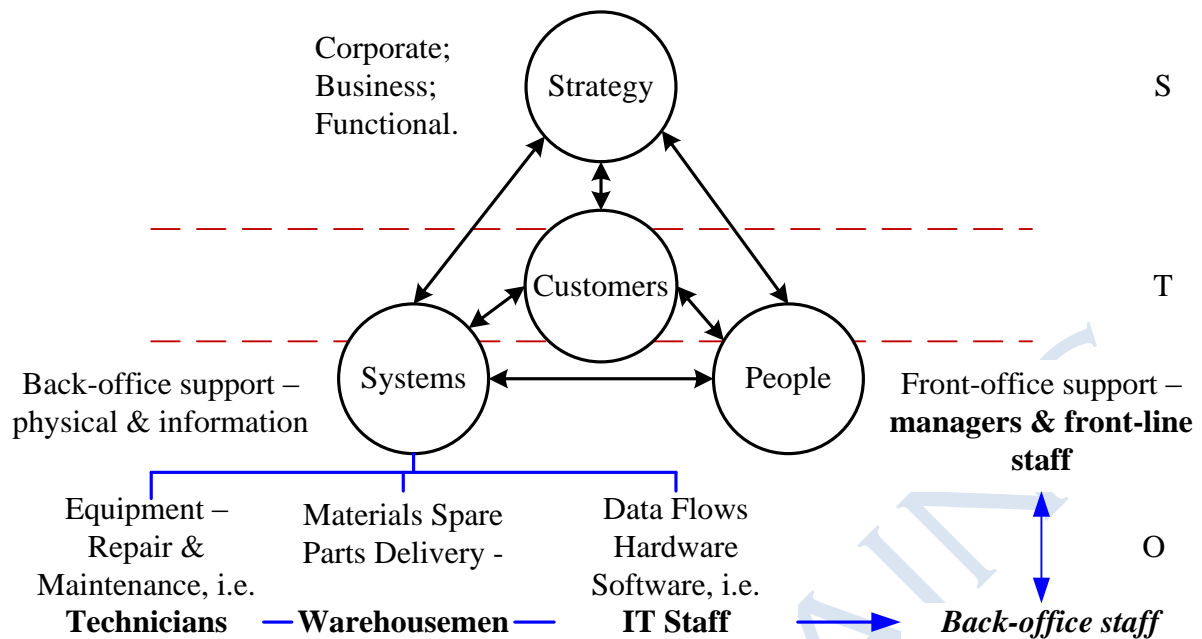
Figure 2: *Expanded service triangle model*

THE information system can be defined as a system for converting data from internal and external sources and transmission of selected information to managers of all levels to make informed and timely decisions on planning, organizing, directing and controlling the activities, for which they are responsible, as well as hardware, software and IT staff.

HENCE, in the systems there is not only equipment, materials and information but a staff who manages the processes in those systems that can be defined as back-office staff.

ACCORDING to that division some further comments are made that have been summarized in **Table 1**.

Table 1: *Summary table of expanded service triangle model*

No	Component	Types	Brief Explanations
1.	Strategy	Corporate	It concerns the selection of businesses in which the company should compete and with the development and coordination of that portfolio of businesses. Corporate strategy is often stated explicitly in a "mission statement".
		Business	It concerns more about developing and sustaining competitive advantage for the goods and services that are produced, i.e. positioning the business against rivals, predicting changes in demand, influencing the nature of competition, etc.
		Functional	It concerns business processes and value chain. Usually, functional strategies are developed in the fields of marketing, finance, operations, HRM, information.
2.	People	Front-Office	Staff that is usually noticed by customers and dealing with welcoming customers, providing information services, filling of the arrival and departure register, dealing with complaints and handling them, communication and coordination with other departments. Traditionally, they are located in marketing, sales, and service departments.
		Middle-Office	Its functions are closely connected with the front-office, but

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			concerned with monitoring, and providing information on, the front-office functions, rather than with the actual origination of transactions. Examples of middle office functions are risk management and product control. Middle- and Front-Office frequently are combined.
		Back-Office	Departments where staff which is invisible for the customers does tasks dedicated to running the company. Back-office staff usually is not given a lot of consideration. Examples of back-office functions are HRM, accounting, operations and IT management.
3.	Systems	Transformation	A system for any activity or group of activities that takes one or more inputs, converts and adds value to them, and provides outputs for customers or clients.
		Support	A system for physical (capacity and material planning) and information support to transformation system and/or customer. Those systems include repair and maintenance and supply with consumables. Information system means converting data from internal and external sources and transmission of selected information to decision-makers on planning, organizing, leading, controlling at all levels, as well as hardware, software and staff.

THEREFORE, it is proposed a new model of staff that services the customer – front-office staff that is responsible for the relationships with him, and back-office staff that manages systems (**Figure 3**).

MOREOVER, there is strong connection among front and back-office staff. The first one usually receives complaints from the customers, but the back-office staff is the one who does the work.
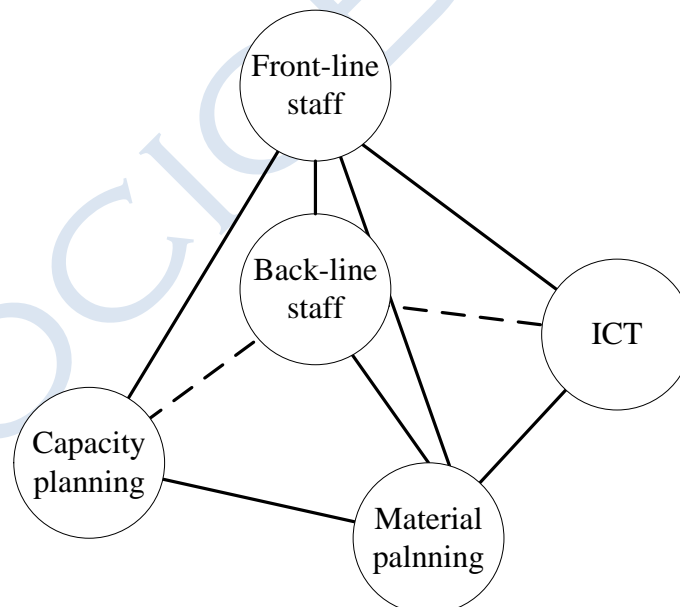

Figure 3: *Conceptual service pyramid model of support subsystems*

BACK-OFFICE staff is concerned with capacity planning, material planning and information system management. Furthermore, that is the most underestimated staff that is frequently is not investigated. Therefore, staffing aspect of support systems should be analyzed.

–*Discussion on staffing issues of the information systems*

ONE of the most undervalued problems to be solved with the introduction of new (improved) information system is staff. Too many systems fail due to insufficient careful staff planning. It is considered that the purchase and installation of computer and software is sufficient for one information systems, and people are perceived as a given (Velcheva & Petkov, 2002).

IT is analyzed the two main directions, proposing the successful implementation of information systems – managers and employees.

A. Managers

MANAGERS should have appropriate information culture to perform successfully their designated functions and information management tasks. In essence, the culture of information managers include: (1) value orientations in relation to information, i.e. what is the attitude of managers to information; (2) knowledge that must hold, i.e. what managers need to know about information; (3) their skills and abilities to use information in its specific activity or what the managers can do. **Table 2** shows in short what should be the information culture of managers.

Table 2: *Information culture of managers*

Values and Attitudes	• To understand the role and importance of information as a resource;
	• To attempt to improve the information support of the enterprise;
What is the attitude of managers to information?	• To look for applying modern ICT;
	• To be motivated for searching and using information;
	• To be prepared to buy information.

Table 2: *cont'd*

Knowledge	• To know the basic concepts of information;
	• To know the information support;
What managers need to know?	• To know the methods of information analysis;
	• To know the recent system and develop business database.
Skills and Abilities	• To have skills how to select the information;
	• To have skills how to analyze and evaluate information;
	• To have skills how to organize the implementation and use of modern ICT;
What the managers can do?	• To be able to identify new information needs;
	• To be able to set priorities and strategies for information support.

B. Employees

ENSURING staff of information systems should be considered in two aspects: (1) planning and allocation of adequate staff - number of disciplines and job type of training, time and place of training, etc.; (2) taking into account social and psychological factors affecting the process of implementation of ICT.

NECESSARY staff, which ensures the functioning of the computerized ICT at the enterprise, is determined in a training program for their implementation, taking into consideration the specific organizational management and operational structure of the enterprise (most regulated in the user guide of the software).

ESSENTIAL requirement in today's ICT is its application to be performed by users and providers of information, i.e. to build computerized places in the points of appearance and use

of it. The problem of selection of appropriate specialists and contractors for each place includes not only their skills, knowledge and abilities but also their integration into new technologies.

MOST plans for implementation of new information systems have a huge disadvantage. The people are perceived as a given. The typical information system plans describe the objectives, tasks and fall often with considerable details, but contain nothing about the ways in which people can succeed on the side of the planned changes.

MANAGEMENT of social psychological factors can be in described in two directions: (1) forms of support and (2) forms of resistance, presented in **Table 3**.

IT is necessary to overcome the social psychological factors expressed in the forms of resistance is necessary to uncover and analyze the underlying causes and identify approaches to eliminate them.

THE reasons underlying the various forms of resistance are caused by: (1) ignorance of the objectives, features and outcomes of implementing new ICT, (2) expectations of adverse changes in the situation of the specific person in the new conditions, (3) fear of interaction with the computer and potentially harmful effects on health.

Table 3: *Basic forms of employees support and resistance against information systems*

Forms of support	Forms of resistance
Active	**Open**
• Expressive support about usefulness of ICT application ; • Initiative in setting and solving problems; • Responsibility; • Competence, control and support; • Promotion of results, etc.	• Clearly negative attitude towards the whole business of implementing new ICT; • Refusal to perform tasks; • Denigration or denial of full results, etc.

Table 3: *cont'd*

Passive	Covert
• Positive attitude towards innovative process; • Deliberate and disciplined implementation of tasks; • Impartiality, etc.	• Mismatch between the external manifestation of their employees and the content side; • Disagreement between words, intentions and activities; • Inertness when active interference and prompt action is needed; • Consciously prepared intentional errors and failures that are well concealed, etc.

STAFF resistance against modern ICT could be rooted in: (1) unconvincing the usefulness and reality of the particular ICT; (2) fear of the complexity of the necessary new skills and additional training, uncertainty in the opportunity to acquire a new profession; (3) ignorance of the problems, difficulties and responsibilities associated with the new system, while the former is familiar and secure; (4) loss of control over the conduction of certain processes; (5) inability to influence them to manipulate the results and reserves and disguising, etc.; (6) loss of position; (7) removal of captured position, loss of reputation, built on old ways of working; (8) detection of hidden weaknesses, mistakes and shortcomings in the existing organization of work, etc.

MEANS to eliminate or reduce the impact of the listed reasons for resistance to ICT is limited to anticipatory awareness and timely training. People should know what they can expect from computerization, to reflect what impact it will have on each of them; help them believe in their ability to accept change.

FOR adoption of new ICT has the potential to use positive changes as a result of their application.

STIMULATING factors that determine the forms of support may be: (1) the emergence of new professions; (2) facilitation of labor and enhance the creative elements in it; (3) prestige of the work performed; (4) qualification which is associated with increased payment; (5) creation of opportunities for advancement, to occupy the higher positions, etc.

FOR successful management of social and psychological factors contribute to the implementation "psychologically stabile" information systems and technologies that ensure the adaptation of the human interaction with the PC and ICT.

4. Conclusions

RELATIONSHIP among the components of the operations/production system and the ingredients of service triangle is established and on that ground is proposed new expanded service triangle model that includes customer, different strategies, and back- and front-office support.

IT is find out that in services the three main support systems for capacity and material planning, and information system are managed by back-office staff – technicians, warehousemen, and IT staff and on that basis is developed conceptual service pyramid model that relate back- and front-office staff.

THE case of information system staff is analyzed in two aspects – managers and employees, and general conclusions are made about manager's information culture and basic forms of employees support and resistance against information systems.

THE results of information system staff analysis can be applied in the physical systems, i.e. capacity and material ones.

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