

Contents/Kazalo

5/2008

RESEARCH PAPERS	161	MILAN AMBROŽ, MARTINA PRAPROTNIK	Organisational Effectiveness and Customer Satisfaction
	174	DARJA PELJHAN, METKA TEKAVČIČ	The Impact of Management Control Systems - Strategy Interaction on Performance Management: A Case Study
	185	PAKIZE TAYLAN, GERHARD-WILHELM WEBER	Organization in Finance Prepared by Stochastic Differential Equations with Additive and Nonlinear Models and Continuous Optimization
SUPPLEMENT / DODATEK RAZPRAVE	A219	MILENA BEVC	Financiranje, učinkovitost in pravičnost terciarnega izobraževanja v Sloveniji
PREDLOGI ZA PRAKSO	A231	GREGOR MIKLIČ, MAJA ZAMAN	Dejavnost družbe kot dejavnik pri izbiri davčne oaze
POVZETKI	A242		
DONATORJI	A244		

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Organisational Effectiveness and Customer Satisfaction

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This paper presents a test of the relationship between organizational culture as a crucial indicator of organizational effectiveness and customer satisfaction using service-unit data from two health resorts. Ensuring survival of the service organisation in the long run requires adaptations which are oriented towards achieving maximum customer satisfaction. This study intended to unveil the effect organisational factors have on customer service orientation from the customer and employee point of view within a two health resort service setting. The finding suggests that when trying to predict the comparative degree which organisational effectiveness factors have in satisfying customers' needs, performance, adaptability and mission can be of the highest importance. Some effects like performance were uniform for employees and customers, while others varied depending on the organisation and the customer or employee group. Furthermore, findings suggest that service performance and organisation mission of the service organisation predict customer satisfaction based on established and proven health services. In this context there is no room for innovation, despite the fact that employees and customers do not share similar views about the impact of organisational effectiveness. Developing an effective service organisation can provide a competitive advantage to the organisation. Critical for the success of the service organisation is that organisational agents have a clear view of the existing organisation effectiveness and a clear view of the customer expectations in this area.

Key words: organisational effectiveness, customer satisfaction, customer complexity, service orientation, survival, adaptability

1 Introduction

Health resort organisations are the providers of the most complex services, because they commonly act as service provider and producer of goods at the same time. The difficulty of this complexity shows a need to improve organisational effectiveness to become more competitive in the health service market. As in many other private and public service organisations, competitive advantage is strongly attached to and dependent upon customer satisfaction. Customers and consumers put high pressure on service organisations to provide and deliver a cheap, innovative and high quality service. They develop new needs and expectations which directly push service organisations to compete and strengthen their capability to satisfy the customer. These rapid changes are happening due to development of the information society. The customer is well-informed, goal-oriented and wants to participate actively in the process of creation and consumption of the service to expand the field of his satisfaction. Moreover, new customers have access to similar services at the same time and a possibility to benchmark the service of one provider to the services of other pro-

viders. Bellou (2007) estimates that the new customer has the power to decide which organisation will survive and which organisation will eventually cease to exist. Such a competitive environment pushes service organisations to search for new and innovative ways to satisfy customers as well as new factors of organisational effectiveness. It is of the utmost importance that an organisation understand its competitive advantages and its position in the market based on a clear mission. It is not enough to provide a customer with a contracted service. Service organisations deliver service timely and effectively accompanied with feelings of comfort and joy, and the possibility of customer inclusion in the service that he or she wants to buy. These new demands can be fulfilled when a service organisation has a customer oriented organisational culture, which is in a constant flux of innovation.

The aim of our study is to gain insight into the relationship between organisational effectiveness and customer satisfaction from the employee and the customer point of view in two health resort service organisations. The study tries to reveal how existing organisational effectiveness in these two organisations shapes the organisation and its ability to emphasise customer needs and priorities (Heiser, McQuitty and Stratemeyer, 2005).

2 Theory and implications

2.1 The relationship between organizational culture and organisational effectiveness

Organizational culture is defined as a system of common beliefs, values, norms and rules in an organisation that conduct the behaviour and emotions of its members (Schein, 1995). It is manifested in the way that organisations' members work, perform tasks and in the way that decisions about important concerns of the organization are expressed. It articulates the organisations' policy, strategy and procedures. Among other things it gives meaning to the success and creates a unique picture of the organisational environment (Hofstede, 1981). Common, and at the same time divided images of an organisation, articulated by common beliefs, creates a unique organisational style. It is the image of the way that an organisation and its customers, partners and stakeholders understand, resonate and value its performance (Hofstede, 2006; Hatch and Cunliffe, 2006, Schein, 2005; O'Donovan, 2006).

Many studies show that organizational culture is one of the most important factors with an influential role in the determination of organizational performance (Chatman and John, 1994, Hofstede et al, 1990, Schein, 1990, Denison, 1990, Fey and Denison, 2003, Gillespie et al, 2007). Lewis (2002) even argues that organizational culture has proven to be an enduring concept in predicting performance.

Additionally, many researchers have confirmed the relationship between organisational culture and effectiveness (Denison, 1990; Ambrož, 2004; Ouchi, 1981; Kwantes and Boglarsky, 2007; Berry and Parasuraman, 1992; Stein and Bowen, 2003). A number of authors have investigated culture from a strategic perspective and have presented culture as a source of competitive advantage (Wilkins and Ouchi, 1983; O'Neill et al, 2001; Hasmi and Asaari, 2007). Detert (2000) focused organisational researchers on the relation between the organisational culture and quality of services. His research shows that there is a close relationship between a quality service system and organisational culture.

Denison (1990), Kotter and Heskett (1992), Denison and Mishra (1995) developed explicit theories of organizational culture and effectiveness, but have focused on the American context. Hofstede (1980), Conrad (1997) and Fey and Denison (2000) related organizational culture to different national contexts and showed that organizational culture cannot be studied as a distinctive phenomenon.

Gilbert and Parhizgari (2000) investigated service organizations and found that different service organization cultures are effective in different contexts. Ambrož (2004) researched the relationship between organizational culture and performance in three industrial organizations and confirmed that their culture distinctively and uniquely affected their performance. It has been recently firmly asserted that organisational culture is effective only in certain circumstances (Igo and Skitmore, 2006). Trice and Beyer (1993: 174) caution that although organiza-

tions may have distinctive cultures, it would not be wise to consider that an organization has a single, homogeneous culture.

They argue that various scholars have commented that most organisations have multiple cultures embedded within an encompassing or complete culture that are labelled as subcultures (Ouchi, 1980; Ashforth and Mael, 1989). Subgroups in organizations can create subcultures that build specific networks of meaning and at the same time remain associated with the ideologies and values of the organization's leadership (Bellou, 2007). The fact that the impact of cultures and subcultures differs in predicting an organization's performance leads us to an investigation of the relationship between the perceptions of the role of the organizational culture of the employees and the customers of the particular organization. Parasuraman et al. (1985) suggest that employees can predict customer perceptions of many determinants of service quality. They are particularly accurate in service quality areas such as courtesy and responsiveness.

Schneider, Parkington & Buxton (1980) and Schneider and Bowen (1985) revealed that branch customer attitudes about service quality were significantly correlated to employee views of customer service. Furthermore, Conduit and Mavondo (2001) found that synergistic effects of an internal customer orientation and market orientation have an impact on an organization's performance. Subramony, Beehr and Johnson (2004) investigated employee and customer perceptions on service effectiveness, group maturity, and service quality and confirmed positive links between these two groups' perceptions. However, other studies do not support their conclusions. A study by Shahani-Denning (2000) revealed that customers and employees often perceive organizational effectiveness differently. Recently there has been an urgent need to study the relationship between an organization's behaviours and customer satisfaction. Despite the fact that profit is the major goal of every organization, most research efforts are spent on customer satisfaction and on his or her experiences with a service organization (Anderson et al., 1997). Bowen et al (2000) and Gupta et al (2005) studied organisational culture and customer satisfaction and confirmed the strong link between these two influencing conditions of organizational effectiveness.

2.2 Customer satisfaction

Customer satisfaction is an organization's ability to attract and retain customers and to improve customer relationship over time. It is often seen as the satisfaction with an organization's products or services. Furthermore, it is considered to be the key to success and long-term competitiveness. The knowledge of customer satisfaction is the source for the fulfilment of customer expectations, the informed source for gaining their retention and the source for studying organizational effectiveness in the process of service delivery. An organization can decide on the actions required to meet customer needs if it understands perceptions. Furthermore, it can identify its own

strengths and weaknesses and chart out the strategy of future progress and improvement of the work practices and processes used within the organization.

Customer satisfaction is a hardly universal category because its meaning is based on circumstances and different points of view and is the outcome of individual customer judgement. Researchers of customer satisfaction have developed different concepts and different views of organizational performance outcome. Wilson (2002) argues that customer satisfaction is ambiguous and complex in nature, and it often consists of various components that are measured with different methods under different conditions. Edvardsson (1996) argues that customer satisfaction is an individual category since the customer tacitly understands it in his own unique way. This means that customer satisfaction can be understood as a web of psychological, social and physical variables, which correlate with the notion of a satisfied customer.

Parasuraman, Zeithaml and Berry, (1988) and O'Neill in Palmer (2004) see customer satisfaction as a cognitive construct and as a psychological state. Anderson, Fornell, and Lehman (1994) argue that customer satisfaction is primarily an emotional state and the outcome of the long-term relationship between customers and service providers. Ning-jun Zhang et al (2007) show that the emotional dependency of employees fosters their efforts to satisfy customers. Parasuraman, Zeithaml & Berry (1988) relate customer satisfaction to qualitative and quantitative elements of the service and see it as a relation between customer satisfaction, service performance, and perceived customer service performance expectations (Oliver, 1997). Zeithaml & Bitner (2000) propose a simpler definition of customer satisfaction based on the degree of customer needs and expectation satisfaction, which directly impacts the degree of customer dissatisfaction.

Customer satisfaction measures future customer expectations and quality measures what the customer should expect from the service in the future, which is a more abstract category. The outcome of both measures is the relation between expectations and performance (Bolton and Drew 1991; Parasuraman; Zeithaml, and Berry 1988). Empirical analysis has shown that, not only are the actions of employees fundamental for a high-quality delivery of service, but also that their morale influences consumer satisfaction (Schneider and Bowen, 1993).

Based on intensive research through time, two types of customer satisfaction definitions have emerged. The first type defines customer satisfaction as an outcome of a buying experience (Westbrook and Reilly, 1983). The second type of definition defines customer satisfaction as a benchmark between the real purchase and the purchase expectations of the customer (Hunt, 1977). Despite its complexity, customers do not have any problems with the definition of satisfaction even if it is not deliberately explained (Gupta and Zeithaml, 2007). This is the reason it is so important that the management of a service organization primarily sees the customer's point of view of the organisation's strength that results in delivering the service that fulfils the customer's social, personal and

physical expectations regarding service quality. Service organizations must consider customer satisfaction as a key leverage point to differentiate themselves from other organisations (Gillespie et al, 2007).

Customer satisfaction is the outcome of his or her needs and expectations which influence the interaction with service providers and other customers. The quality of this interaction impacts customer decisions to repurchase the service, his retention and the intention of the customer to recommend to other potential customers and finally to pass on useful information about the service quality and delivery. Customer satisfaction is related to different ways of interacting with the environment. A positive recommendation is a social interaction, which is positively related to customer retention, reduces transaction costs and increases long-term profitability (Jamieson, 1994, Mackey, 2005). Word of mouth has great communication power because it is a direct transmission of customer satisfaction to other potential customers. Weinberger, Allen and Dillon (1981) and Herr et al (1991), are convinced that word of mouth is more important than information about service generated by marketing activities. The communication power of word of mouth is manifested when the service provider fails to meet the complaints of the customer or his reactions are not congruent with the customer demands. The highest importance of word of mouth is when customer reaction to the service provider is negative (Richins, 1983).

The result of negative perceptions is a dissatisfied customer, who rarely decides to repurchase the service from the same provider (Newman and Werbel, 1973). The worst case is when a customer refuses to buy another service from the same provider (Fitzgibbon and White, 2007). Word of mouth is closely related to the customer intentions to repurchase the service (Gupta and Zeithaml, 2007).

3 Organizational effectiveness and customer satisfaction

Customer satisfaction is a complex phenomenon and cannot be collapsed into a single satisfaction index. The customer ultimately judges the strength of his or her relationship with a vendor or service provider on the totality of experiences with the company, of which agent performance is only one required ingredient. Linking organizational culture and customer satisfaction creates some empirical problems. A service can be simulated as a product, but in reality it is not tangible. It does not have a solid form and its physical, psychological and social dimensions are not easily identified and the production of service and deliverance cannot be separated and distinguished. One of the most important facts is that behaviour of the service provider during service delivery and consumption directly influences customer satisfaction. Customer perception during the providing and consumption of the service is focused on the provider and on the service delivery effectiveness, not on the service. Customers are satisfied only

when they actively participate in the creation, delivery and consummation of the service (Yoo, Donhty and Lee, 2000).

Various social environments impact customer satisfaction. Wangenheim et al (2007) argue that customer satisfaction is social group dependent. Different social groups perceive customer satisfaction with a service differently and the goals of different customers are social group dependent (Mittal and Kamakura, 2001). Castro et al (2007) developed a framework which shows that there are substantial correlations between tourist intentions to revisit a tourist destination and his or her intentions to recommend the tourist destination to his or her relatives and friends. Schneider and Bowen (1993) and Ad de Jong et al. (2005) researched the internal social group environment and found that employees' perceptions of positive group climate positively impact customer perceptions about the service quality.

Service quality and customer satisfaction are related, but different. Bolton and Drew (1991) clearly distinguish between these two groups. Quality is a long-term process and customer satisfaction is a result of the immediate service transaction. Castro et al. (2007) showed that a tourist who decided to revisit a tourist destination recommended it to other tourists. Quality social interaction with employees of the service provider is evidently an important source of customer satisfaction.

Some researchers do not share this view, and argue that service marketing and the quality of service are primary factors that impact a customer's decision to repurchase the service from the same service provider (Nelson, 1994, Getty and Getty, 2003). Customers who are satisfied with the quality of the relations with the employees are more satisfied with the quality of the service (Solnet, 2007). Brown et al. (2001) confirmed that conclusion. Their research shows that quality relations between customers and employees have a positive impact on word of mouth, empower trust between groups, strengthen social interaction and build sincere personal relations. Service organizations tend to employ a cheap work force to maintain their competitive advantage. Seasonal workers and others with low wages are not motivated to build good relations with the customers. The consequences of these actions are mainly reflected in negative word of mouth and in the decision of the customer not to repurchase the service from the same service provider (Sungjin, 2005).

Organizational effectiveness is closely related to the ability of the service provider to satisfy the customer. A service provider who is in a position to offer extra services, such as better quality service, excitement or a large variety of services, will have a greater chance to satisfy a customer (Kano et al., 1984). Lewis and Bridger (2000:126) argue that customers that have an opportunity to save time, to gain personal advantage or to increase their enjoyment, will be more satisfied with the service.

The modern customer is no longer satisfied with the basic attributes of health service. He needs a positive experience and service that can be efficiently applied in his future self-image construction and personal develop-

ment. His satisfaction will be even stronger when he is served by employees who genuinely enjoy their work and feel personally involved in providing the service. By improving the procedures and arrangement of health resort physical facilities that offer comfort and ease, by organizing timely and prepared services, and through streamlined contact with customers supported by quality written information, customer experiences are broadened and so is their satisfaction (DiJulius, 1964:53).

Past and recent empirical studies link organizational and customer satisfaction that address service delivery and customer satisfaction, but these relations are more or less theoretical or indirect (Gupta et al., 2005). De Tienne and Holland (2007) relate customer satisfaction to organizational culture by defining it as a consistent, adaptable and qualified process of customer needs satisfaction. Recently, Gillespie et al (2008) showed that organisational culture is a unique phenomenon that must be researched and used as an effectiveness indicator in the environment where a service organisation usually operates. Their recent research in two different organisations on the regional markets of a residential home-building company and automobile dealership show a significant relationship between organizational culture and customer satisfaction.

Bellou (2007) confirmed these findings. She found that long-term customer satisfaction is closely related to the organisational culture which affects employees' eagerness to serve customers. She argues, "as a result, must be organisational agents shape culture in an effective way, by emphasizing aggressiveness, decisiveness, innovativeness and rewards but diminishing outcome orientation". She is convinced that the clear view of the power of the organizational culture by organizational agents serves to emphasize customers' needs and priorities (Bellou, 2007).

Organizations whose cultures are not strongly customer and service oriented, have little chance to succeed. Service organisations must be constantly open to the suggestions, needs and expectations of the customer and open enough to make space for the active participation of the customer in this process. By focusing on the system as a whole, organizations may be better able to satisfy their customers, but in the process also identify areas in need of improvement with respect to their mission, the interaction among employees, and the systems and structures that encourage efficient operations (Denison, 1990).

The current empirical research in two health resorts in Slovenia builds on the organizational culture framework of Denison and colleagues (Denison, 1990; Denison and Mishra, 1995; Fey and Denison, 2003, Gillespie et al., 2008). This framework conceptualizes organizational culture in four dimensions that have been shown to relate to organizational effectiveness: Involvement, Consistency, Adaptability and Mission.

These four dimensions describe the extent to which a company is customer-focused and strategically-oriented (Gillespie et al, 2008). As Denison (1990 : 2) states, the four dimensions measure the underlying values, beliefs, and principles that serve as a foundation for an organiza-

tion's management system as well as the set of management practices. This organizational model represents a system approach to organizational culture and customer satisfaction and has an impact on organizational effectiveness as described below (Denison, 2000).

Our study is the test of the relationship between organizational culture dimensions and customer satisfaction using service-unit data from two health resorts. The vantage point of our research is based on literature study and empirical findings and starts from the hypothesis that customer satisfaction can be maintained when the members of an organisation share the same values that orient the organisation to customer satisfaction through organisational effectiveness. The new value in our study is a detailed report of customer satisfaction seen by two groups at the same time in the same service organisation. This way we add new perspective to the meaning of customer satisfaction and to the meaning of organisation satisfaction in predicting customer satisfaction.

Hypothesis 1: The better the performance provided by employees, the higher the customer satisfaction.

A performance dimension is closely connected to the capabilities of employees in a service organisation who have knowledge and are motivated to deliver quality services, to their commitment and a sense of ownership. Additionally, it is a competitive advantage of an organisation, which connects the functional capability of employees with organisation strategy, encourages organisational effectiveness and active change processes (Lundby, 2001).

Hypothesis 2: The higher the innovativeness of the services of a health resort, the higher the customer satisfaction.

A service innovation dimension is a special feature of organisational effectiveness that enables an organisation to adapt its goals to customer expectations. Innovativeness is a core and long-term activity of an organisation which is manifested as the creation of new services and as a maintaining of an organisation's competitive advantage (Denison, 1990; Hatch and Cunliffe, 2006). At the same time, innovativeness is an organisation's capacity to innovate. Services structured in a series of processes that are designed and managed to create and apply ideas and knowledge, directed at value creation, are leading to new and different products, service and processes. Innovativeness is an outcome of processes that add new value to service (Bubner, 2001; Edwards et al., 2002; Angel, 2006).

Hypothesis 3: The higher the adaptability of the services of a health resort, the higher the customer satisfaction.

An adaptability dimension is the capability of a service organisation to cope with changes in the service market. An adaptable organization is based on a dynamic network of connections between different internal and external stakeholders who participate in the continuous improvements of the organisation's competitive advantage and customer satisfaction (Brown and Eisenhardt, 1997). The benchmark between successful and less suc-

cessful organizations shows that successful organizations foster complete communication, create and recreate organizational environment and climate in order to support continuous low cost improvements.

Hypothesis 4: The stronger the mission of a health resort, the higher the customer satisfaction.

A mission is the capability of a service organization to set clear goals and strategies to sustain a long-term competitive advantage. Effective organizations follow their mission with economic and non-economic goals that make sense and bring meaning to the internal and external stakeholders (Denison and Mishra, 1995; Gillespie et al, 2008). Successful organizations have clear intentions, goals and future vision (Jung et al, 2003; Whetstone, 2005). Their mission is reflected in customer satisfaction. Customers of the organisation with clear goals and mission have positive experiences that empower a positive self-concept and open development perspectives that are realized in the opportunity to be part of the individual service creation delivered by satisfied customers. Wilkins et al (2006) researched the meaning of the self-concept of hotel guests after leaving the hotel. They found that positive experiences with the services of the hotel empowered guests' self-concept, depending on sex and tourist destination.

Hypothesis 5: Perceptions of customer satisfaction in health resorts are different among employees and customers.

Customer satisfaction is complex and research shows that different elements of customer satisfaction in relation to organisational effectiveness are correlated. This is the reason we integrated them into a single factor which was used to test the impact of organizational effectiveness on customer satisfaction in two service organisations in health resorts. Customer satisfaction in our study is measured by the outcome of the benchmark of similar services in similar organisations in health service, with the degree of customer expectation satisfaction, with the quality of customer employee relations and with the ability of service providers to adapt to the service challenges.

4. Methodology

4.1 Methods

This empirical evidence presents a test of the relationship between the features of organisational effectiveness presented by organizational culture dimensions, and customer satisfaction in two health resorts in Slovenia, one from the inland and the other from the Adriatic coast. During September 2006, 233 respondents, employees and customers from both resorts returned questionnaires. Data were computerized, checked for errors and statistically analysed. To yield four cultural dimensions and to confirm a customer satisfaction indicator we conducted factor analysis – a principal component method with Varimax normalized rotation.

In the second step of statistical analysis data were regressed to cultural dimensions on a customer indicator to test the relationship between organizational culture dimensions representing organizational effectiveness factors as independent variables and the customer satisfaction indicator as a dependent variable.

4.2 Sample

Respondents in our research were selected from among employees from the health resort and among customers or guests that were staying at the resort at the time of conducting the study. Employees and guests assessed the organizational effectiveness and customer satisfaction in the health resort at the same time. Respondents from both groups, employees and guests, were randomly selected with all having the same chance to be selected, and mirror the structure at the time the questionnaire was administered. Questionnaires were distributed personally by the researcher. About 10% of respondents refused to participate in the study. Respondents from the guest sample visited the health resort on account of chronic health problems. In the Adriatic coast health resort, there were many respondents that visited it on account of health problems and for pleasure.

In the first resort from the inland (DT), 57 guests, 26 men and 31 women, with 55.37 years of average work experience and 57 frontline, administrative and health and medical staff, 20 men and 37 women, with 17.35 years of average work experience, filled out and returned the questionnaire containing items about organisational effectiveness and customer satisfaction. In the second resort from an Adriatic coast (K), 61 guests, 18 men and 43 women, with 31.60 years of work experience, filled out and returned the questionnaire and 58 frontline, admin-

istrative and health and medicine staff, 20 men and 38 women, with 17.35 years of working experience, filled out and returned the questionnaire.

4.3 Instrument

We chose a quantitative study with survey instruments to benchmark differences and similarities between the samples in the study and between the health resorts in the study. To test the relationship between organizational culture dimensions and customer satisfaction, a survey instrument with a five point Likert-type continuous scale was developed. The scale of the instrument ranged from (1) absolutely disagree with the statement to (5) absolutely agree with the statement. As a base for the current study in two health resorts in Slovenia is the organizational culture framework of Denison (1990). Four dimensions of an organizational culture were developed consisting of: Performance dimension: quality of service, customer expectation fulfillment, readiness of the employees to understand and serve problem solutions and to process information to the customers, trust in employees, long-term oriented system approach toward customers.

Innovation dimension: generating new products and services, integrating packaged services in various combinations, performing service animations, inclusion of the customer in service creation:

- A performance dimension: quality of service, customer expectation fulfillment, readiness of the employees to understand and assist in solving problems and to process information to the customers, trust in employees, long-term oriented system approach toward customers.
- An innovation dimension: generating new products and services, integrating packaged services in various

Table 1: Sample features of respondents in the study

Sample	Sex	Age (average for both groups)	Working experience (average)	Days of staying
Inland resort (DT) guests	Male	26	55.73	25.80
	Female	31		
Inland resort (DT) employees	Male	14	38.26	16.89
	Female	43		
Adriatic coast resort (K) guests	Male	18	62.67	31.60
	Female	43		
Adriatic coast resort (K) employees	Male	20	36.98	17.35
	Female	38		

combinations, performing service animations, inclusion of the customer in service creation.

- An adaptability dimension: comfort of the buildings, deliverance service capability, continuous service improvement, professional behaviour of the staff, introduction.
- A mission dimension: management and staff responsiveness, business opportunity exploration, clearness of goals and organization strategy, development of employees.
- Customer satisfaction: quality of service, expectation fulfillment, service repurchase intent, likeness to the

organization staff, timetable suitability, comfort of buildings, quality and frequency of information about services, openness to change.

5. Findings and discussion

Descriptive statistics for the determining factors of organizational effectiveness and customer satisfaction are presented in Table 2 and in Table 3. It can be seen that the mean scores for effectiveness factors vary between 3.46 and 4.37, respectively, innovativeness being the least

Table 2: Organizational effectiveness and factors

Factor analysis	Eigenvalues	Explained variance	Reliability (Cronbach alfa)	Mean
Involvement and factor				
Our customer always receives quality service.	0.72			4.42
I am sure that employees will fulfil customer expectations.	0.73			4.35
Employees are always willing to help.	0.85			4.51
Employees sincerely want to please customer.	0.82	34%	0.94	4.51
Employees always help to solve problems of the customers.	0.77			4.27
The behaviour of employees confirms trust in them.	0.83			4.32
Employees provoke good feelings in customers.	0.87			4.48
Employees are always nice.	0.80			4.44
Customer gets information, whenever he wants.	0.80			4.36
Employees definitely want to understand customers.	0.70			4.25
Employees work systematically, gradually and long-term oriented.	0.55			4.27
Customers know to whom to turn to get information about service.	0.62			4.26
Innovativeness and factor				
The organization introduces new services.	0.92			3.47
The organization combines different services.	0.92			3.43
The organization introduces priced packages.	0.92	17%	0.95	3.55
The organization offers animation services.	0.89			3.40
The organization services are unique.	0.89			3.47
Adaptability and factor				
Facilities of the organization are comfortable.	0.75			4.00
Organization demonstrates deliverance service capability.	0.86			4.17
The organization continuously improves services.	0.83	9%	0.89	4.21
The staff in organization conducting professionally.	0.80			4.31
The organization introduces individually oriented services.	0.64			4.08
Mission and factor				
The management and staff in organization successfully respond to the demands of the circumstances.	0.77			4.15
The organization successfully takes advantages of business opportunities.	0.75	8%	0.77	3.89
The organization has clear goals and strategy.	0.79			4.39
The organization takes care of the employees' personal development.	0.75			4.08

prominent and performance being the most prominent characteristics of organizational effectiveness in the two health resorts in Slovenia. We can conclude from our findings that the organizations studied underestimate the importance of innovativeness of services to retain a competitive advantage. Innovation can make an obvious difference and keep the organization competitive.

We used factor analysis of principal components with Varimax standardized rotation to reduce the number of variables in the research. Factor analysis was conducted separately for the variables from the organizational effectiveness group and for the variables from the customer satisfaction group. To control reliability, Cronbach's alpha was used to separately assess the reliability of the scales generated by factor analysis. We found that the scales generated after factor analysis are reliable and can be used to assess organizational effectiveness and customer satisfaction (Table 2).

The first group of variables yielded five factors that explain 68% (Table 2) of variance and was named "Organizational effectiveness". The first factor "Performance" is the strongest and explains 34% of the variance, followed by the factor "Innovativeness" that explains 17% of the variability. The third factor in the analysis was named "Adaptability" and explained 9% of the variance. The last factor named "Mission" explained 8% of the variance. The analysis shows that service performance is perceived as the most important factor of service delivery based on the behaviour pattern of employees in the process of service delivery. Furthermore, results show that the organization mission is not a well known and well accepted organizational effectiveness factor in the process of service delivery. Employees and customers did not give it much importance in ranking organizational effectiveness. The second group of variables yielded only one factor that explains 44% of

the variance and was named "Customer satisfaction". The results are not a surprise. They only confirm the fact that customer satisfaction is a complex phenomenon that must be studied as a combination of several types of customer satisfaction.

The first objective of this study was to examine the extent to which organisational effectiveness can predict customer service orientation, in an effort to provide insight into customer satisfaction (Table 3). To test the composite level of impact that any of the independent variables has upon customer contribution, General Linear Regression was used and the impact captured by F and p value. Results show that organisational effectiveness factors have an impact on customer satisfaction (R^2 , adjusted = 0.64, $p < 0.000000***$). In the regression model, the organisational effectiveness factor has the strongest correlation with customer satisfaction ($F = 149$; $p < 0.000000***$). Since factor innovativeness has no significant correlation with customer satisfaction ($F = 2.65$; $p < 0.10$), we must reject the hypothesis that the higher the adaptability of the services of a health resort, the higher the customer satisfaction. According to Table 5, three organisational effectiveness variables and one control variable (groups) are important customer service predictors.

Apparently, performance, adaptability, mission and control variable groups significantly impact the extent to which employees and customers put customers' interests first. According to the results of the study, we can accept the hypotheses that performance of employees, the adaptability to customer needs and a clear organization mission predict customer satisfaction. Such a finding implies that employees and customers recognize that being competitive as a service organisation tends to be perfectly included in service delivery, to have a clear vision of what service largely means to customers and to be flexible in all circumstances regarding service delivery. In addition,

Table 3: Customer satisfaction and factor

Factor analysis	Eigenvalues	Explained variance	Reliability (Cronbach alfa)	Mean
Customer satisfaction and factor				
Higher quality service than in other health resorts.	0.68			3.89
Quality of services satisfies customer expectations.	0.82			4.22
Customer would repurchase the service in this health resort.	0.79			4.30
Customer looks forward to meet the resort staff again in the future.	0.67			4.39
Customer is comfortable with the time table in resort.	0.53	44%	0,84	4.08
Facilities are comfortable, streamlined and timely prepared.	0.63			3.98
Customer receives high quality information about services.	0.66			4.23
Customer is frequently informed about services in the resort.	0.57			4.30
Health resort is open to changes.	0.58			3.96

Table 4: Results of regression analysis

Independent variables	Mean	Standard deviance	R ²	R ²	ΔR ²	F	p
intercept						6,21	0.013498*
Performance dimension	4.37	0.099178				149	0.000000***
Innovativeness dimension	3.46	0.056391				2.65	0.105158
Adaptability dimension	4.15	0.119290				10.65	0.001287*
Mission dimension	4.12	0.206620				18.38	0.000028*
Respondents						4.50	0.004390*
Customer satisfaction	4.15	0.177	0.81	0.66	0.64	55.95	0.00000***
error			22.94	208	0.11		

Notes: $p < 0.05$ *; $p < 0.01$ **; $p < 0.001$ ***

being competitive means to have in mind that different groups have different perceptions of customer satisfaction.

We tested findings of regression analysis on the statistical significant difference between employees and customers using the Scheffe Multivariate Test (Table 5), which can be used when means are not equal, non-homogeneous or non-normally distributed. Results show that the perceptions of the customers in resort (K) significantly differentiate from the perceptions of the employees in (K) and from the customers and employees in (DT).

Repeating multiple regression separately for the organization revealed both similarities and differences (Table 6). Organization (DT) is an old health resort. Both employees and customers believe that for organization (DT) the strongest organizational effectiveness factor is service performance – the capacity of its employees to perform and to deliver service that fulfils customer expectations, combined with the second factor – adaptability, understood as a capability for teamwork and deliverance

of individual service for each customer. Health resort (K) has a different organizational effectiveness structure. Employees and customer perceptions in (K) resort differ significantly. Customers are more satisfied with employees' performance in service delivery and with the mission of the health resort.

Service performance is the most important positive similarity in a complete sample and in groups by health resort. An effective service organization is an organization with employees that have skills and knowledge and are committed to service delivery to satisfy customers. On the other hand, the most important negative similarity is the absence of new services. It seems that both resorts are effective in selling well proven services to the customers, and they are satisfied. Performance based on stability and predictability prevails over innovativeness and excitement. Customers in both resorts are mostly aged populations (K = average 63 years; DT = average 56 years) who value predictability and effective service delivery and are

Table 5: Post Hoc Tests

Scheffe test; variable Probabilities for Post Hoc Tests Error: Between MSE = ,11026, df = 208,00				
respondents	{ 1 }	{ 2 }	{ 3 }	{ 4 }
1 DT_customers		0.249885	0.999828	0.000001
2 DT_employees	0.249885		0.291156	0.002924
3 S_employees	0.999828	0.291156		0.000002
4 S_employees	0.000001	0.002924	0.000002	

Table 6: Sample regression results

Independent variables	All organisations	Organisation (DT)	Organisation (K)
An performance	0.65***	0,569036***	0,559129***
An innovativeness	-0.11	-0,027788	-0,113289
An adaptability	0.22*	0,447030***	0,043624
A mission	0.28**	0,153282	0,421328**
Groups	0.14*	-0,052551	-0,413341**
Adjusted R	0.64	0.70	0.61
F - ratio	56	53	32

a population who has very defined needs related to health improvement.

However, there are some differences as well so we can accept our hypothesis that perceptions of employees and customers are different. Resort (K) is more of a goal and new opportunity oriented resort and resort (DT) is more conservative and oriented to producing quality health treatment services (Table 6). Evaluating competition from a customer's perspective encourages a broader view of competition because customers are not bound by the typical single-industry definition of competition. Market-oriented firms attempting to satisfy customers' needs and wants should have an interest in understanding how their customers select products in the face of wide-ranging competition. Developing an organizational effectiveness which fosters satisfaction can provide a competitive advantage to the service organization. It is thus critical for organizational agents to have a clear view of the existing effectiveness but also to shape it in such a way that emphasizes customer needs and priorities (Bellou, 2007).

As we noted before, the findings of our research show that service performance is a core competence of the service organization in our sample. Employees that are qualified, trusted and flexible are a service organization asset. Quality relations between employees and customers are the best way to develop a customer oriented organization. Our research findings confirm that organizational effectiveness is important in building a service oriented organization. However, organizational effectiveness is a result of many cultural, physical and psychological factors. It is multifaceted and reflects organizational culture practices, customer needs, wants and expectations. In order to achieve successful implementation of initiatives, the human resource management practices in a health resort must be designed accordingly, by recruiting and selecting applicants that fit the organization. Newcomers should be effectively involved in organization operations, procedures, and standards (Bellou, 2007).

Service innovation in a health resort is another feature which needs more attention in future research. Service is not tangible and cannot be innovated in the same way as a physical product. Service innovation in the health and beauty sector takes time and new services are accepted when new life styles or new health treatment services are developed. Furthermore, this can be realized when employees fully understand the mission of their organization and follow it with a firm belief in better customer service. The findings of our research show that service innovativeness is not a significant independent variable in our sample and rather limited (3.46 on a five-point Likert scale), implying that there are still a lot of innovative opportunities for customer needs satisfaction with added services. If health resort managers are to avoid mistakes that arise from a limited view of innovation opportunities in the present situation, then new, innovative and continuous improvement competitive health service forms must be identified and considered when developing future marketing strategies.

5.1 Limitations of the study

This study has some limitations that need to be taken into consideration when interpreting the results. First of all, employees and customers assessed both organizational effectiveness and customer service orientation. As a result, one cannot be certain that there was no common method variance. Secondly, only two health resorts in Slovenia were included in our sample. To assess the complete impact of the organizational effectiveness factors in health resorts, future research should include all health resorts in Slovenia.

5.2 Implications for future research

Despite these limitations, it is strongly believed that the findings of this study provide a platform for understanding the complexity of customer satisfaction in relation to organizational effectiveness. Our findings reveal that different groups positively have priority of different organizational factors. Future research should include groups of employees and customers that will assess the same services to detect the customer oriented organizational culture of health resorts.

6 Conclusions

Ensuring survival of the service organization in the long run requires adaptations which are oriented towards achieving maximum customer satisfaction. This study intended to unveil the effect organizational factors have on customer service orientation from the customer and employee point of view within a health resort service setting. The findings suggest that when trying to predict the impact which organizational effectiveness factors have in satisfying customers' needs, performance, adaptability and mission factors can be of the highest importance. Developing a culture which fosters customer satisfaction can provide a competitive advantage to the organization. It is thus critical for organizational agents not only to have a clear view of the existing culture but also to shape it in such a way that emphasizes customer needs and priorities.

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Organizacijska učinkovitost in zadovoljstvo kupca

V tem članku predstavljamo pomen součinkovanja med organizacijsko kulturo, ki predstavlja osrednji kazalec organizacijske učinkovitosti in zadovoljstvom kupca v dveh zdraviliščih v Sloveniji. Pri tem izhajamo iz podmene, da storitveni organizaciji dolgoročno uspešnost zagotavlja zlasti zadovoljstvo njenih kupcev. Namen naše študije je bil razkriti stališča zaposlenih in kupcev glede pomembnosti faktorjev organizacijske učinkovitosti pri posredovanju storitev v organizacijskem okolju dveh slovenskih zdravilišč.

Izidi študije kažejo, da na organizacijsko učinkovitost storitev v procesu zadovoljevanja potreb kupca v obeh zdraviliščih, najbolj vplivajo zmogljivost zaposlenih, prilagodljivost in poslanstvo zdravilišča. Zaposleni v zdraviliščih in kupci storitev v zdraviliščih so si enotni glede učinka zmogljivosti zaposlenih pri posredovanju storitve, kar pa ne velja za druge faktorje, kjer se stališča obeh skupin v študiji razlikujejo med seboj. Izidi študije tudi kažejo, da kupci in zaposleni zadovoljstvo s storitvijo povezujejo z zmogljivostjo zaposlenih zadovoljevanju potreb kupca in s poslanstvom zdravilišča, ki se izraža v dolgoročnem odnosu do kupca. Kupci v obeh zdraviliščih so najbolj zadovoljni s standardnimi in preskušeni storitvami, saj izidi študije kažejo, da inovacijski potencial, kot dimenzija organizacijske kulture zdravilišča, nima značilnega vpliva na zadovoljstvo kupca. Pri tem se stališča kupcev in zaposlenih razlikujejo glede na zdravilišče. Pomen naše študije je zlasti v ugotovitvi, da je učinkovita organizacija pomemben faktor zadovoljstva kupca še zlasti takrat, ko se zaposleni tega zavedajo in znajo in zmorejo zadovoljiti pričakovanja kupca.

Ključne besede: organizacijska učinkovitost, zadovoljstvo kupca, kompleksnost kupca, usmerjenost v storitve, preživetje, prilagodljivost

The Impact of Management Control Systems - Strategy Interaction on Performance Management: A Case Study

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We study the interaction between management control systems and strategy and its impact on organisational performance considering the way in which multiple aspects of control systems and dimensions of context combine in a variety of ways to enhance performance. Our purpose is to investigate the relationship among management control systems, strategy and organisational performance in a particular company. The contribution of this study is that it upgrades the existing theory in that it does not only establish a relationship between strategy and management control systems, but also considers how this relationship impacts on organisational performance. The study shows that the combination of performance-driven behaviour and regular use of management control systems leads to improved results. The second contribution of the study is that it incorporates a wider range of controls, including informal controls as being equally important as formal controls, to provide a more comprehensive analysis, as opposed to the majority of prior studies focusing on a more limited range of controls. In this way, this paper contributes to the literature in terms of examination of the broader components of management control systems than was previously done.

Key words: management control systems, strategy, levers of control, performance, performance management

1 Introduction

In the paper, we study the interaction between management control systems (MCS) and strategy and its impact on organisational performance from contingency theory point of view considering the way in which multiple aspects of control systems and dimensions of context combine in a variety of ways to enhance performance (see also: Chenhall and Langfield-Smith, 1998; Selto *et al.*, 1995). Contingency theory suggests that the design and use of MCS is influenced by certain factors which are internal (*e.g.* strategy) or external (*e.g.* environment) to the company (Hickson *et al.*, 1969; Lawrence and Lorsch, 1967; Woodward, 1965). The basic argument underlying contingency theory is that the organisation neither functions in isolation of the external environment (*i.e.* level of uncertainty may change) nor does it remain static or constant with respect to its internal environment, as for example, size or technology may change (Otley, 1980). As one or more of these factors change, they are likely to cause the company to redesign at least some aspects of its MCS.

We study management control from the Simons' (1995a, 1995b, 2000) four levers of control framework point of view (see: Appendix 1). The four levers of control consist of: diagnostic control systems; interactive control systems; beliefs systems and boundary systems. The Simons' (1995b) levers of control framework combine a focus on strategy with a wider view of the control mechanisms that can be utilised to implement strategy. Control of business strategy is achieved by integrating these four levers of control. The power of these levers in implementing strategy does not lie in how each is used individually, but rather in how they complement each other when used together. These four levers create tension between creative innovation and predictable goal movement. This tension requires managers of effective companies to know how to achieve both high degrees of learning (innovation) and high degrees of control (efficiency) (Simons, 2000).

In this paper, our purpose is to investigate the relationship among MCS, strategy and organisational performance in a particular company. In the study, MCS are defined broadly as systems conveying useful information to assist managers in their jobs and decision-making to effi-

ciently and effectively achieve the desired organisational goals (see also: Anthony and Govindarajan, 2001; Langfield-Smith, 1997; Otley, 1999). Hence, from this viewpoint and also taking into account the recent developments of MCS (see: Peljhan, 2005, 2007), the proposition is that the use of more comprehensive MCS practices and information results in improved company performance. The case study company is a large Slovenian manufacturing company, called Trimo Trebnje, d.d. (henceforth Trimo). The 1992 – 2004 period is investigated. Trimo has been for many years the leading Slovenian company for production and assembly of pre-fabricated steel constructions, and one of the most important European manufacturers of pre-fabricated buildings and living containers. Trimo is a Slovenia-based company achieving its business vision of becoming the leading European company offering complete solutions in the area of steel buildings.

The paper is divided into six sections. Section 1 is the introduction. Section 2 presents the literature review regarding the research area of the paper. Section 3 is the methodological section, introducing case study research method used in the study. The research results are presented in section 4. Further discussion and interpretation of the research results then follows in section 5. A final chapter concludes the paper, summarising the findings and introducing avenues for future research.

2 Literature review

Management control systems are both affected by and affect the strategy process itself (Langfield-Smith, 1997; Simons, 1995b). So far, a significant body of literature has explored the effects of strategy on MCS and, to a lesser extent, the effects of MCS on strategy (Dent, 1990; Langfield-Smith, 1997; Shields, 1997). A first line of research has emphasised the effects of strategy on MCS. The concept of strategy has been generally examined at a strategic-choice level, *e.g.* cost leadership *vs.* differentiation (see: Govindarajan, 1988; Govindarajan and Fisher, 1990) and prospector *vs.* defender (see: Hoque, 2004; Simons, 1987a). These conceptualisations generally take strategy as a given. In these studies, MCS are considered for the most part to be strategy-implementation systems and the last step in the strategic management process (Henri, 2006). This conceptualisation of MCS follows a structural approach whereby the perspective is static and the focus is placed on such issues as the presence or absence of specific systems, their technical properties and their design (Chapman, 1997, 1998).

A second line of research has emphasised the effects of MCS on strategy. Mostly, the concept of strategy has also been examined at a strategic-choice level (see: Abernethy and Brownell, 1999; Chenhall, 2005, Chenhall and Langfield-Smith, 2003; Marginson, 2002). These conceptualisations consider strategy as being influenced by MCS. In these studies, the role of MCS in the formulation of strategy is recognised as well as their continuous implication during strategic management process. This conceptualisation of MCS follows a processual approach whereby the

perspective is dynamic and the focus is on such issues as the dialogue and interaction surrounding the use of MCS (Chapman, 1997, 1998).

Strategy plays a key role within MCS, yet this role is not fully understood, although a growing body of literature has examined the impact of strategy on MCS (for a review see: Langfield-Smith, 1997). Langfield-Smith (1997) suggests that MCS have to be tailored explicitly to support the strategy of the business to lead to competitive advantage and superior performance. Underlying most accounting research is the assumption that MCS contribute to the successful operation and profitability of the company. Also, there is evidence (Govindarajan, 1988) that high organisational performance results from the matching of an organisation's environment, strategy and internal structures and systems. Miles and Snow (1978) suggest that the strategy choice the company makes will affect its MCS, meaning that different types of organisational plans and strategies will tend to cause different control system configurations. Moreover, scholars (Hope and Hope, 1995; Whittington, 1995) suggest that there is an important link between strategy and MCS and that a congruent match of the two variables is essential to performance.

There are several frameworks that show how companies react in a changing competitive environment (see: Peljhan, 2005). Classifications of Miles and Snow (1978) and Porter (1980) appear to be referred to most in the literature. The typology developed by Miles and Snow (1978) is based on how companies respond to a changing environment and align environment with their company. They identified generic strategies which they labelled defender, prospector, analyser and reactor, where defender and prospector are assumed to be at the ends of the continuum. Miles and Snow (1978) argue that defenders will emphasise cost control, trend monitoring and efficiency rather than scanning the environment for new opportunities. Prospectors, by contrast, will use comprehensive planning and measure performance more subjectively. Considering that many contemporary MCS techniques (*e.g.* BSC, informal controls) appear to be better equipped for dealing with the information requirements of highly innovative companies, we postulate that defenders use contemporary MCS techniques to a lesser extent than prospectors. We argue that what is ignored by much of the past research is the potential for MCS to be used much more actively as a tool for formulating and implementing changes in strategic direction. Therefore, we will use an in-depth longitudinal case study to explore and explain this, at the moment insufficiently researched area, of how companies use MCS to facilitate and support the strategic change process in more detail.

3 Methodology

In our study, we have followed a case study methodology (Eisenhardt, 1989; Yin, 2003) as the strength of this method is the likelihood of it resulting in a new or upgraded theory (Eisenhardt, 1989). Case studies were undertaken in the past to investigate the role of the MCS in suppor-

ting and influencing the strategic processes within companies (see: Simons, 1990). Chenhall (2003) argues that the generation of propositions concerning novel relationships concerning MCS, processes and their contextual setting are often best identified and elaborated by using case study methods. Moreover, Henri (2006) indicates that qualitative methodologies would be particularly useful to provide further explanations and new insights into issues concerning relationships between MCS and strategy. This is also one of the reasons we decided to use an in-depth explanatory case study method to investigate the relationship between MCS and strategy.

The in-depth explanatory case study enables generation of exhaustive data on the use of MCS to yield much more insightful theories to be further the basis for the learning of other companies. Furthermore, the goal is to build a new theory or to upgrade the existing one based on the empirical findings. New or upgraded theory is the starting-point for further organisational learning (of other companies). Thus, case-based study results do not lead to "practice from practice" learning but foster "practice from theory (built or re-built on practical experiences)" learning. It is important not to uncritically accept all practice as appropriate, but to carefully document the observed affects of different practices in different circumstances. Ittner and Larcker (2002) argue that field-based research may be the only way to truly understand the antecedents and consequences of management accounting practices. What practice-oriented research can contribute is the ability to refine the theories and empirical tests based on acquired knowledge.¹

When undertaking the case study, multiple sources of evidence were used. Therefore, data was gathered from formal and semi-formal interviews and observations during site visits and through the participation in Trimo's strategic conferences, from the study of internal and external documents and from professional literature. This enabled us a systematic and comprehensive analysis. Data on Trimo's MCS were collected from various sources, including interviews with top and middle managers, company documents and archival records. The use of multiple sources of evidence enabled verification through triangulation, which is the strength of case research (Noda and Bower, 1996). A major concern of the present study was to triangulate managers' views and opinions with "harder" evidence, such as that obtained from documents and archival records. An interview protocol² ensured that the same themes were covered with each interviewee. Construct validity of the interview data was pursued through an "action-research" approach. Eden and Huxham (2002) have argued that an action research setting increases the

possibility of being able to access respondents "theory-in-use", which in itself aids validity in this type of research.

The questionnaire used and the semi-structured interviews were carefully constructed and contained questions to elicit information required to investigate research question and as such, it is assumed that construct validity is high. To avoid possible misunderstandings, respondents (top managers) were provided with descriptions of four levers of control from Simons' (1995b) definitions, translated into Slovene. A particular control system was deemed to exert a particular influence only if this effect could be traced to at least three-quarters of respondents. Interview data were continually cross-referenced with other data sources and cross-checked with the chronology of activities and events that took place during the course of the study. This form of triangulation enhanced the internal validity and reliability of the case study material. Finally, a draft research report was prepared and sent to all interviewees for comment. These were evaluated in order to ensure that reported ideas and propositions aligned with managers' experiences. This increased the construct validity of our research (*cf.* Atkinson and Shaffir, 1998; Yin, 2003).

4 Results

Trimo's history begun in 1961 when the company "*Kovinsko podjetje Trebnje*" was founded, as socially-owned enterprise. The next year saw the beginning of another new company, this one called "*Kovinooprema*". In 1971, both companies and some smaller companies merged to form "*Trimo Trebnje*". The main activity of the new company was production of metal elements and equipment made of stainless steel. In the following years, the former Yugoslavia and third world countries had many infrastructure and other projects, creating a high demand for Trimo's products. The 1980s, however, brought crises in the export markets and the company faced its first major challenge. It responded with the modernisation of the production line and the introduction of new fireproof products.³ For a short time it seemed that the company overcame its problems but in 1991 Slovenia became independent and the former multiethnic state of Yugoslavia fell apart. As Trimo lost the majority of its domestic (former federal) market it had to suddenly re-orientate towards more competitive foreign markets, especially in the European Union, and the emerging Central and Eastern European markets (see: Šević, 2005).

¹ As case-based method is not so widely used in Slovenia as a survey method, it has to be emphasised that the notion of external validity for case methodology relates to the generalisability of the results to the underlying theory. Therefore, case studies are generalisable to theoretical propositions and not to populations. In this sense, the case study, like experiments, does not represent a sample. Hence, the study's goal was to expand and generalise theories (i.e. analytical generalisation).

² The interview protocol is not included in the paper due to its length. If required it can be provided by the author.

³ Before modernisation, Trimo used polyurethane as the filling for the building panels. After modernisation, they have used environmentally friendlier fireproof mineral wool that enables them to penetrate to more demanding markets.

As Trimo encountered many problems at the beginning of the 1990s, a true company turnaround was needed and that also meant the need for a new vision and a different approach to developing and implementing business strategy. The major turnaround of the company was achieved in 1992 when new top management was appointed. Today, Trimo is a joint-stock company with €44,100 value added per employee, internationally-oriented with 74 per cent of exports, mainly in Europe, operating in 50 countries (Trimo, 2006). Their main products include pre-fabricated steel buildings, steel structures, façades, roofs, containers and sound-isolating systems. Trimo's main product is called "complete solutions" and includes a mix of all the products and services Trimo offers, from an idea and draft to the finished building. When looking into Trimo's production programme, there is no similar company in Slovenia. Trimo is the market leader in the area of roofs and façades from mineral wool panels in west and central Europe and in the area of steel constructions in Slovenia (Kranjec, 2003). With its business orientation towards offering complete solutions and with a broad production programme, Trimo cannot be directly compared to any of its competitors that are all manufacturers with relatively focused production programmes (Trimo, 2005c). Trimo builds its strategy of long-term growth of the company on internationalisation (Trimo, 2004). As a result of a successfully implemented turnaround, Trimo has made significant improvements in the way it runs its business that results in the performance increasing year by year. In the period from 1992 to 2004 revenues and value added per employee grew seven times, export grew eight times and the number of employees decreased by 21 per cent (Trimo, 2005a).

In the early 1990s Trimo pursued a defender strategy (Trimo 2005c) as defined by Miles and Snow (1978). It was a company with a relatively narrow production-oriented business scope. They paid primary attention to improving the efficiency of their existing operations and offered more limited products than competitors, and competed especially through costs. They engaged in little product and market development. At the beginning of the turnaround, the company looked at the fundamental question: "What are we really about? – the essence of Trimo", as they strived to set up their vision, mission and strategy in 1993. Today, the emphasis is on the learning organisation. Mission of the company is to facilitate original and complete solutions in the area of steel buildings. The mission reflects itself in the following stakeholder approach directions:

- To assure customers an increase in effectiveness by successful accomplishment of solutions.
- To develop the potentials of each individual within the company.
- To build a financially strong company that delivers adequate ROE growth of the company to the shareholders.
- To be sensitive to the environment and aware of the need to protect it for future generations and to support different social and environmental activities.

On the other hand, in the second half of 1990s, especially since 1998, Trimo has begun to pursue a prospector strategy, continually searching for market opportunities, and regularly experimenting with potential responses to emerging environmental trends. They have become strongly focused on product and market development, but still considering costs as prices of their inputs, especially raw materials, vary a lot. Trimo's strategy can be characterised as differentiation strategy focusing on creating a product or service that is perceived by customers as something unique. When Trimo was in defender stage, it used control systems less intensively than in prospector stage, when they attach a great deal of importance to forecast data in control systems, setting tight budget goals, and monitoring outputs carefully.

In 1998, Trimo achieved the breakthrough in its internationalisation (see: Peljhan, 2005) causing the business to expand. They stated a new vision in 1998 very ambitiously: "To become the leading producer of pre-fabricated buildings in Europe by 2010". In 2001, they redefined it even more ambitiously to "...become the leading European company offering complete solutions in the area of steel buildings". From 2001, the product that differentiates Trimo from its competitors has been called "complete solutions" that Trimo provides to its customers. Although Trimo is a manufacturing company, services (design, projecting, technical service) play very important part in providing the complete solution to their customers. In 2002, Trimo's decision to transform itself from a simple (production) company to the highly technological and engineering company began to show results. The share of low-educated employees has been falling, while the share of the highly educated people has been rising. In 2002, each employee had around 50 hours of education and training. Further, in 2002, Trimo started to implement Balanced Scorecard (BSC) and upgraded Total Quality Management (TQM) programme, which has been the important part of strategic directions of the company from 1992 on. The main novelty was introduction of "Key Files" as the tool they use for facilitating process improvements. Annually, they invest around 3 per cent of revenues in new products' development. In 2003, Trimo launched a new production line for fireproof façade panels to expand the existing selection of façade panels with a new environmentally-friendly product. In 2004, European Foundation for Quality Management (EFQM) recognised Trimo for excellence. Also in 2004, production capacities were increased and production flexibility improved to accommodate the enormous product range, which prompted the construction of a new warehouse for raw materials.

There was a huge effect of strategic change on the decision context in Trimo. The change process created a context where decision-making by top management became increasingly complex and unpredictable as new opportunities altered strategic objectives and changed the priorities placed on those objectives. Abernethy and Brownell (1999) argue that in this situation, top management redefines goals and objectives. This can create a level of uncertainty or ambiguity for subordinates as to the prio-

rities or preferences on which to focus their attention. In addition, the technological and production changes associated with changes in product mix and with new product development, required that new routines be learnt. As Galbraith (1973) notes, these conditions impose additional demands on the organisation's information processing capabilities. That also was the case in Trimo.

At 2005 Strategic Conference, the Managing Director briefly sketched the company's background examining the turnaround of Trimo from 1992 to the present. The basic business concepts of continuous improvement, quality, and customer satisfaction were the key strategies' components for the company's turnaround. The drivers of change for renewal from 1992 on were manufacturing excellence (e.g. productivity and flexibility), responsive product development - the result of an all-pervasive close to the customer philosophy - and extensive "building" of sales network. Trimo's turnaround is a result of the following (Trimo, 2004; 2005d): dedication of each employee to the continuous improvement of the business; development of the highest quality product possible; and the improvement of both internal and external relationships to maintain customer satisfaction. These are simple principles, the most significant of which is each employee's dedication to the concept of continuous improvement, because it is the foundation for other two concepts. Dedication to continuous improvement means never being satisfied with the status quo. It means working every day to improve upon the prior day's performance.

To summarise, key elements of the Trimo's transformation process from 1992 on were the clear vision and business strategy set at the beginning. This vision and strategy have been successfully communicated to all employees. Clearly defined values and norms as building blocks of Trimo's organisational culture helped to shape employee behaviour to fit the new business philosophy of customer orientation, continuous improvements and TQM. The formalised processes of continuous improvements, TQM key files, and care for company property gave employees clear tasks and responsibilities. Consecutive strategic change following the successful turnaround was a change from defender to prospector strategy (see: Miles and Snow, 1978). On the contrary, when turnaround would be unsuccessful, it would manifest itself in a strong resistance to change that was not the case in Trimo. As changes usually induce rational and emotional reactions due to ambiguity felt by participants of the change process, Trimo could not avoid problems of resistance to changes, especially at the beginning (1992-1995) when employees wondered why they need to change the old way of doing things if they all knew the processes very well. Top management has managed to spread the need to change through constant communication and employee training. This awareness of the need to change is the necessary condition for a successful implementation of changes (Kotter, 1996).

In Trimo, they monitor the achievement of strategic goals every six months, while the implementation of annual plans is controlled weekly. Corrective measures are taken as soon as negative deviations are reported.

Employees are informed about the company's results in weekly or bi-weekly departmental meetings, in weekly newsletter (on one page), in quarterly company's magazine, and at annual education days where the Managing Director (MD) presents last years' results and future plans. Trimo modifies its strategy according to the changes in its business environment. They have very good experience with flexible actions as they managed to continually reach or even exceed short- and long-term goals in the last decade. They remain focused on their customers' needs.

Critical success factors that have to be addressed for achieving competitive advantage are people, customers, value added, and environment. These factors are considered in the company as follows (Trimo, 2002):

- *People*: Employees are the key strength of Trimo. Company's power depends on the management and all employees. Values are team work, goal orientation, creativeness, innovativeness, and individual talents.
- *Customers*: Enthusiastic and satisfied customer is the measure of company success. Trimo develops and improves original and complete product and service solutions for its customers.
- *Value added*: Profit and value added growth and cash flow available enable quicker company development.
- *Environment*: They take care of orderly factory and are friendly to their environment. Employees' health is the value accomplished by the healthy way of living.

Trimo began implementing strategic performance management in the prospector period when it realised the importance of aligning all levers of control in the company, so what is critical to the company's success is regularly evaluated and rewarded by using key performance indicators (KPIs). KPIs are used by top management to monitor organisational performance in key strategic areas, as defined by key processes in the company. There are 62 KPIs (cf. Peljhan, 2005). 28 of them are included in BSC. In Trimo, managers consider KPIs once a week at the Management board meeting. In diagnostic control, managers use management-by-exception approach when discussing the reports at the weekly Management board meetings. As Quality Assurance Director (Trimo, 2005b) says: "*Reports contain explanations for KPIs variances and whether they present problems or not*". Only problems (i.e. deviations) are discussed and appropriate actions taken. That the changes trigger revised action plans is reflected in the following Quality Assurance Director statement (Trimo, 2005b): "*In the weekly meetings in which we discuss KPI for each organisational unit (sector) specific decisions are made about what actions we have to take in case of deviations*". Based on observations, we argue that they have been using strategic performance management system quite systematically from 2002 on. In the following years, they will enhance the capabilities of their system by upgrading it to ERP system enabling them to monitor key performance information in real time. Trimo's main performance indicator is value added per employee. This

clearly shows that Trimo is focused on its future development and growth.

Trimo uses balanced measurement systems as a means of communicating to their employees what is important and where the business is heading. Performance measurement systems assist managers in tracking the implementation of business strategy by comparing actual results against strategic goals and objectives (*cf.* Simons, 2000). They use BSC from 2002, although they have measured their performance from financial and non-financial perspective before. At the moment, they are striving to form efficient functional BSCs. They want to focus especially on reducing the number of measures they are currently using. Although the system is well organised, it hasn't yet received the full "buy-in" of some managers as they are still using parallel systems designed in the past. As this is maybe allowed in "transition" period of applying new performance measurement systems, it must not be tolerated when new ERP system will be completely implemented.

One of the major conclusions with regard to Trimo's strategy is that MD's leadership style is a very important determinant of Trimo's successful implementation of the strategy. She is very charismatic and capable of mobilising employees towards achieving common goals. In literature, there are discussions about different types of leaders. When looking into the classification that distinguishes transactional and transformational leadership styles (*e.g.* Bass and Avolio, 1994; Tracey and Hinkin, 1998; Tucker and Russell, 2004), we conclude that she is a true transformational leader with the following characteristics:

- She is a leader of innovation.
- She creates new pathways in an organisation.
- She motivates people to work for a new and greater good and to create change. She appeals to higher motivation and adds to the quality of life in the people and the organisation. She uses authority and power to inspire and motivate people to trust and follow her example.
- She has energy-producing characteristics that generate new changes for the organisation.
- She formulates an inspiring vision, facilitates the vision, encourages short-term sacrifices, and makes pursuing the vision a fulfilling venture.

MD's characteristics of transformational leader were essential in the period of strategic change from defender to prospector strategy. She as a transformational leader (and of course by the help of whole top management team) managed to alter the existing structure of early 1990s and influenced people to buy into a new vision and new possibilities. Based on observations it is concluded that her primary focus since 1992, when she took a managing director position, has been to create a change process continually causing people within the organisation to learn and grow. She builds shared vision and goals and implements them through teamwork and high commitment. Trimo's management believes that fast and open flow of information, ideas and efficient problem-solving are of key importance in order to follow new trends in business and for implementing all the necessary chan-

ges. In order to do that, employees had to change their approach and accept teamwork principles. These principles are used both in managing the company and in actual execution of work.

Information and knowledge from management is transferred to co-workers at weekly meetings. From there information and knowledge is transferred to different work areas and to other employees. This kind of organisational structure also enables different forms of group work. Teamwork also allows for a better specification of the problems and their faster solving. Most of the Trimo's practices are congruent with those usually described at prevailing best practices: extensive training and communication, decentralised decision making, teamwork and employee involvement in problem-solving, as well as high job security and fair compensation. These practices help Trimo to build their competitiveness through people which is also the underlying principle of Trimo's organisational culture. As such, their approach is difficult to imitate and thus presents a true sustainable source of competitive advantage.

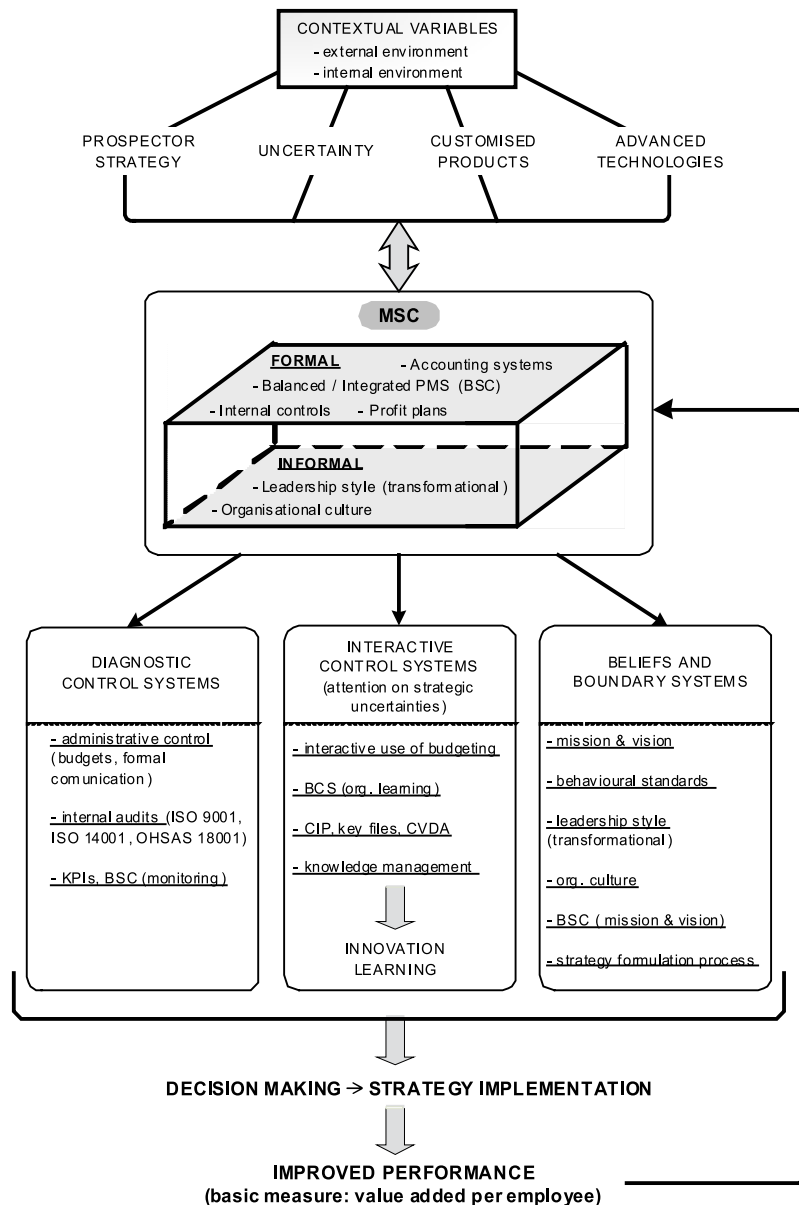
5 Discussion

When looking the whole 1992-2004 period, the study's results suggest that Trimo's strategic change from defender to prospector resulted in improved organisational outcomes, as they responded to changed business conditions by altering structural arrangements within the organisation. The present study tested the intervening role of the use of comprehensive MCS between strategy and performance in Trimo during 1992-2004 period. More specifically, the study looked at how the relationship between the strategy moving from defender to prospector and the use of comprehensive MCS evolved during the researched period. It was found that strategy change had a positive relation to Trimo's performance. In addition, as discussed above, strategy change has had a positive relation also to the use of MCS. Trimo has been growth-oriented in the whole researched period (and still is). Also, it has been increasing the usage of more comprehensive MCS practices year by year.

Trimo measures its performance with respect to the key elements of its strategy. Therefore, it uses strategic performance management system (*cf.* Kaplan and Norton, 2001; Simons, 2000). Based on observations, it is argued that they have been using such a system quite systematically from 2002 on. Furthermore, they have enhanced the capabilities of their system by upgrading it to ERP system enabling them to monitor key performance information in real time. Trimo's main performance indicator is value added per employee. This clearly shows that Trimo is focused on its future development and growth. Trimo uses balanced measurement systems as a means of communicating to their employees what is important and where the business is heading. Performance measurement systems assist managers in tracking the implementation of business strategy by comparing actual results against strategic goals and objectives (*cf.* Simons, 2000).

To conclude the discussion chapter, the basic components of the refinement of the existing theory on implications of MCS for organisational performance management are presented (see: Figure 1). The in-depth explanatory case study method has enabled generation of exhaustive data on the use of MCS to upgrade the existing

theories. The upgraded theory is the starting-point for further organisational learning (of other companies) enabling “practice from refined theory” learning. This study has carefully documented the observed affects of different practices in different circumstances.



Legend:

Abbreviation	Meaning
BSC	Balanced Scorecard
CIP	Continuous Improvement Process
CVDA	Cost-Value Driver Analysis
KPI	Key Performance Indicator
MCS	Management Control System(s)
PMS	Performance Measurement System(s)

Figure 1: Implications of MCS for organisational performance management in Trimco

Considering the diffusion of the use of MCS in Trimco, the conclusion is drawn that this company does not fit in the frames of recent research results in Slovenian companies that traditional management tools are dominating the more recently developed and more strategic-oriented practices (e.g. Peljhan *et al.*, 2005; Tekavčič and Peljhan, 2003). Also, when considering the 1992-2004 period, the trend seems to be towards increasing use of the latter type. The findings of the present study indicate that Trimco systematically uses comprehensive MCS information and practices. Trimco began implementing strategic performance management in the prospector period when it realised the importance of aligning all levers of control in the company, so what is critical to the company's success is regularly evaluated and rewarded by using KPIs. Hence, in the discussion of theory refinement proposals we focus on companies pursuing prospector strategy orientation, operating in uncertain environment, producing innovative customised products with advanced technologies; all these characterise today's complex business environment.

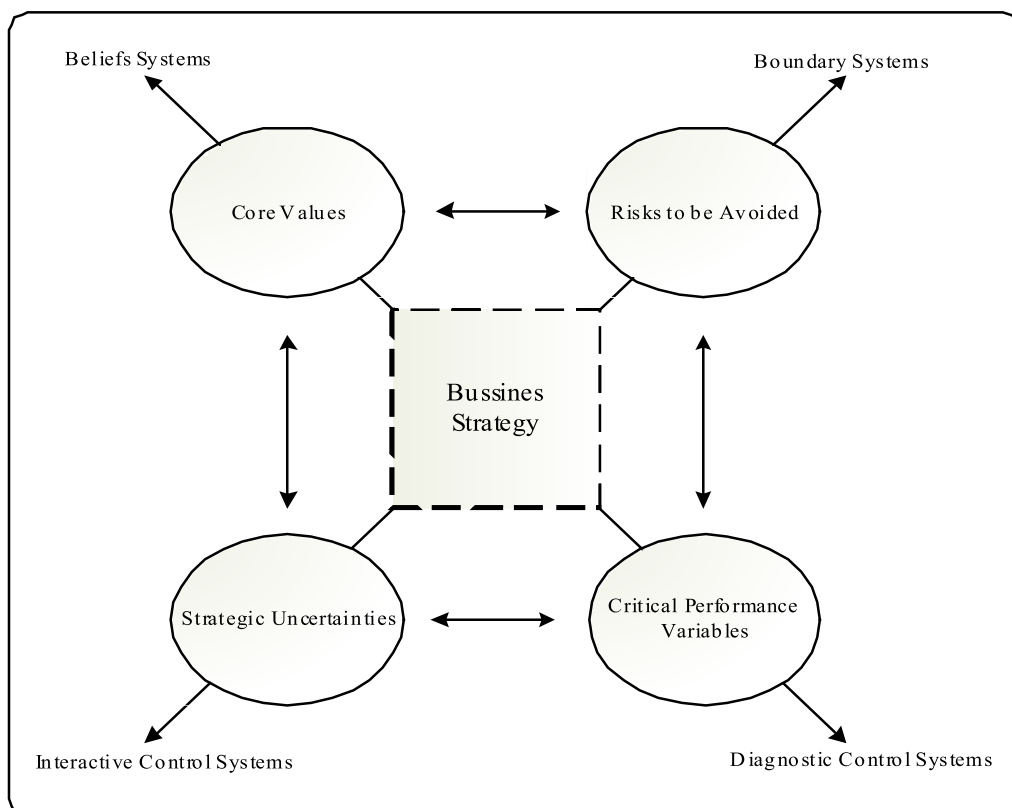
First, this study upgrades the existing theory in that it not just establishes a relationship between contextual and MCS variables, but also considers how this relationship impacts on organisational performance. It is argued that managers and other employees need to display performance-driven behaviour (*i.e.* goal-oriented behaviour) for efficient and effective management control to be achieved. This research shows that the combination of

performance-driven behaviour and regular use of MCS leads to improved results. We identified factors that influence positively performance-driven behaviour and can be used also by other companies (for more details on this see Peljhan, 2005).

Second, research in accounting has paid much attention to the role of MCS to emphasise control and, to a lesser extent, to stress flexibility. To date, most of the empirical research has focused on issues related to the diversity of measurement (*i.e.* the use of broad set of financial and non-financial measures) and has overlooked the use of MCS as a whole. Therefore, this study fills this void as it considers the importance of holistic use of formal and informal MCS that make cause-and-effect relationships transparent and keep managers from sub-optimising by improving one measure at the expense of others.

Third, one of our important research conclusions for further refinement of the theory is that organisational culture has been overlooked in recent MCS studies. We would like to emphasize that elements of culture are considered as informal controls which act as a starting point for the design and use of formal control systems. This study concludes that control systems are material artefacts or pattern behaviour influenced by the underlying value structure that creates meaning in the organisation. Therefore, this study argues, that current MCS theory has to be refined in considering more informal controls, like organisational culture and leadership style, as catalysts of

Appendix 1: Four Levers of Control



Source: Simons 1995a.

efficient formal controls. Implications of MCS for organisational performance management can be properly explored and explained only when paying regard to both, formal and informal controls.

6 Conclusion

Ideally, the role of strategy is dynamic, involving managers in continually assessing the way combinations of environmental conditions, technologies and structures enhance performance. This study's conclusion is that MCS influence the implementation and monitoring of strategies, providing feedback for learning and information to be used interactively to formulate strategy further. Few studies in MCS have investigated these issues (see: Simons, 1987b, 1991, 1994), rather, most have been restricted to identifying MCS that are appropriate for different strategic models (Chenhall, 2003). Therefore, the findings of the paper fill this void. The important contribution of this study is that it upgrades the existing theory in that it does not only establish a relationship between strategy and MCS, but also considers how this relationship impacts on organisational performance. The study shows that the combination of performance-driven behaviour and regular use of MCS leads to improved results.

The second contribution of the study is that it incorporates a wider range of controls, including informal controls (e.g. organisational culture, leadership style) as being equally important as formal controls (e.g. accounting systems, BSC, profit plans, internal controls), to provide a more comprehensive analysis, as opposed to the majority of prior contingency studies focusing on a more limited range of controls. In this way, this paper contributes to the literature in terms of examination of the broader components of MCS than was previously done.

Consistent with the research design and methodology, the scope of this research is limited in the following respects. First, one of the problems in writing this paper was deciding where to draw the boundaries among different disciplines (i.e. accounting, general and strategic management, HRM, manufacturing and operations management, marketing, and organisational behaviour) as the area of MCS represents an important and wide-ranging topic. Second, only one company was studied due to depth and breath of the research project. Third, both the industry and site were selected based on the preset criteria for selection (see: Peljhan, 2005). Directions for future research stem from the paper's findings as well as from missed opportunities that indicate opportunities for future research. It would be worthwhile to conduct a longitudinal study on a wider sample of companies to study how and why they change their strategic orientation and the use of MCS and how this has impacted their decision-making, actions and performance management. This study can combine case-study as well as survey methods. The role of the present study is that it provides an impetus for future researchers to address these issues and to move beyond existing models of control.

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Vpliv vzajemnega delovanja managerskih sistemov nadzora in strategije na obvladovanje uspešnosti poslovanja: študija primera

V prispevku proučujemo medsebojno delovanje managerskih sistemov nadzora in strategije ter njegov vpliv na uspešnost poslovanja. Naš namen je raziskati odnos med managerskimi sistemi nadzora, strategijo in uspešnostjo poslovanja v izbranem slovenskem podjetju. Prispevek pričujoče raziskave je v tem, da nadgrajuje obstoječo teorijo, ker se ne osredotoča le na proučevanje odnosa med stategijo in managerskimi sistemi nadzora pač pa upošteva tudi vpliv tega odnosa na uspešnost poslovanja podjetja. Ugotovili smo, da kombinacija ciljno usmerjenega vedenja ter redne uporabe managerskih sistemov nadzora vodi do boljših poslovnih rezultatov. Drugi prispevek raziskave je v tem, da vključuje širok nabor kontrolnih mehanizmov, saj upošteva tudi neformalne oblike nadzora kot enakovredne formalnim. S tem omogoča celovitejšo analizo kot prejšnje raziskave s tega področja, ki so se osredotočile na bolj omejen nabor kontrolnih mehanizmov (predvsem formalnih). Na ta način članek nadgrajuje obstoječo literaturo s področja proučevanja managerskih sistemov nadzora.

Ključne besede: managerski sistemi nadzora, strategija, vzvodi nadzora, uspešnost poslovanja, obvladovanje uspešnosti poslovanja

Organization in Finance Prepared by Organization in Finance Prepared by Stochastic Differential Equations with Additive and Nonlinear Models and Continuous Optimization

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A central element in organization of financial means by a person, a company or societal group consists in the constitution, analysis and optimization of portfolios. This requests the time-depending modeling of processes. Likewise many processes in nature, technology and economy, financial processes suffer from stochastic fluctuations. Therefore, we consider stochastic differential equations (Kloeden, Platen and Schurz, 1994) since in reality, especially, in the financial sector, many processes are affected with noise. As a drawback, these equations are hard to represent by a computer and hard to resolve. In our paper, we express them in simplified manner of approximation by both a discretization and additive models based on splines. Our parameter estimation refers to the linearly involved spline coefficients as prepared in (Taylan and Weber, 2007) and the partially nonlinearly involved probabilistic parameters. We construct a penalized residual sum of square for this model and face occurring nonlinearities by Gauss-Newton's and Levenberg-Marquardt's method on determining the iteration step. We also investigate when the related minimization program can be written as a Tikhonov regularization problem (sometimes called ridge regression), and we treat it using continuous optimization techniques. In particular, we prepare access to the elegant framework of conic quadratic programming. These convex optimization problems are very well-structured, herewith resembling linear programs and, hence, permitting the use of interior point methods (Nesterov and Nemirovskii, 1993).

Key words: Stochastic Differential Equations, Regression, Statistical Learning, Parameter Estimation, Splines, Gauss-Newton Method, Levenberg-Marquardt's method, Smoothing, Stability, Penalty Methods, Tikhonov Regularization, Continuous Optimization, Conic Quadratic Programming.

1 Introduction

This paper is devoted to a modeling of financial processes which may serve as a basis of analysis and structural investigation. An important expression of this structure, the composition of its parts - its *organization* of financial assets - is called *portfolio* consisting of securities such as bonds, stocks, certificates, etc.. The organization of this portfolio requests pricing, hedging, optimization and optimal control. Those processes are on single assets and price processes, and on larger portfolios as well. The present study focusses on the first part of this modeling called regression, especially, parameter estimation.

Real-world data from the financial sector and science are often characterized by their great number and by a high variation. At the same time, the data need to become well understood and they have to serve as the basis of future prediction. Both the real situation and the practical requests are hard to balance (Hastie, Tibshirani and Friedman, 2001; Taylan and Weber, 2007; Taylan, Weber and Beck, 2007).

In fact, related mathematical modeling faces with non-differentiability and a high sensitivity of the model with respect to slightest perturbations of the data. Our paper analyzes this challenge by discussing and elaborating the corresponding parameter estimation problem by means of Tikhonov regularization, conic quadratic programming

and nonlinear regression methods. Herewith, we offer an alternative view and approach to stochastic differential equations (SDEs), and we invite to future research and practical applications. As a preparation, we firstly introduce into our methodology of statistical learning entitled *additive models*, which we will then exploit systematically. Indeed, we will apply them to SDEs, using modern methods of regularization and optimization. We shall address both the linear and the nonlinear case of parameter estimation. By this we develop and improve the results made in (Taylan and Weber, 2007).

2 Classical Additive Models

Regression models are very important in many applied areas, the *additive model* (Buja, Hastie and Tibshirani, 1989) is one of them. These models estimate an additive approximation of the multivariate regression function. For N observations on a response (or dependent) variable Y , denoted by $\mathbf{y} = (y_1, y_2, \dots, y_n)^T$ measured at N design vector $\mathbf{x}_i = (x_{i1}, x_{i2}, \dots, x_{im})^T$, the additive model is defined by

$$(2.1) \quad Y = \beta_0 + \sum_{j=1}^m f_j(X_j) + \varepsilon,$$

where the errors ε are independent of the factors, X_j , $E(\varepsilon) = 0$ and $\text{Var}(\varepsilon) = \sigma^2$. Here, the functions f_j are arbitrary unknown, univariate functions, they are mostly considered to be splines and we denote the estimates by \hat{f}_j . The standard convention consists in assuming at X_j that $E(f_j(X_j)) = 0$, since otherwise there will be a free constant in each of the functions (Hastie, Tibshirani and Friedman, 2001); all such constants are summarized by the intercept (bias) β_0 .

1.1 Estimation Equations for Additive Model

Additive models have a strong motivation as a useful data analytic tool. Each function is estimated by an algorithm proposed by (Friedman and Stuetzle, 1981) and called *backfitting* (or *Gauss-Seidel algorithm*). As our estimator for β_0 , the mean of the response variable Y is used: $\hat{\beta}_0 = E(Y)$. This procedure depends on the partial residual against X_j :

$$(2.2) \quad r_j = Y - \beta_0 - \sum_{k \neq j} f_k(X_k),$$

and it consists of estimating each smooth function by holding all the other ones fixed. Then, $E(r_j | X_j) = f_j(X_j)$ which minimizes $E\left(Y - \beta_0 - \sum_{j=1}^m f_j(X_j)\right)^2$ (Friedman and Stuetzle, 1981; Hastie and Tibshirani, 1987).

3 Stochastic Differential Equations

3.1 Definition (Stochastic Differential Equations)

Many phenomena in nature, technology and economy are modelled by means of a deterministic differential equation with initial value $x_0 \in \mathbb{R}$:

$$\begin{cases} \dot{x} \quad (:= dx/dt) = a(x, t), \\ x(0) = x_0. \end{cases}$$

But this type of modeling omits stochastic fluctuations and is not appropriate for, e.g., stock prices. To consider stochastic movements, *stochastic differential equation (SDE)* are used since they arise in modeling many phenomena, such as random dynamics in the physical, biological and social sciences, in engineering and economy. Solutions of these equations are often diffusion processes and, hence, they are connected to the subject of partial differential equations. We try to find a solution for these equations by an *additive* approximation (cf. Section 2), which is very famous in the statistical area, using spline functions.

Typically, a *stochastic differential equation*, equipped with an initial value, is given by

$$(3.1) \quad \begin{cases} \dot{X}(t) = a(X, t) + b(X, t)\delta_t & (t \in [0, \infty)), \\ X(0) = x_0, \end{cases}$$

where a is the deterministic part, $b\delta_t$ is the stochastic part, and δ_t denotes a generalized stochastic process (Kloeden, Platen and Schurz, 1994; Øksendal, 2003).

An example of a generalized stochastic processes is white noise. For a generalized stochastic processes, derivatives of any order can be defined. Suppose that W_t is a generalized version of a Wiener process which is used to model the motion of stock prices, which instantly responds to the numerous upcoming informations. A one-dimensional Wiener process (or a Brownian motion) is a time continuous process with the following properties.

1. $W_0 = 0$, with probability one.
2. $W_t \sim N(0, t)$ for all $t \in (0 \leq t \leq T)$, that is, for each t the random variable W_t is normally distributed with mean $E[W_t] = 0$ and variance $\text{Var}[W_t] = E[W_t^2] = t$.
3. All increments $\Delta W_t := W_{t+\Delta t} - W_t$ on nonoverlapping time intervals are independent. That is, the displacements $W_{t_2} - W_{t_1}$ and $W_{t_4} - W_{t_3}$ are independent for all $0 \leq t_1 < t_2 \leq t_3 < t_4$.

We note that a multi-dimensional Wiener processes can be similarly defined. Usually a Wiener process is differentiable almost nowhere. To obtain our approximate and, then, smoothed model, we treat W_t as if it was differentiable (a first approach which is widespread in literature). Then, white noise δ_t is defined as $\delta_t = \dot{W}_t = dW_t/dt$ and a Wiener process can be obtained by smoothing the white

noise. If we replace $\delta_t dt$ by dW_t in equation (3.1), then, this *stochastic differential equation* can be rewritten as

$$(3.2) \quad dX_t = a(X_t, t)dt + b(X_t, t)dW_t,$$

where $a(X_t, t)$ and $b(X_t, t)$ are drift and diffusion term, respectively, and X_t is a solution which we try to find based on the experimental data. Equation (3.2) is called **Itô SDE**. Here we want to simulate values of X_t , since we do not know its distribution. For this reason, we simulate a *discretized* version of the SDE.

3.2 Discretization of SDE

There are a number of discretization schemes available; we choose the **Milstein scheme**. Then, we represent an approximation \hat{X}_t , in short: \hat{X}_j ($j \in IN$), of the process X_t by

$$(3.3) \quad \hat{X}_{j+1} = \hat{X}_j + a(\hat{X}_j, t_j)(t_{j+1} - t_j) + b(\hat{X}_j, t_j)(W_{j+1} - W_j) + \frac{1}{2}(b'b)(\hat{X}_j, t_j)[(W_{j+1} - W_j)^2 - (t_{j+1} - t_j)],$$

where the prime “'” denotes the derivative with respect to t . Now, particularly referring to the finitely many sample (data) points (\bar{X}_j, \bar{t}_j) ($j = 1, 2, \dots, N$), we get

$$(3.4) \quad \dot{\bar{X}}_j = a(\bar{X}_j, \bar{t}_j) + b(\bar{X}_j, \bar{t}_j) \frac{\Delta W_j}{\bar{h}_j} + 1/2(b'b)(\bar{X}_j, \bar{t}_j) \left(\frac{(\Delta W_j)^2}{\bar{h}_j} - 1 \right)$$

Here, the value $\dot{\bar{X}}_j$ represents a difference quotient based on the j th experimental data \bar{X}_j and on step lengths $\Delta \bar{t}_j = \bar{h}_j := \bar{t}_{j+1} - \bar{t}_j$ between neighbouring sampling times:

$$\dot{\bar{X}}_j := \begin{cases} \frac{\bar{X}_{j+1} - \bar{X}_j}{\bar{h}_j}, & \text{if } j = 1, 2, \dots, N-1, \\ \frac{\bar{X}_N - \bar{X}_{N-1}}{\bar{h}_N}, & \text{if } j = N. \end{cases}$$

The relations (3.4) cannot be expected to hold in an exact sense, since they include real data, but we satisfy them best in the *approximate* sense of least squares of errors. For the sake of convenience, we still write “=” instead of the approximation symbol “ \approx ”, and we shall study the least-squares estimation in Subsection 3.3.

Since $W_t \square N(0, t)$, the increments ΔW_j are independent on non-overlapping intervals and moreover, $\text{Var}(\Delta W_j) = \Delta \bar{t}_j$, hence, the increments having normal distribution can be simulated with the help of standard normal distributed random numbers \bar{Z}_j . Herewith, we obtain a discrete model for a Wiener process:

$$(3.5) \quad \Delta \bar{W}_j = \bar{Z}_j \sqrt{\Delta \bar{t}_j}, \quad \bar{Z}_j \square N(0, 1).$$

If we use this value in our discretized equation, we obtain

$$(3.6) \quad \dot{\bar{X}}_j = a(\bar{X}_j, \bar{t}_j) + b(\bar{X}_j, \bar{t}_j) \frac{\bar{Z}_j}{\sqrt{\bar{h}_j}} + \frac{1}{2}(b'b)(\bar{X}_j, \bar{t}_j)(\bar{Z}_j^2 - 1).$$

For simplicity, we write equation (3.6) as

$$(3.7) \quad \dot{\bar{X}}_j = \bar{G}_j + \bar{H}_j c_j + (\bar{H}_j' \bar{H}_j) d_j,$$

where

$$c_j := \bar{Z}_j / \sqrt{\bar{h}_j}, \quad d_j := 1/2(\bar{Z}_j^2 - 1), \quad \bar{G}_j := a(\bar{X}_j, \bar{t}_j) \quad \text{and} \quad \bar{H}_j := b(\bar{X}_j, \bar{t}_j).$$

To find the unknown values of \bar{G}_j and \bar{H}_j , we consider the following optimization problem:

$$(3.8) \quad \min_y \sum_{j=1}^N \left(\dot{\bar{X}}_j - (\bar{G}_j + \bar{H}_j c_j + (\bar{H}_j' \bar{H}_j) d_j) \right)^2.$$

Here, y is a vector which comprises all the parameters in the Milstein model. We point out that also vector-valued processes could be studied, then referring to sums of terms in the Euclidean norm $\| \cdot \|_2^2$. Data from the stock market, but also from other sources of information or communication, have a high variation.

Then, we must use a parameter estimation methods which will diminish this high variation and will give a smoother approximation to the data. **Splines** are more flexible and they allow us to avoid large oscillation observed for high-degree polynomial approximation. We recall that these functions can be described as linear combinations of basis splines and approximate the data (\bar{X}_j, \bar{t}_j) smoothly. Therefore, we approximate each function underlying the values $\bar{G}_j = a(\bar{X}_j, \bar{t}_j)$, $\bar{H}_j = b(\bar{X}_j, \bar{t}_j)$ and $\bar{F}_j = b'b(\bar{X}_j, \bar{t}_j)$ in an *additive* way established on basis splines. This treatment is very useful for the stability of the model in the presence of the many and highly varying data. Let us use basis splines for each function characterized by a separation of variables (coordinates); e.g., in equation (3.7):

$$(3.9) \quad \begin{aligned} \bar{G}_j &= a(\bar{X}_j, \bar{t}_j) = \alpha_0 + \sum_{p=1}^2 f_p(\bar{U}_{j,p}) = \alpha_0 + \sum_{p=1}^2 \sum_{l=1}^{d_p^a} \alpha_p^l B_p^l(\bar{U}_{j,p}), \\ \bar{H}_j c_j &= b(\bar{X}_j, \bar{t}_j) c_j = \beta_0 + \sum_{r=1}^2 g_r(\bar{U}_{j,r}) = \beta_0 + \sum_{r=1}^2 \sum_{m=1}^{d_r^b} \beta_r^m C_r^m(\bar{U}_{j,r}), \\ \bar{F}_j d_j &= b'b(\bar{X}_j, \bar{t}_j) d_j = \varphi_0 + \sum_{s=1}^2 h_s(\bar{U}_{j,s}) = \varphi_0 + \sum_{s=1}^2 \sum_{n=1}^{d_s^f} \varphi_s^n D_s^n(\bar{U}_{j,s}), \end{aligned}$$

where $\bar{U}_j = (\bar{U}_{j,1}, \bar{U}_{j,2}) := (\bar{X}_j, \bar{t}_j)$. Let us give an example on how one can gain bases of splines. If we denote the k th order basis spline by $B_{\eta,k}$, a polynomial of degree $k-1$ with knots, say x_η , then a great benefit of using the base splines is provided by the following recursive algorithm (De Boor, 2001):

$$(3.10) \quad B_{\eta,1}(x) = \begin{cases} 1, & \text{if } x_{\eta} \leq x < x_{\eta+1} \\ 0, & \text{otherwise,} \end{cases}$$

$$B_{\eta,k}(x) = \frac{x - x_{\eta}}{x_{\eta+k-1} - x_{\eta}} B_{\eta,k-1}(x) + \frac{x_{\eta+k} - x}{x_{\eta+k} - x_{\eta+1}} B_{\eta+1,k-1}(x).$$

3.4 The Penalized Residual Sum of Squares Problem for SDE

We construct the *penalized residual sum of squares* for SDE in the following form:

$$(3.11) \quad PRSS(\theta, f, g, h) := \sum_{j=1}^N \left\{ \tilde{X}_j - (\bar{G}_j + \bar{H}_j c_j + \bar{F}_j d_j) \right\}^2 + \sum_{p=1}^2 \lambda_p \int [f_p''(U_p)]^2 dU_p + \sum_{r=1}^2 \mu_r \int [g_r''(U_r)]^2 dU_r + \sum_{s=1}^2 \varphi_s \int [h_s''(\bar{U}_s)]^2 dU_s.$$

Here, for convenience, we use the integral symbol “ \int ” as a dummy in the sense of $\int_{[a_{\kappa}, b_{\kappa}]}$, where $[a_{\kappa}, b_{\kappa}]$ ($\kappa = p, r, s$) are appropriately large intervals where the integration takes place, respectively. Furthermore, $\lambda_p, \mu_r, \varphi_s \geq 0$ are *smoothing* (or *penalty*) *parameters*, they represent a tradeoff between first and second term. Large values of $\lambda_p, \mu_r, \varphi_s$ yield smoother curves, smaller values result in more fluctuation. If we use an additive form based on the basis splines for each function, then PRSS will become

$$(3.12) \quad \sum_{j=1}^N \left\{ \tilde{X}_j - (\bar{G}_j + \bar{H}_j c_j + \bar{F}_j d_j) \right\}^2 + \sum_{j=1}^N \left\{ \tilde{X}_j - \left(\alpha_0 + \sum_{p=1}^2 \sum_{l=1}^{d_p^*} \alpha_p^l B_p^l(\bar{U}_{j,p}) + \beta_0 + \sum_{r=1}^2 \sum_{m=1}^{d_r^*} \beta_r^m C_r^m(\bar{U}_{j,r}) + \varphi_0 + \sum_{s=1}^2 \sum_{n=1}^{d_s^*} \varphi_s^n D_s^n(\bar{U}_{j,s}) \right) \right\}^2.$$

For simplicity, we introduce the following matrix notation:

$$(3.13) \quad \begin{aligned} \bar{G}_j + \bar{H}_j c_j + \bar{F}_j d_j &= \alpha_0 + \sum_{p=1}^2 \sum_{l=1}^{d_p^*} \alpha_p^l B_p^l(\bar{U}_{j,p}) + \\ &+ \beta_0 + \sum_{r=1}^2 \sum_{m=1}^{d_r^*} \beta_r^m C_r^m(\bar{U}_{j,r}) + \varphi_0 + \sum_{s=1}^2 \sum_{n=1}^{d_s^*} \varphi_s^n D_s^n(\bar{U}_{j,s}) \\ &= \bar{A}_j \theta, \end{aligned}$$

where

$$\begin{aligned} \bar{A}_j &= (B_j \ C_j \ D_j), \quad B_j = (B_j^1 \ B_j^2), \quad C_j = (C_j^1 \ C_j^2), \quad D_j = (D_j^1 \ D_j^2) \\ B_j^p &= (B_p^1(\bar{U}_{j,p}), B_p^2(\bar{U}_{j,p}), \dots, B_p^{d_p^*}(\bar{U}_{j,p})) \quad (p=1,2), \quad C_j^r = (C_r^1(\bar{U}_{j,r}), C_r^2(\bar{U}_{j,r}), \dots, C_r^{d_r^*}(\bar{U}_{j,r})) \quad (r=1,2), \\ D_j^s &= (D_s^1(\bar{U}_{j,s}), D_s^2(\bar{U}_{j,s}), \dots, D_s^{d_s^*}(\bar{U}_{j,s})) \quad (s=1,2) \quad \text{and} \end{aligned}$$

$$\begin{aligned} \theta &= (\alpha^T, \beta^T, \varphi^T)^T, \quad \alpha = (\alpha_0, \alpha_1^T, \alpha_2^T)^T, \quad \alpha_p = (\alpha_p^1, \alpha_p^2, \dots, \alpha_p^{d_p^*})^T \quad (p=1,2), \quad \beta = (\beta_0, \beta_1^T, \beta_2^T)^T, \\ \beta_r &= (\beta_r^1, \beta_r^2, \dots, \beta_r^{d_r^*})^T \quad (r=1,2), \quad j = (\varphi_0, \varphi_1^T, \varphi_2^T)^T, \quad \varphi_s = (\varphi_s^1, \varphi_s^2, \dots, \varphi_s^{d_s^*})^T \quad (s=1,2). \end{aligned}$$

Now, we can obtain the residual sum of squares as the squared length of the difference between \tilde{X} and $\bar{A}\theta$, where

\bar{A} is matrix which contains the row vectors \bar{A}_j , and \tilde{X} is our vector of difference quotients standing for the change rates of the experimental data:

$$(3.14) \quad \sum_{j=1}^N \left\{ \tilde{X}_j - \bar{A}_j \theta \right\}^2 = \left\| \tilde{X} - \bar{A} \theta \right\|_2^2,$$

where $\bar{A} = (\bar{A}_1^T, \bar{A}_2^T, \dots, \bar{A}_N^T)^T$, $\tilde{X} = (\tilde{X}_1, \tilde{X}_2, \dots, \tilde{X}_N)^T$.

Indeed, we get a discretized form of each integration term in the following way:

$$(3.15) \quad \int_a^b [f_p''(U_p)]^2 dU_p \equiv \sum_{j=1}^{N-1} [f_p''(U_{j,p})]^2 (U_{j+1,p} - U_{j,p}) = \sum_{j=1}^{N-1} \left[\sum_{l=1}^{d_p^*} \alpha_p^l B_p^l''(U_{j,p}) u_j \right]^2.$$

Using Riemann sums, we can discretize and represent each integration by the squared length of a vector, namely,

$$(3.16) \quad \begin{aligned} \int_a^b [f_p''(U_p)]^2 dU_p &\equiv \sum_{j=1}^{N-1} [B_j^{p*} u_j \alpha_p]^2 = \left\| \bar{A}_p^B \alpha_p \right\|_2^2 \quad (p=1,2), \\ \int_a^b [g_r''(U_r)]^2 dU_r &\equiv \sum_{j=1}^{N-1} [C_j^{r*} v_j \beta_r]^2 = \left\| \bar{A}_r^C \beta_r \right\|_2^2 \quad (r=1,2), \\ \int_a^b [h_s''(\bar{U}_s)]^2 dU_s &\equiv \sum_{j=1}^{N-1} [D_j^{s*} w_j \varphi_s]^2 = \left\| \bar{A}_s^D \varphi_s \right\|_2^2 \quad (s=1,2). \end{aligned}$$

Here,

$$\begin{aligned} \bar{A}_p^B &:= (B_1^{p*T} u_1, B_2^{p*T} u_2, \dots, B_{N-1}^{p*T} u_{N-1})^T, \quad u_j := \sqrt{U_{j+1,p} - U_{j,p}}, \\ \bar{A}_r^C &:= (C_1^{r*T} v_1, C_2^{r*T} v_2, \dots, C_{N-1}^{r*T} v_{N-1})^T, \quad v_j := \sqrt{U_{j+1,r} - U_{j,r}}, \\ \bar{A}_s^D &:= (D_1^{s*T} w_1, D_2^{s*T} w_2, \dots, D_{N-1}^{s*T} w_{N-1})^T, \quad w_j := \sqrt{U_{j+1,s} - U_{j,s}} \quad (j=1,2,\dots,N-1) \end{aligned}$$

Using this discretized form in (3.17), PRSS looks as follows:

$$(3.17) \quad PRSS(\alpha, \beta, \varphi, g, h) = \left\| \tilde{X} - \bar{A} \theta \right\|_2^2 + \sum_{p=1}^2 \lambda_p \left\| \bar{A}_p^B \alpha_p \right\|_2^2 + \sum_{r=1}^2 \mu_r \left\| \bar{A}_r^C \beta_r \right\|_2^2 + \sum_{s=1}^2 \varphi_s \left\| \bar{A}_s^D \varphi_s \right\|_2^2$$

But, rather than a singleton, there is a finite sequence of the *tradeoff* or *penalty* parameters $\lambda = (\lambda_1, \lambda_2, \mu_1, \mu_2, \varphi_1, \varphi_2)^T$ such that this equation is not yet a *Tikhonov regularization problem* with a single such parameter. For this reason, let us make a uniform penalization by taking the same value $\lambda_p = \mu_r = \varphi_s = \lambda = \delta^2$ for each term. Then, our approximation of PRSS can be rearranged as

$$(3.18) \quad PRSS(\theta, f, g, h) = \left\| \tilde{X} - \bar{A} \theta \right\|_2^2 + \delta^2 \left\| \bar{L} \theta \right\|_2^2,$$

with the $(6(I - 1) \times m)$ -matrix

$$\bar{L} := \begin{pmatrix} 0 & \bar{A}_1^B & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \bar{A}_2^B & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \bar{A}_1^C & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \bar{A}_2^C & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \bar{A}_1^D & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \bar{A}_2^D \end{pmatrix}.$$

Herewith, based on the basis splines, we have identified the minimization of PRSS for some stochastic differential equation as an *Tikhonov regularization problem* (Aster, Borchers and Thurber, 2005):

$$(3.19) \quad \min_m \|Gm - d\|_2^2 + \delta^2 \|Lm\|_2^2$$

with penalty parameter $\lambda = \delta^2$. This regularization method is also known as *ridge regression*; it is very helpful for problems whose solution does not exist, or which is not unique or not stable under perturbations of the data. MATLAB Regularization Toolbox can be used for solution (Aster, Borchers and Thurber, 2005).

4 An Alternative Solution for Tikhonov Regularization Problem with Conic Quadratic Programming

4.1 Construction of the Conic Quadratic Programming Problem

We just mentioned that we can solve a Tikhonov regularization problem with MATLAB Regularization Toolbox. In addition, we shall explain how to treat our problem by using *continuous optimization* techniques which we suppose to become a complementary key technology and alternative to the concept of Tikhonov regularization. In particular, we apply the elegant framework of *conic quadratic programming (CQP)*. Indeed, based on an appropriate, learning based choice of a bound M , we reformulate our Tikhonov regularization as the following optimization problem:

$$(4.1) \quad \min_{\theta} \left\| \bar{A}\theta - \dot{\bar{X}} \right\|_2^2, \\ \text{subject to } \left\| \bar{L}\theta \right\|_2^2 \leq M.$$

Here, the objective function in (4.1) is not linear but quadratic, however, the original objective function can be moved to the list of constraints, and we can write an equivalent problem as follows:

$$(4.2) \quad \min_{t, \theta} t, \\ \text{subject to } \left\| \bar{A}\theta - \dot{\bar{X}} \right\|_2^2 \leq t^2, \quad t \geq 0, \\ \left\| L\theta \right\|_2^2 \leq M,$$

$$\text{or} \\ (4.3) \quad \min_{t, \theta} t, \\ \text{subject to } \left\| \bar{A}\theta - \dot{\bar{X}} \right\|_2 \leq t, \\ \left\| L\theta \right\|_2 \leq \sqrt{M}.$$

Then, if we consider the form of a conic quadratic optimization problem (Nemirovski, 2002)

$$(4.4) \quad \min_x c^T x, \quad \text{subject to } \left\| D_i x - d_i \right\| \leq p_i^T x - q_i \quad (i=1, 2, \dots, k),$$

we can see that our optimization problem for SDE is a conic quadratic program with $c = (1 \quad 0_m^T)^T$, $x = (t \quad \theta^T)^T$, $D_1 = (0_N, \bar{A})$, $d_1 = \dot{\bar{X}}$,

$$p_1 = (1, 0, \dots, 0)^T, \quad q_1 = 0,$$

$$D_2 = (0_{6(N-1)}, L), \quad d_2 = 0, \quad p_2 = 0_{m+1}^T, \quad q_2 = -\sqrt{M},$$

$$m = \sum_{p=1}^2 d_p^g + \sum_{r=1}^2 d_r^h + \sum_{s=1}^2 d_s^h + 3.$$

In order to state the optimality conditions, we firstly reformulate our problem as

$$(4.5) \quad \min_{t, \theta} t, \\ \text{such that } \chi := \begin{pmatrix} 0_N & \bar{A} \\ 1 & 0_m^T \end{pmatrix} \begin{pmatrix} t \\ \theta \end{pmatrix} + \begin{pmatrix} -\dot{\bar{X}} \\ 0 \end{pmatrix}, \\ \eta := \begin{pmatrix} 0_{6(N-1)} & L \\ 0 & 0_m^T \end{pmatrix} \begin{pmatrix} t \\ \theta \end{pmatrix} + \begin{pmatrix} 0_{6(N-1)} \\ \sqrt{M} \end{pmatrix}.$$

Here, χ and η belong to L^{N+1} and $L^{6(N-1)+1}$, where L^{N+1} and $L^{6(N-1)+1}$ are the $(N+1)$ - and $(6(N-1)+1)$ -dimensional ice-cream (or second-order Lorentz) cones, defined by

$$L^v := \left\{ x = (x_1, x_2, \dots, x_v)^T \in \mathbb{R}^v \mid x_v \geq \sqrt{x_1^2 + x_2^2 + \dots + x_{v-1}^2} \right\} \quad (v \geq 2).$$

Then, we can also write the *dual problem* to the latter problem as

$$(4.6) \quad \max (\dot{\bar{X}}^T, 0) \kappa_1 + (0_{6(N-1)}^T, -\sqrt{M}) \kappa_2 \\ \text{such that } \begin{pmatrix} 0_N^T & 1 \\ \bar{A}^T & 0_m \end{pmatrix} \kappa_1 + \begin{pmatrix} 0_{6(N-1)}^T & 0 \\ L^T & 0_m \end{pmatrix} \kappa_2 = \begin{pmatrix} 1 \\ 0_m \end{pmatrix} \\ \kappa_1 \in L^{N+1}, \quad \kappa_2 \in L^{6(N-1)+1}.$$

Moreover, $(t, \theta, \chi, \eta, \kappa_1, \kappa_2)$ is the primal-dual optimal solution if the following constraints are provided in the corresponding ice-cream (second-order Lorentz) cones:

$$\begin{aligned}
 (4.7) \quad \chi &:= \begin{pmatrix} 0_N & \bar{A} \\ 1 & 0_m^T \end{pmatrix} \begin{pmatrix} t \\ \theta \end{pmatrix} + \begin{pmatrix} -\bar{X} \\ 0 \end{pmatrix}, \\
 \eta &:= \begin{pmatrix} 0_{6(N-1)} & L \\ 0 & 0_m^T \end{pmatrix} \begin{pmatrix} t \\ q \end{pmatrix} + \begin{pmatrix} 0_{6(N-1)} \\ \sqrt{M} \end{pmatrix}, \\
 \begin{pmatrix} 0_N^T & 1 \\ \bar{A}^T & 0_m \end{pmatrix} \kappa_1 + \begin{pmatrix} 0_{6(N-1)}^T & 0 \\ L^T & 0_m \end{pmatrix} \kappa_2 &= \begin{pmatrix} 1 \\ 0_m \end{pmatrix}, \\
 \kappa_1^T \chi &= 0, \quad \kappa_2^T \eta = 0, \\
 \kappa_1 &\in L^{N+1}, \quad \kappa_2 \in L^{6(N-1)+1}, \\
 \chi &\in L^{N+1}, \quad \eta \in L^{6(N-1)+1}.
 \end{aligned}$$

4.2 On Solution Methods for Conic Quadratic Programming

For solving “well-structured” convex problems like conic quadratic problems, there are *interior point methods (IPMs)* which were firstly introduced by *Karmarkar (1984)*. IPMs classically base on the interior points of the feasible set of the optimization problem; this set is assumed to be closed and convex. Then, an *interior penalty function (barrier) F(x)* is chosen, well defined (and smooth and strongly convex) in the interior of the feasible set. This function is “blowing up” as a sequence from the interior approaches a boundary point of the feasible set (Nesterov and Nemirovskii: 1993). Of great importance are *primal-dual IPMs* which refer to the pair of primal and dual variables.

The *canonical barrier function* for second-order (Lorentz) cones

$$L^v := \{ x = (x_1, x_2, \dots, x_v)^T \in \mathbb{R}^n \mid x_v \geq \sqrt{x_1^2 + \dots + x_{v-1}^2} \}$$

($v \geq 2$) is defined by $L_v(x) := -\ln(x_v^2 - x_1^2 - \dots - x_{v-1}^2) = -\ln(x^T J_v x)$, where $J_v = \begin{pmatrix} -I_{v-1} & 0 \\ 0 & 1 \end{pmatrix}$. The *parameter* of this barrier is $\alpha(L_v) = 2$.

These algorithms have the advantage of employing the structure of the problem, of allowing better complexity bounds and exhibiting a much better practical performance.

5 On Nonlinear Dependence on Parameters and Their Estimation

Let return to equation (3.2) again, with two ways of generalization. (i) The model functions $a(\cdot)$ and $b(\cdot)$ may not only depend on the parameters which appear as coefficients in the linear combination with base splines, but also on really *probabilistic (stochastic)* parameters. (ii) Differently from the earlier linear dependence on the parameters, the dependence on the newly considered parameters may be *nonlinear*. In that case, we should use

any nonlinear parameter estimation methods like, e.g., *Gauss-Newton’s method* or *Levenberg-Marquardt’s method* (Nash and Sofer, 1996).

Let us look at (i), for example, we consider following the stochastic differential equation:

$$\begin{cases} dX_t = \mu X_t dt + \sigma X_t dW_t, \\ X(0) = x_0, \end{cases}$$

where $X_t = X(t)$ denotes the (random) price of a stock at time $t \geq 0$, and $\mu > 0$ and σ are parameters called the *drift* and *volatility* of the stock and x_0 is the starting price, respectively. Then, referring to the finitely many sample (data) points (\bar{X}_k, \bar{t}_k) ($k = 1, 2, \dots, N$) we get

$$\begin{aligned}
 \dot{\bar{X}}_k &= \mu \bar{X}_k + \sigma \bar{X}_k \frac{\Delta W_k}{\bar{h}_k} + \frac{1}{2} \sigma^2 (P'P)(\bar{t}_k) \left(\frac{(\Delta W_k)^2}{\bar{h}_k} - 1 \right) \\
 &= g(\bar{X}_k, \mu, \sigma).
 \end{aligned}$$

To determine the unknown values μ, σ we consider following optimization problem:

$$(5.1) \quad \min f(\beta) := \sum_{k=1}^N \left(\dot{\bar{X}}_k - g(\bar{X}_k, \mu, \sigma) \right)^2 = \sum_{k=1}^N f_k^2(\beta) \quad \left(\text{or } \frac{1}{2} \sum_{k=1}^N f_k^2(\beta) \right)$$

Here, $\beta = (\mu, \sigma)^T$, $P(X) := X$, hence $P'(\bar{t}_k) := 0$ (since P does not depend on t), and the objective function $f(\beta)$ of parameter estimation is defined linearly in auxiliary functions f_k squared ($k = 1, 2, \dots, N$). This problem representation holds true also if the quadratic term $(1/2)\sigma^2(P'P)(\bar{t}_k) \left((\Delta W_k)^2 / \bar{h}_k - 1 \right)$ would not vanish and in many further examples where (ii) the parametric dependence may be *nonlinear* indeed.

Nonlinear parametric dependence can occur by the composition of stochastic processes. For example, in financial modelling of the dynamics of wealth from time t to $t + dt$ or maturity time T , V_t , may be given by

$$\begin{cases} dV_t = \left[(\theta_t^T (\mu - r\mathbf{e}) + r) V_t \right] dt - c_t dt + \theta_t^T \sigma V_t dW_t, \\ V_0 = v_0, \end{cases}$$

where θ_t is the fraction of wealth invested in the risky asset at time t and c_t is the consumption at time t . We can easily identify both $a(t, V_t, c_t, \theta_t; r, \mu) := (\theta_t^T (\mu - r\mathbf{e}) + r) V_t - c_t$ and $b(t, V_t, \theta_t; \sigma) := \theta_t^T \sigma V_t$. Here, r is the short-term interest rate, μ denotes the vector of expected rates of return, \mathbf{e} is the vector consisting of ones, σ stands the volatility matrix of the risky assets. The entire parameter $\beta := (r, \mu, \sigma)^T$ (arranged as a column vector) is assumed to be constant through time (Akume, 2007). Finally, W is a Wiener process with the property that dW_t is $N(0, dt)$ distributed. While the dependence of the right-hand side of the stochastic differential equation on β is linear, nonlinear parametric dependencies can occur via the insertion

of the processes c_t and θ_t in a and b , but also if r becomes a stochastic process r_t , e.g., in the following way. Namely, as a direct example of nonlinearity, the stochastic interest rate r_t for each $\tau \in \square$ may be given by

$$dr_t = \alpha (R - r_t)dt + \sigma_t r_t^\tau dW_t,$$

where σ_t and W_t are volatility and a Brownian motion, respectively. Here, α is a positive constant, and the drift term $\alpha (R - r_t)$ is positive for $R > r_t$ and negative for $R < r_t$ (Seydel, 2003). We denote $a(t, r_t; R) := \alpha (R - r_t)$ and $b(t, r_t, \sigma_t; \tau) := \sigma_t r_t^\tau$. This process on the interest rate can be attached to a price or wealth process. By this interest rate processes and the composition of stochastic processes, further parameters such as (R, τ) , can implicitly and in a partially nonlinear way enter the interest rate dynamics r_t and processes beyond of that dynamics.

In fact, the financial sector with the modeling and prediction of stock prices and interest rate are the most prominent application areas here. Moreover, mixed linear-nonlinear dependences on the parameters may be possible due to the linearly and the nonlinearly involved parameters of various kinds. This optimization problem (5.1) means a nonlinear least-squares estimation (or nonlinear regression). In the context of data fitting, each of the functions f_κ corresponds to a residual in our discrete approximation problem which may arise in a mathematical modelling or in an inverse problem. Let us represent basic ideas of nonlinear regression theory with the help of (Nash and Sofer, 1996).

Now, (5.1) can be represented in vector notation:

$$(5.2) \quad \min f(\beta) := \frac{1}{2} F^T(\beta)F(\beta),$$

where F is the vector-valued function $F(\beta) := (f_1(\beta), \dots, f_N(\beta))^T$ ($\beta \in \square^p$) and where the factor $1/2$ serves for a more "optimal" normalization of the derivatives. In fact, by the chain rule we obtain

$$(5.3) \quad \nabla f(\beta) := \nabla F(\beta)F(\beta),$$

where $\nabla f(\beta)$ is an $(p \times N)$ -matrix-valued function. By row-wise differentiation of $\nabla f(\beta)$ and using this gradient representation, we obtain the Hessian matrix of f :

$$(5.4) \quad \nabla^2 f(\beta) := \nabla F(\beta)\nabla F^T(\beta) + \sum_{\kappa=1}^N f_\kappa(\beta)\nabla^2 f_\kappa(\beta).$$

Let β^* be a solution of (5.1) and suppose $f(\beta^*) = 0$. Then, $f_\kappa(\beta^*) = 0$ ($\kappa = 1, 2, \dots, N$), i.e., all the residuals r_κ are vanishing and the model fits data without error. As a result, $F(\beta^*) = 0$ and, by (5.3), $\nabla f(\beta^*) = 0$, which just confirms our first-order necessary optimality condition. Furthermore, we can obtain the Hessian of f being

$$\nabla^2 f(\beta^*) := \nabla F(\beta^*)\nabla^T F(\beta^*),$$

which is a positive semi-definite matrix, just as we expected by our *second-order necessary optimality condition*. In case where $\nabla F(\beta^*)$ is a matrix of full rank, i.e., $\text{rank}(\nabla F(\beta^*)) = p$, then $\nabla^2 f(\beta^*)$ is positive definite, i.e., *second-order necessary optimality condition* is provided such that β^* is also a strict local minimizer.

From this basic idea, a number of specialized *nonlinear least-squares* methods come from. The simplest of this methods, called *Gauss-Newton* uses this approximative description in an indirect way. It make a replacement of the Hessian in the formula

$$(5.5) \quad \nabla^2 f(\beta)q = -\nabla f(\beta),$$

such that we have relation

$$(5.6) \quad \nabla F(\beta)\nabla^T F(\beta)q = -\nabla F(\beta)F(\beta),$$

where q is Gauss-Newton increment $q = \beta_1 - \beta_0$. If $F(\beta^*) \approx 0$ and $\text{rank}(\nabla F(\beta^*)) = p$ ($\leq N$), then, near to a solution β^* , Gauss-Newton behaves like Newton's method. However, we need not pay the computational cost of calculating second derivatives. Gauss-Newton's method sometimes behaves poor if there is one or a number of outliers, i.e., if the model does not fit the data well, or if $\text{rank}(\nabla F(\beta^*))$ is not of full rank p . In these cases, there is a poor approximation of the Hessian.

Many other nonlinear least-squares methods can be interpreted as using an approximation of the second additive form in the formula for the Hessian. i.e., of

$$(5.7) \quad \sum_{\kappa=1}^N f_\kappa(\beta)\nabla^2 f_\kappa(\beta).$$

Levenberg-Marquardt's method uses the simplest of these approximation:

$$(5.8) \quad \sum_{\kappa=1}^N f_\kappa(\beta)\nabla^2 f_\kappa(\beta) \approx \lambda I_p,$$

with some scalar $\lambda \geq 0$. This approximation yields the following linear system:

$$(5.9) \quad (\nabla F(\beta)\nabla^T F(\beta) + \lambda I_p)q = -\nabla F(\beta)F(\beta).$$

We can often find Levenberg-Marquardt method implemented in the context of a trust-region strategy. There, q is obtained, e.g., by minimizing a quadratic model of the objective function with Gauss-Newton approximation of the Hessian:

$$(5.10) \quad \begin{cases} \min_q Q(q) := f(\beta) + q^T \nabla F(\beta) F(\beta) + \frac{1}{2} q^T \nabla F(\beta) \nabla^T F(\beta) q \\ \text{subject to } \|q\|_2 \leq \Delta. \end{cases}$$

Here, λ is indirectly determined by picking a value of Δ . The scalar Δ can be chosen based on the effectiveness of the Gauss-Newton.

Levenberg-Marquardt method can be interpreted as a mixture between Gauss-Newton method (if $\lambda \approx 0$) and steepest-descent method (if λ is very large) (Aster, Borchers and Thurber, 2005; Nash and Sofer, 1996). An adaptive and sequential way of choosing λ and, by this, of the adjustment of mixture between the methods of Gauss-Newton and steepest-descent, is presented in (Nash and Sofer, 1996). We note that the term “ λI_p ” can also be regarded as a regularization term that shifts the eigenvalues of $\nabla F(\beta) \nabla^T F(\beta)$ away from 0.

Another way to solve the system (5.9) for given $\beta = \beta_k$, i.e., to find the $(k+1)$ -st iterate $q = q_k$, consists in an application of least-squares estimation. If we denote (5.9) by $Gq = d$, where $G = \nabla F(\beta) \nabla^T F(\beta) + \lambda I_p$ and $d = -\nabla F(\beta) F(\beta)$, then we can study the regularized problem by adding to the squared residual norm $\|Gq - d\|_2^2$ a penalty or regularization term of the form $\delta^2 \|Lq\|_2^2$, i.e.,

$$(5.11) \quad \min_q \|(\nabla F(\beta) \nabla^T F(\beta) + \lambda I_N)q - (-\nabla F(\beta) F(\beta))\|_2^2 + \delta^2 \|Lq\|_2^2,$$

where L may be the unit matrix, but it can also represent a discrete differentiation of first or second order. This regularization serves to diminish the complexity of the model. We recall (Aster, Borchers and Thurber, 2004) for closer explanation about this *Tikhonov regularization*. But instead of the penalization approach, we can again bound the regularization term $\|Lq\|_2^2$ by an inequality constraint. What is more, we can turn the optimization problem to a CQP problem in order to find the step q_k and, herewith, the next iterate $\beta_{k+1} := \beta_k + q_k$. By this conic quadratic modelling and solution technique we are back in the methodology that we presented in Section 4. Indeed, with a suitable and maybe adaptive choice of an upper bound M_1 (Iřcanoglu Ćekić, Weber and Taylan, 2007; Taylan and Weber, 2007; Taylan, Weber and Beck, 2007) we can write our problem as

$$(5.12) \quad \min_b \|(\nabla F(\beta) \nabla^T F(\beta) + \lambda I_N)q - (-\nabla F(\beta) F(\beta))\|_2^2, \\ \text{subject to } \|Lq\|_2^2 \leq M_1,$$

or we can write an equivalent problem as follows:

$$\min_{t,q} t, \\ \text{subject to } \|(\nabla F(\beta) \nabla^T F(\beta) + \lambda I_p)q - (-\nabla F(\beta) F(\beta))\|_2^2 \leq t^2, \quad t \geq 0, \\ \|Lq\|_2^2 \leq M_1.$$

Then, if we consider the general problem form (Nemirovski, 2002)

$$\min_x c^T x, \quad \text{subject to } \|D_i x - d_i\| \leq p_i^T x - q_i \quad (i=1, 2, \dots, k),$$

we can see that our optimization problem for determining step length q is a *conic quadratic program* with

$$c = (1 \quad 0_p^T)^T, \\ x = (t \quad q^T)^T, \quad D_1 = (0_p, \bar{A}), \quad d_1 = -\nabla F(\beta) F(\beta),$$

$$p_1 = (1, 0, \dots, 0)^T, \quad q_1 = 0,$$

$$D_2 = (0_p, L_{p \times p}), \quad d_2 = 0_p, \quad p_2 = 0_{p+1} \quad \text{and} \quad q_2 = -\sqrt{M_1},$$

6 Concluding Remarks

This paper gave a new contribution to problems related with SDEs using regression under an additive model or a nonlinear formulation, as a preparatory step on the way of *organizing* assets in terms of portfolios. We made modern methods of inverse problems and continuous optimization, especially, CQP and methods from nonlinear regression, become accessible and usable. Herewith, a bridge has been offered between statistical learning and data mining on the one hand, and the powerful tools prepared for well-structured convex optimization problems (Boyd and Vandenberghe, 2004) and Newton- and steepest-descent type regression methods (Nash and Sofer, 1996) on the other hand. We hope that future research, theoretical and applied achievements on this fruitful interface will be stimulated by our paper. The study on prediction of credit-default risk (Iřcanoglu Ćekić, Weber and Taylan, 2007) already showed the value of our generalized additive model approach. Indeed, further combined applications of our methods on real-word data from areas of finance, science and technology may be expected, where our contribution can be utilized.

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Organizacija v financah izhajajoč iz stohastičnih diferencialnih enačb in nelinearnih modelov zvezne optimizacije

Osrednji element v organizaciji finančnih sredstev, tako sredstev posameznika kot tudi podjetja ali družbene skupine, je oblikovanje, analiza in optimizacija portfelja. To zahteva modeliranje časovno spremenljivih procesov. Tako kot na mnoge procese v naravi, tehniki ali gospodarstvu tudi na finančne procese vplivajo naključne fluktuacije. Zato smo uporabili stohastične diferencialne enačbe, saj v realnosti, še posebej v finančnem sektorju, na mnoge procese vpliva naključni šum. Pomanjkljivost tega načina pa je, da je te enačbe težko predstaviti v obliki primerni za računalnik, in jih je težko reševati. V tem članku smo jih izrazili na poenostavljen način, tako, da smo uporabili aproksimacijo tako z diskretizacijo in kot tudi aditivnimi modeli, ki temeljijo na zlepkih. Določanje parametrov se nanaša na linearne koeficiente zlepkov in delno nelinearne probabilistične parametre. Izgradili smo penalizirano residualno vsoto kvadratov za ta model in obravnavali nelinearnosti, ki os se pojavljale, z Gauss-Newtonovo in Levenberg-Marquardt-ovo metodo za določanje iteracijskih korakov. Raziskovali smo tudi kdaj je s tem povezani program za minimizacijo lahko napisan kot Tikhonov problem regularizacije, in ga obravnavamo z uporabo zveznih optimizacijskih tehnik. Bolj natančno, pripravimo dostop do elegantnega okvirja koničnega kvadratnega programiranja. Ti konveksni optimizacijski problemi so zelo dobro strukturirani, zato so podobni linearnim programom, torej omogočajo uporabo metod interne točke.

Ključne besede: stohastične diferencialne enačbe, regresija, statistično učenje, določanje parametrov, Gauss-Newtonova metoda, Levenberg-Marquardt-ova metoda, glajenje, stabilnost, metode penalov, regularizacija po Tikhonovu, kontinuirna optimizacija, konično kvadratno programiranje



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Založba
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Financiranje, učinkovitost in pravičnost terciarnega izobraževanja v Sloveniji

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Izhodišče prispevka je trditev, da ima sistem financiranja terciarnega izobraževanja (TI) lahko pomembne učinke na učinkovitost visokošolskih izobraževalnih ustanov, donosnost naložb v izobraževanje, agregatno vključenost v izobraževanje ter na socialno pravičnost sistema (vključenost različnih socialnih skupin). V prispevku prikazujemo značilnosti sistema financiranja dodiplomskega študija v javnih ustanovah v Sloveniji ter njegove učinke na navedene dimenzije. Prikazujemo tudi trende v vključenosti v to izobraževanje. Ugotavljamo, da sistem financiranja ne zagotavlja notranje učinkovitosti TI (izražene preko uspešnosti študija) in socialne pravičnosti. Prikazujemo tudi predlog sprememb obeh delov sistema financiranja – financiranje izobraževalnih ustanov in finančna pomoč študentom - v smeri boljšega uresničevanja navedenih dveh ciljev. Predlagamo povečanje zasebnega financiranja. Pri vseh proučenih vidikih (vključenost v izobraževanje, izdatki zanj, sistem financiranja, notranja in zunanja ekonomska učinkovitost, pravičnost) prikazujemo tako trende v Sloveniji kot primerjavo Slovenije z državami EU in OECD. Prikazujemo tudi oceno ekonomske izvedljivosti povečanega zasebnega financiranja. Prispevek zaključuje mo z glavnimi sklepnimi ugotovitvami.

Ključne besede: financiranje, pravičnost, terciarno izobraževanje, Slovenija, učinkovitost

1 Uvod

Učinkovitost in pravičnost sta dva najpomembnejša kriterija financiranja izobraževanja iz javnih sredstev, ki vplivata med drugim tudi na obseg vključenosti v izobraževanje. Posebej pomembna sta v terciarnem izobraževanju (TI), ki je najdražji podsektor izobraževalnega sistema. V prispevku želimo odgovoriti na dve vprašanji: (1) ali veljavni sistem financiranja dodiplomskega študija v javnih ustanovah v Sloveniji zagotavlja učinkovitost in pravičnost, (2) ali je potrebno in mogoče in povečati obseg zasebnega financiranja tega izobraževanja.

Prispevek začnemo z opisom nekaterih glavnih značilnostih vpisov v TI. Nadaljujemo s pregledom obsega naložb v TI (izdatkov zanj), prikazom sistema financiranja tega izobraževanja in utemeljemo njegov vpliv na delitev stroškov na študenta med različne nosilce. Temu sledi analiza pravičnosti in učinkovitosti (notranje in zunanje) financiranja TI. Prikazujemo tudi oceno ekonomske sposobnosti rednih oziroma full-time (ta izraza bomo uporabljali kot sinonima) dodiplomskih študentov in njihovih staršev za povečanje zasebnega financiranja TI v Sloveniji. Na koncu sledi prikaz nekaterih glavnih zaključkov.

Večji del prispevka, predstavljenega (v širši inačici) na mednarodni konferenci o financiranju, učinkovitosti

in pravičnosti terciarnega izobraževanja (Funding, Equity and Efficiency of Higher Education), ki je bila novembra leta 2007 v Portorožu¹, temelji na analizah, izdelanih v zadnjih desetih letih na Inštitutu za ekonomska raziskovanja v Ljubljani.

2 Vključenost v terciarno izobraževanje

Stopnja vključenosti v terciarno izobraževanje je v Sloveniji višja kot v povprečju v EU in OECD, zlasti za mlajše starostne skupine, ker se skoraj vsi »diplomanti« srednjega izobraževanja vpišejo v visoko šolstvo (Zgaga et al., 2004); najvišja je za starostni skupini 19 in 20 let, za kateri znaša 44% in 50% (OECD, 2007). Število študentov in stopnja vključenosti v TI v Sloveniji se od zgodnjih 90. let naglo povečujeta, zlasti za ženske in na drugi strani za izredne študente. Razkorak med povpraševanjem po rednem dodiplomskem študiju, na katerem ni šolnine, in dejansko vpisanimi na ta študij, se povečuje (Zgaga et al., 2004). Omejitev vpisa na redni študij je določena na nacionalni ravni in je pogojena z rezultati zunanega preverjanja znanja na koncu srednje šole.

Za analizo financiranja, pravičnosti in učinkovitosti TI so pomembni različni vidiki strukture študentov, med njimi vpisi po sektorjih (javni, zasebni) in po načinu študi-

¹ Spletna stran konference je: <http://www.fhe.fm-kp.si/>. Referati s konference pa so objavljeni v zborniku na CD-ju (Bevc et al., 2007).

ja (redni oziroma »full-time« ter izredni oziroma »part-time«). V Sloveniji terciarno izobraževanje skoraj v celoti izvajajo javne izobraževalne ustanove. Delež študentov, vpisanih na javne ustanove, precej presega povprečje za države EU in OECD, ne glede na to, katero stopnjo programov po ISCED opazujemo (Eurostat, 2007a; OECD, 2007). Na drugi strani pa se struktura študentov po načinu študija na stopnji ISCED-5B zelo razlikuje od povprečne strukture v državah EU in OECD; delež rednih študentov je dosti manjši in znaša 46% nasproti 75% za 19 držav EU in 71% za OECD (OECD, 2007). Na ravni ISCED-5A skupaj s ISCED-6 pa je struktura študentov glede na način študija v Sloveniji podobna kot v povprečju v državah EU in OECD; 80% predstavljajo full-time študenti (prav tam). Delež izrednih študentov na dodiplomskih programih se je v obdobju od srede 90. let povečal od ene petine na eno tretjino. Po podatkih iz mednarodne raziskave Eurostudent je ta delež med najvišjimi izmed prek 20 držav, vključenih v to raziskavo; leta 2005 je bil višji le še v Veliki Britaniji (Eurostudent 2005). Danes v Sloveniji večino izrednih študentov predstavljajo mladi podobne starosti kot je značilna za redne študente.

3 Izdatki za terciarno izobraževanje in sistem njegovega financiranja

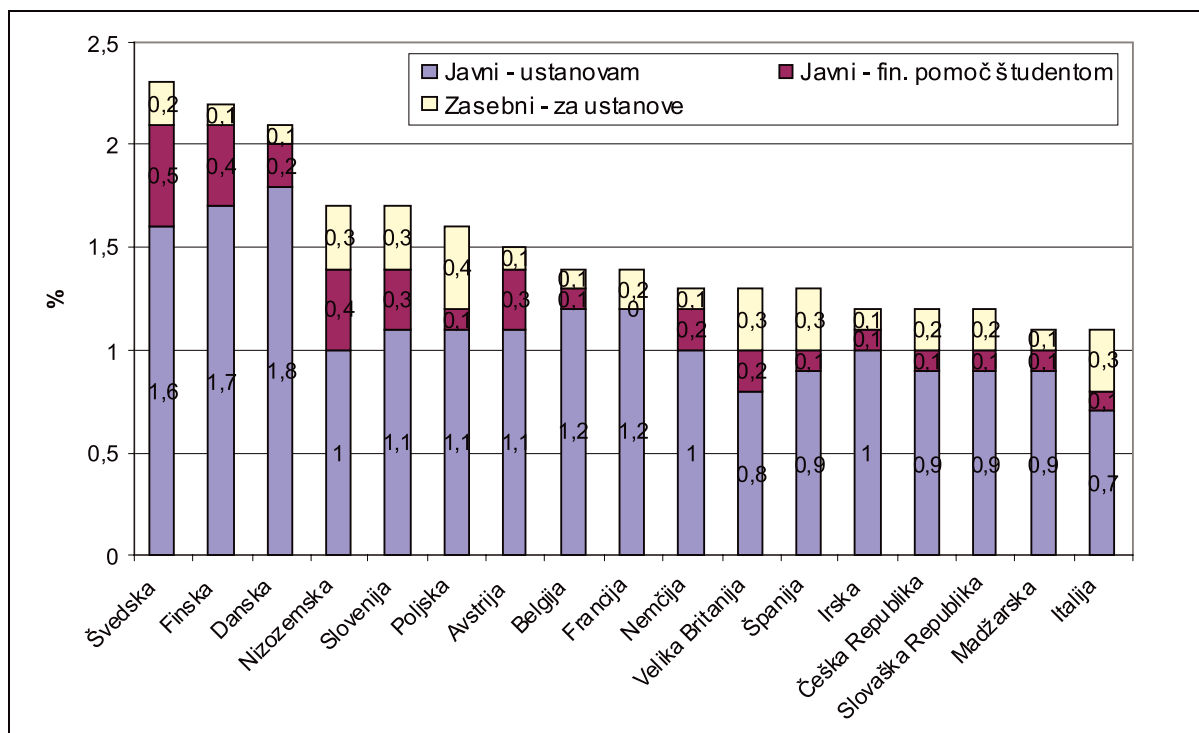
Iz javnih in zasebnih virov skupaj, kjer so pri zasebnih izdatkih upoštevani le izdatki za izobraževalne ustanove,

Slovenija namenja 1,7% bruto domačega proizvoda (BDP) za terciarno izobraževanje, pri tem 1,4% iz javnih in 0,3% iz zasebnih virov (slika 1). To je visoka raven tudi v primerjavi z večino držav EU in OECD. Tudi delež javnih izdatkov za TI v BDP je precej nad povprečjem za obe skupini držav (slika 1). Po padcu v drugi polovici 90. let, se je v tekočem desetletju ta delež do leta 2004 nekoliko povečal (zatem pa zmanjšal). Ena od posledic počasnejše rasti javnih izdatkov za TI od rasti števila študentov je nadaljevanje omejevanja vpisov na rednem študiju, kar je prispevalo k naraščanju števila izrednih študentov. Zasebni izdatki za TI se na podlagi razpoložljivih podatkov od konca 90. let realno povečujejo (Eurostat, 2007b), zlasti izdatki za vpisnine in šolnine za izredni študij.

V tem poglavju bomo naredili pregled sistema financiranja dodiplomskega študija v Sloveniji s treh dimenzij: (1) veljavni sistem, (2) sistem, predlagan s strani avtorice tega prispevka in nekaterih drugih strokovnjakov, in (3) planirane vladne spremembe.

3.1 Veljavni sistem financiranja terciarnega izobraževanja

Zadnja obsežna analiza sistema financiranja terciarnega izobraževanja in delitve stroškov med različne nosilce je bila izdelana sredi 90. let (Bevc et al., 1996; Bevc, 1997); v zadnjih nekaj letih pa so bile izdelane številne pomembne nove analize (Vodopivec, Gabersček, 2002; Trunk et al., 2007; Svöljščak, 2007), ki so proučevale posamezne



Vir: OECD, *Education at a Glance 2007*.

Slika 1. Delež posameznih vrst izdatkov za terciarno izobraževanje v BDP – Slovenija, 2004 (%)

segmente celotnega sistema financiranja TI. Nagraditev navedene celovite 10 let stare analize se izvaja v raziskovalnem projektu, ki je v teku (Bevc et al., 2008). Glavne značilnosti sistema financiranja pa se od srede 90. let niso spremenile. Tri četrtine celotnih javnih izdatkov za TI je namenjeno izobraževalnim ustanovam (skoraj v celoti javnim), četrtina pa raznim vrstam državne finančne pomoči študentom. Delež celotnih javnih izdatkov za finančno pomoč študentom v vseh izdatkih za terciarno izobraževanje je dosti višji od povprečja v EU; znaša 24% nasproti 16% v EU-27 (Eurostat, 2007a). V okviru EU je ta delež le v nekaj državah višji kot v Sloveniji.

3.1.1 Financiranje izobraževalnih ustanov

Med značilnostmi sistema financiranja izobraževalnih ustanov v Sloveniji si oglejmo, kako je s prispevkom študentov, mehanizmom financiranja ustanov, strukturo dohodka ustanov ter izdatki (stroški) ustanov na študenta.

V Sloveniji dodiplomski študenti rednega študija v javnih ustanovah ne plačajo *šolnine* (celotne stroške poučevanja pokrivajo davkoplačevalci), temveč le nizko vpisnino. V okviru EU ima podoben sistem le Poljska. Na drugi strani pa izredni oziroma part-time študenti plačajo šolnino v višini celotnih stroškov poučevanja na študenta. V Sloveniji so redni študenti privilegirani v primerjavi s študenti v drugih evropskih državah. V 16 državah EU morajo full-time dodiplomski študenti plačati šolnino (Eurostat, 2007a). V Sloveniji država oziroma davkoplačevalci pokrivajo tudi del stroškov poučevanja omejenemu številu študentov podiplomskega študija.

Najpomembnejši element v *mehanizmu financiranja izobraževalnih ustanov* je število študentov. Leta 2004 je bil vpeljan nov mehanizem, integralno ali "lump sum" financiranje, ki je utemeljen v poglavju 3.3. Značilnosti in učinke tega mehanizma financiranja so podrobneje proučili Trunk in drugi (2007) ter Tajnikar in Debevec (2007) ter predlagali tudi njegove spremembe.

Struktura dohodka izobraževalnih ustanov se od srede 90. let, ko je bila prvič proučena (Bevc, 1999), ni spremenila. Javni viri predstavljajo tri četrtine dohodka izobraževalnih ustanov, ostalo pa nedržavni viri. Glavni delež v slednjih predstavlja šolnina izrednih oziroma part-time študentov. Po deležu zasebnih virov - v letu 2004 24% (OECD, 2007) - se Slovenija med državami EU uvršča skoraj v sam vrh; povprečje za EU znaša 20% (Eurostat, 2007a). Ta delež je obenem višji tudi v primerjavi s številnimi državami OECD s precej bolj razvitim zasebnim sektorjem v TI in s šolninami v javnih visokošolskih ustanovah.

Izdatki na študenta, izmerjeni kot delež v BDP na prebivalca, so se v obdobju 2001-2004 zmanjšali od 37%

na 34%²; delež je nižji kot v povprečju v državah EU, kjer znaša 39% (Eurostat, 2007a).

3.1.2 Državna finančna pomoč študentom

Slovenija spada v skupino držav, v katerih se študenti razumejo kot finančno odvisni od svojih staršev in posledično je državna finančna pomoč namenjena študentom in njihovim staršem. Ob odsotnosti šolnine za redni študij je ta pomoč namenjena pokrivanju študentskih življenjskih stroškov. Dodeljuje se študentom in njihovim staršem.

Skupni obseg državne finančne pomoči študentom znaša 0,3% BDP v primerjavi s 0,2% BDP sredi 90. let. Pretežni del te pomoči je namenjene rednim oziroma full-time študentom. Na drugi strani pa je večina sredstev namenjena neposrednim oblikam pomoči.

V Sloveniji predstavljajo edino obliko *neposredne pomoči* študentom štipendije. V okviru EU je enak sistem mogoče najti le v štirih drugih državah, v ostalih pa so na razpolago tudi študentska posojila. Te štipendije so omejene predvsem na redne oziroma full-time študente. Kljub povečanemu številu teh štipendij se je delež rednih študentov, ki prejema štipendijo, v poznih 90. letih naglo zmanjšal in se v tekočem desetletju stabiliziral; v letu 2006 je znašal 27%³ (slika 5). Povpraševanje po štipendijah iz javnih sredstev presega ponudbo.

Na drugi strani obstaja v Sloveniji veliko oblik *posredne pomoči* študentom. Mogoče jih je razdeliti v dve skupini: (1) subvencije za življenjske stroške (prehrana, nastanitev, prevoz), ki predstavljajo skupaj kar precejšen znesek⁴, (2) druge oblike posredne pomoči (zdravstveno zavarovanje in študentov neobdavčen dohodek). Glavna oblika posredne pomoči so subvencije za prehrano in nastanitev. V Sloveniji več rednih oziroma full-time študentov prebiva v državno subvencioniranih študentskih domovih kot v povprečju v drugih državah EU in sicer 14% v primerjavi s približno 10% v EU (Eurostat, 2007a), vendar pa kljub temu povpraševanje še vedno precej presega ponudbo.

Državna *finančna pomoč študentovim staršem* zajema otroški/družinski dodatek in davčne olajšave za otroke.

3.1 Planirane spremembe sistema financiranja s strani neodvisnih strokovnjakov in tiste, zajete v nekaterih nacionalnih strateških dokumentih

V drugi polovici 90. let je M. Bevc v raziskovalnem projektu za nekdanje Ministrstvo za šolstvo predlagala spremembo sistema financiranja dodiplomskega študija (Bevc, 1997). Na osnovi značilnosti veljavnega sistema (za redni študij ni šolnine, edina neposredna oblika državne pomoči študentom so štipendije) in izračunane delitve stroškov med različne nosilce (glej poglavje 4) je domnevala, da

² SURS, Statistične informacije, št. 66/2006 in št. 86/2007.

³ Vir: Bevc, 1997 in lastni izračuni na podlagi podatkov SURS (Podatkovna baza SI-STAT; Statistični letopis Slovenije, 2000 in 2006.

⁴ V 90. letih je ta znesek na enega rednega študenta presegal raven te pomoči v številnih razvitih državah

niso zagotovljeni trije osnovni pogoji sistema financiranja iz javnih sredstev: učinkovitost, pravičnost in stabilnost. Danes, po opravljenih empiričnih analizah o uspešnosti študija in pravičnosti državnega financiranja TI (Bevc et al., 2001a, 2001b) predstavljenih v poglavjih 5 in 6, se ti že desetletje stari predlogi kažejo še bolj verodostojni. Predlog sprememb je zajemal oba dela sistema financiranja dodiplomskega študija – financiranje izobraževalnih stanov in finančno pomoč študentom.

V *sistemu financiranja izobraževalnih ustanov* je bila predlagana vpeljava šolnine za redni študij v višini 20-30% stroškov poučevanja na študenta in sprememba mehanizma financiranja iz javnih sredstev – vpeljava formule, v kateri bi bila upoštevana tudi učinkovitost študija (poleg inputov – števila študentov naj bi se upoštevalo tudi število diplomantov in študentov, ki izstopijo). Slednji predlog je bil pred nekaj leti vpeljan in se torej že uresničuje.

V okviru *državne finančne pomoči študentom* pa je bila predlagana ohranitev kombinacije različnih oblik pomoči, vendar pa ob spremenjeni strukturi in s vpeljavo študentskih posojil. Delež neposredne pomoči naj bi se povečal, ta pomoč pa naj bi bila sestavljena iz štipendij (za zagotovitev pravičnosti v dostopu) in državno podprtih študentskih posojil (za zagotovitev učinkovitosti in pravičnosti)⁵. Predlagan je bil program posojil, kjer so odplačila vezana na dohodke bodočega diplomanta (income-contingent student loans). V tekočem desetletju so tak program posojil predlagali tudi Vodopivec in Gaberšček (2002).

Dodatno k gornjemu predlogu je potrebno opozoriti na razprave o možnostih vpeljave *vavčerjev*, o čemer je izdelal študijo Svoltjšček (2007). V nasprotju z njim menimo, da vavčerji niso primerna rešitev za Slovenijo, predvsem zaradi majhnosti države, ki ne omogoča večje ponudbe sorodnih programov na majhni razdalji.

3.2 Planirane vladne spremembe sistema financiranja

V zadnjih desetih letih je bilo v Sloveniji sprejete precej nove zakonodaje s področja financiranja visokega šolstva: Zakon o visokem šolstvu (ZVŠ, 2006), Uredba o javnem financiranju visokošolskih in drugih zavodov v obdobju 2004-2008 (UJFVIDZ, 2003) in številni zakoni o različnih vrstah finančne pomoči študentom (o štipendijah - ZŠ, 2007; o državnem subvencioniranju študentske prehrane - ZDSŠP, 2007). V nadaljevanju prikazujemo planirane spremembe v financiranju izobraževalnih ustanov (prispevek študentov, mehanizem financiranja iz javnih sredstev) in v finančni pomoči študentom.

Prispevek študentov (šolnina) za redni dodiplomski študij v javnih ustanovah, ki traja po starih programih v večini primerov štiri leta (in 1 leto absolventskega staža, kar je edinstveno v primerjavi drugimi državami): V osnut-

ku Nacionalnega razvojnega plana o visokem šolstvu je bila vpeljava šolnin za redni dodiplomski študij omenjena kot možna rešitev v prihodnosti, toda končna inačica tega plana, sprejeta v parlamentu leta 2007 (RNRPVŠ, 2007), te možnosti ni več vključevala. V novem zakonu o visokem šolstvu (ZVŠ, 2006), ki je vpeljal spremenjen sistem študijskih programov v skladu z bolonjsko deklaracijo, je predvideno, da država nadalje financira celotne stroške poučevanja za štiri leta rednega dodiplomskega študija (vsa 3 leta skrajšane prve stopnje ter prvo leto druge stopnje bolonjskih programov).

V *mehanizmu financiranja izobraževalnih ustanov* je vlada nekaj let pripravljala vpeljavo integralnega oziroma »lump sum« financiranja; izvajati so jo začeli v letu 2004 (pilotno obdobje naj bi se zaključilo z letom 2008). Delež »normativnih« sredstev je na začetku tega procesa predstavljal 20% skupnih državnih sredstev izobraževalnim ustanovam; ta delež se bo po Uredbi o financiranju visokošolskih izobraževalnih ustanov (UJFVIDZ, 2003) in njenih spremembah (SUJFVIDZ, 2004, 2006) nadalje povečeval. Obseg normativnih sredstev temelji na formuli, v kateri je poleg števila študentov na rednem študiju upoštevano tudi število diplomantov; odvisen pa je tudi od skupine, v katero je uvrščen posamezen študijski program (obstaja 6 skupin). Nedavno je bila za Ministrstvo za visoko šolstvo izdelana analiza tega mehanizma financiranja s predlogi njegovih sprememb (Trunk et al., 2007). Spremembe mehanizma predlagata tudi Tajnikar in Debevec (2007).

Na področju *finančne pomoči študentom* je bil v letu 2007 prvič doslej sprejet poseben zakon o štipendijah (ZŠ, 2007), ki zajema vse vrste štipendij s poudarkom na štipendijah iz javnih sredstev. Glavni cilji zakona so: povečanje števila in deleža prejemnikov štipendij iz javnih sredstev iz nižjih socialnih slojev, spodbuditi podjetja k ponovnemu štipendiranju (podobno kot je bilo v 80. letih) in povečanje skupnega deleža študentov, ki bi prejeli katerokoli vrsto štipendije.

Pred tremi leti je skupina mladih reformistov predlagala v svojem paketu socialnih reform (OGSR, 2005) vpeljavo »odložene šolnine« (šolnine, ki se odplačuje iz bodočih dohodkov – študentskih posojil), torej prej navedenih posojil, ki so namenjena le za plačilo šolnine. Predlagali pa so tudi vpeljavo vavčerjev.

4 Delitev stroškov terciarnega izobraževanja med različne nosilce

Obsežna celovita analiza delitve celotnih denarnih stroškov dodiplomskega študija na študenta je bila izdelana za sredino 90. let (Bevc, 1997). Ocenjeni letni stroški poučevanja na študenta so znašali 3200 US\$ in ocenjeni letni povprečni življenjski stroški 4000 US\$, skupaj torej 7200 US\$. Prvi stroški so predstavljali 44%, življenjski

⁵ Štipendije iz javnih sredstev naj bi bile omejene na najrevnejše, drugim študentom pa bi naj bi bila na razpolago študentska posojila. Mogoča je tudi inačica, ko lahko najrevnejši dobijo tako štipendijo kot posojilo, ostali pa le posojilo.

stroški pa 56% skupnih denarnih stroškov na študenta. Novejša analiza je v izdelavi (Bevc et al. 2008). Ker za redni študij ni šolnine, davkoplachevalci pokrijejo vse stroške poučevanja za te študente na eni strani, na drugi strani pa tudi velik del njihovih drugih, torej nešolninskih denarnih stroškov prek državne finančne pomoči študentom (sredi 90. let v primeru študenta, prejemnika štipendije iz javnih sredstev, prek 50%). Razlika je pokrita predvsem s strani staršev. Na drugi strani pa morajo izredni oziroma part-time študenti pokriti skoraj vse stroške svojega študija sami ali pa s pomočjo staršev, včasih pa tudi delodajalcev.

Navedena analiza je pokazala, da so redni študenti privilegirani: (1) najprej v primerjavi z mladimi izrednimi študenti, ki nadaljujejo šolanje takoj po zaključenem srednjem izobraževanju in se ne morejo vpisati "redno" zaradi omejenega vpisa na ta študij, in (2) drugič, še bolj v primerjavi z nekaterimi kategorijama mladih, ki se ne morejo vpisati niti redno niti izredno (niso dovolj revni ali nadarjeni, da bi bili upravičeni do štipendije iz javnih sredstev) iz ekonomskih razlogov. Gre za naslednje kategorije mladih: (a) tiste, katerih starši (ali oni sami) ne morejo pokrivati velik del njihovih življenjskih stroškov, ki ga naj bi pokrivali - se ne morejo vpisati redno, in (b) tiste, katerih starši ne morejo pokrivati tako stroškov poučevanja (šolnine) kot tudi življenjskih stroškov - jim omogočiti izreden vpis.

Po našem mnenju je pričakovani prispevek davkoplachevalcev v financiranju rednega dodiplomskega terciarnega izobraževanja in pričakovani prispevek staršev, zlasti za izredno terciarno izobraževanje, previsok, medtem, ko je pričakovani prispevek rednih študentov prenizek.

Predlagane spremembe obeh delov sistema financiranja visokega šolstva, ki jih je izdelala M. Bevc in so utemeljene v poglavju 3.2, bi povzročile naslednje spremembe v delitvi stroškov TI med različne nosilce: a) prispevek staršev in na dolgi rok tudi prispevek davkoplachevalcev bi se zmanjšal na račun b) povečanja prispevka rednega študenta iz njegovih bodočih dohodkov (s vpeljavo študentskih posojil). Najpomembnejša pričakovana korist teh sprememb bi bila povečanje dostopa TI za srednje in nižje socialne sloje ter povečanje uspešnosti študija.

V tekočem desetletju so v Sloveniji potekale številne razprave o šolninah za redni dodiplomski študij v javnih ustanovah (in tudi o posojilih), zlasti v povezavi s spremembo študijskih programov skladno z bolonjsko deklaracijo. Izvajale so se v različnih medijih in bile sprožene s strani različnih ustanov in posameznikov ali organizacij.

Od konca 90. let pa je bilo izvedenih nekaj praktičnih poskusov vpeljave povečanega prispevka študenta v financiranju TI v Sloveniji. Pri tem gre za šolnine za redni diplomski študij ter študentska posojila. Glavne nacionalne dokumente, ki so vključevali poskuse vpeljave šolnin, smo že omenili. V letu 2006 najavljena dejanska vpeljava šolnin za redni dodiplomski študij v bližnji prihodnosti s strani ministra za visoko šolstvo pa je izzvala demonstracije študentov. Te so privedle do pogajanj med predstavniki študentov in ministra, končni rezultat pa je bil umik name-

ravane vpeljave šolnin. Glavni argument študentov proti šolninam je bil, da omejuje dostop do TI revnim (o tej temi govori naslednje poglavje). Drugi poskus povečanja zasebnega financiranja predstavlja majhen program študentskih posojil, ki je bil vpeljan leta 1999 (za manj kot 1% študentov). Ker program ni bil dobro pripravljen, se je pojavilo več težav in leta 2001 je bil ustavljen.

5 Pravičnost javnega financiranja terciarnega izobraževanja

Pravičnost v izobraževanju je v tekočem desetletju v Sloveniji aktualna tema. To poglavje temelji na dveh raziskovalnih projektih o pravičnosti državnega financiranja izobraževanja v naši državi (Bevc et al., 2001a; 2008), od katerih prvi predstavlja prvo kvantitativno analizo tega vprašanja v Sloveniji in drugi - projekt v izvajanju - predstavlja njegovo nadgradnjo.

Pravičnost je v državnem financiranju izobraževanja mogoče presojati po več kriterijih - trije glavni so: (1) zagotavljanje enakosti možnosti vključitve (dostopa) v izobraževanje ne glede na materialni položaj posameznika - socialna pravičnost, (2) plačilo v skladu z ekonomskimi možnostmi - sposobnostjo plačati (več naj plačajo tisti, ki imajo več), (3) plačilo v skladu s prejetimi koristmi iz državne blagajne (več naj plačajo tisti sloji, ki so tudi vključeni - imajo koristi od javnih izdatkov), torej skladnost prispevkov posameznih dohodkovnih skupin v državno blagajno s prejetimi koristmi - transferji države.

Med temi kriteriji se smatra kot ključni prvi, zadnji pa ima v javnih financah omejeno uporabo. Kot dodatni kriterij pa se vsaj na primeru visokega šolstva pogosto pojavlja tudi drug vidik koristi izobraževanja od prej navedenega in sicer velikost individualnih ekonomskih koristi te izobrazbe v obliki višjih plač, nižje brezposelnosti, itd.

V navedeni analizi za Slovenijo (osnovni - Bevc et al. 2001a, ter njeni nadgradnji - Bevc et al. 2008) je bil glavni uporabljen kriterij pravičnost v dostopu, pri čemer se je ta opazovala prek strukture vpisanih po socialnoekonomskem položaju. Gospodinjstva smo glede na razpoložljivi dohodek razdelili v deset dohodkovnih skupin - decilov. Informacijo o socialno-ekonomski strukturi vpisanih, izraženi prek izobrazbene strukture študentovih staršev, je za Slovenijo mogoče dobiti tudi iz nekaterih drugih virov: (a) za tekoče desetletje iz popisa prebivalstva ter raziskave Eurostudent, (b) za prvo polovico 90 let pa iz podatkov Statističnega urada Slovenije⁶.

Na osnovi analiziranja trendov v socialno-ekonomski strukturi študentov v terciarnem izobraževanju v Sloveniji je na podlagi podatkov iz navedenih virov mogoče zaključiti, da veljavni sistem financiranja ne zagotavlja pravičnosti v dostopu. Dostop različnih socialno-ekonomskih skupin mladih do dodiplomskega in zlasti podiplomskega študija ni enak, toda situacija se je v obdobju 1997-2005 izboljšala. Dostop do tega izobraževanja je večji za mlade

⁶ Do leta 1995 so se namreč zbirali podatki o izobrazbi staršev z vpisnim listom ob vpisu v prvi letnik.

iz višjih kot za tiste iz nižjih socialnih slojev. Med dodiplomskimi študenti predstavljajo (2004) tisti iz treh najrevnejših decilov 25%, študenti iz zgornjih treh decilov pa 34%; v letu 1998 pa je bilo razmerje 19:37 (slika 2). Med podiplomskimi študenti, za katere so stroški poučevanja od konca 90. let subvencionirani iz javnih sredstev (za študente na ustreznih študijskih programih oziroma ustanovah), pa predstavljajo tisti iz zgornjih dveh decilov kar dve tretjini; leta 1998 so le-ti predstavljali kar štiri petine.

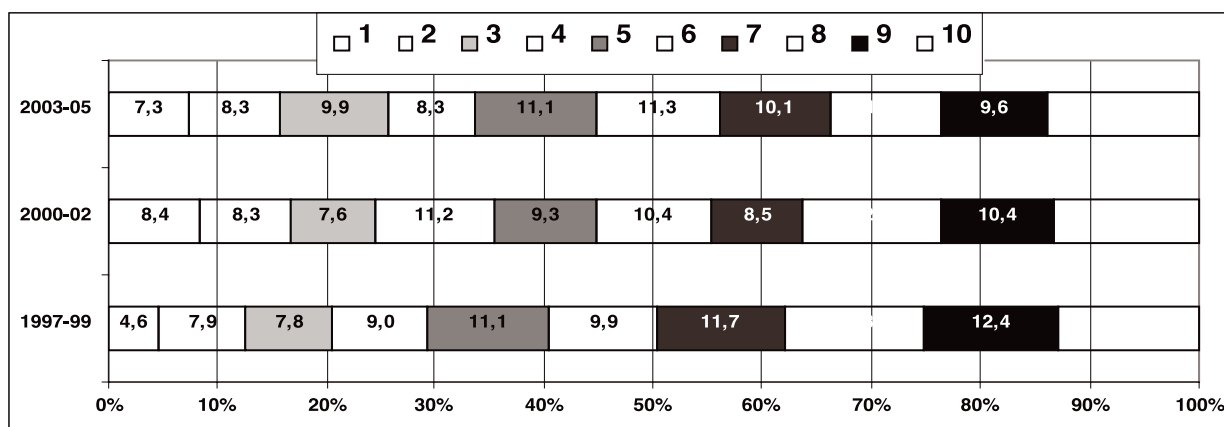
Ti rezultati se skladajo s tistimi o izobrazbenosti študentovih staršev; slednji podatki nam omogočajo analizo trendov celo za daljše obdobje (od začetka 90. let). Vendar pa je spremembe v izobrazbeni strukturi študentovih staršev potrebno primerjati s spremembami v izobrazbeni strukturi ustreznih starostnih skupine (40-60 let) žensk in moških. Primerjava deleža posameznih izobrazbenih kategorij študentovih staršev z ustreznim deležem iste izobrazbene kategorije med ženskami in moškimi v navedeni starostni skupini pokaže z drugimi državami primerljivo sliko socialne selektivnosti v dostopu TI v Sloveniji. Takšna primerjava (kvocientov) je prikazana v siki 3. Kot je razvidno, se je v obdobju 1991-2005 dostopnost mladih iz družin z manj izobraženimi starši povečala, toda vseeno ostaja, podobno kot kažejo tudi analize za druge države (Schnitzer et al., 2005), vrednost navedenega koeficienta za terciarno izobrazbo še vedno precej nad 1, medtem ko je za tiste s končano osnovno šolo ali manj izobrazbe (prvo stopnjo sekundarnega izobraževanja) vrednost tega koeficienta precej nižja od 1⁷.

Drugi rezultati v tem poglavju se nanašajo na pozna 90. leta in so rezultat raziskovalnega projekta o pravičnosti državnega financiranja izobraževanja v Sloveniji (Bevc et al., 2001a). V njem je bilo uresničevanje kriterija "plačilo v državno blagajno v skladu s prejetimi koristmi

iz nje" ocenjeno z analizo porazdelitve državnih izdatkov za visoko šolstvo po socialno-ekonomskih skupinah (dohodkovnih decilih). Ta porazdelitev je bila proučena z dvema pristopoma: (1) izračunom koeficientov koncentracije izdatkov za izobraževanje s primerjavo Ginijevega koeficienta (koncentracije dohodka) in (2) z izračunom deleža izdatkov za izobraževanje v povprečnem dohodku gospodinjstev po socialno-ekonomskih skupinah.

Prvi pristop kaže naslednje: Pozitivna vrednost koeficienta koncentracije za javne izdatke za terciarno izobraževanje (0,139) pomeni, da pri veljavnem sistemu financiranja TI premožni dobijo absolutno več kot revni. Izraženo z drugimi besedami to pomeni, da je študentov več v premožnih gospodinjstvih kot v revnih gospodinjstvih. Ta koncentracija ni izrazita, oziroma je manj izrazita kot je sama koncentracija dohodka (vrednost Ginijevega koeficienta znaša 0,236). Pri tem pa je potrebno upoštevati omejitev, da ni bilo mogoče ločeno opazovati rednih in izrednih študentov. Izhajajoč iz izobrazbenosti njihovih staršev je socialno-ekonomski položaj rednih študentov boljši od položaja izrednih; izredni študenti so v povprečju iz revnejših družin kot redni študenti (Bevc et al., 2008). Tako je mogoče domnevati, da je dejanska vrednost navedenega koeficienta koncentracije izdatkov za TI višja od izračunane, morda celo višja od Ginijevega koeficienta koncentracije dohodka.

Na podlagi drugega pristopa, ki posredno kaže vpliv javnih izdatkov za TI na velikost dohodka gospodinjstev (ta bi bil nižji, če ne bi bilo teh izdatkov), je glavni zaključek za gospodinjstva s študenti za konec 90. let naslednji: (1) izdatki za dodiplomski študij so višji in za podiplomski študij nižji v revnih kot v bogatih gospodinjstvih, in (2) v poprečju predstavljajo javni izdatki za TI 9%

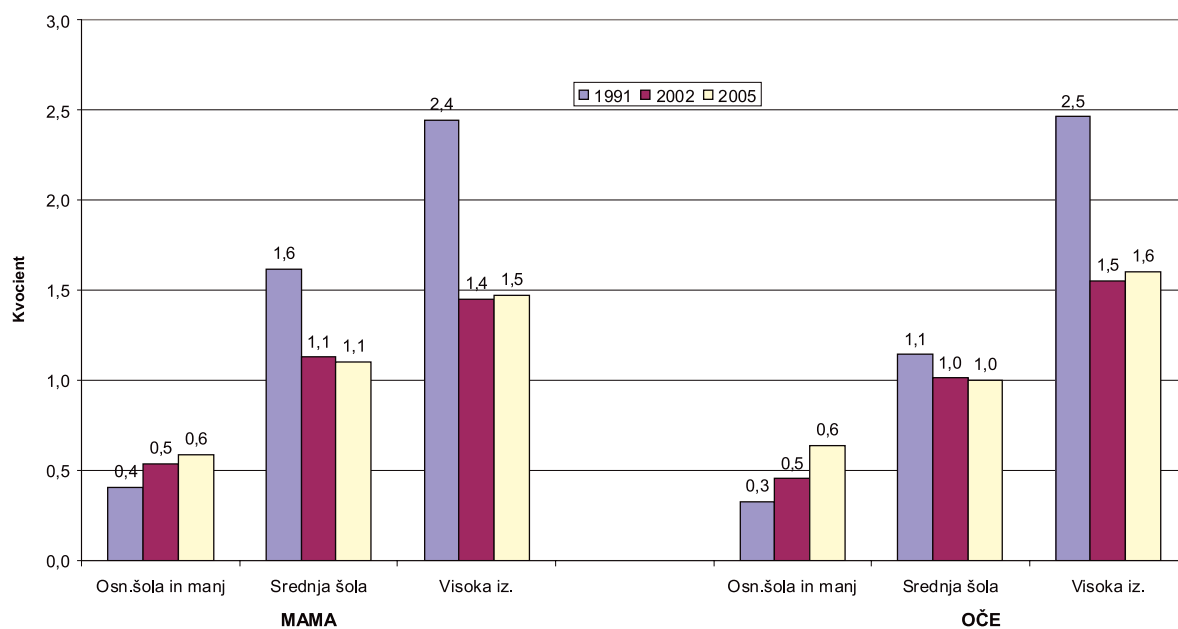


Vir: Bevc et al., 2008 (izračuni na podlagi podatkov SURS – Anкета o porabi gospodinjstev, interna dokumentacija).

^a V sliki se decili (dohodkovne skupine gospodinjstev) vrstijo od najnižjega na skrajni levi do najvišjega na skrajni desni strani.

Slika 2. Struktura študentov dodiplomskega izobraževanja po dohodkovnih decilih gospodinjstev – Slovenija, trije združeni vzorci gospodinjstev (1997-1999, 2000-2002, 2003-2005)

⁷ Povedano z drugimi besedami. Med študenti jih ima večji delež starše z visoko izobrazbo kot znaša delež prebivalcev s tako izobrazbo med vsemi prebivalci v ustreznih starostnih skupini. Nasprotno velja za študente s starši, ki imajo le osnovnošolsko izobrazbo ali manj.



Lastni izračuni na podlagi podatkov v: Bevc et al., 2001a; Eurostudent 2005 – Slovenija, SURS, Popis prebivalstva 1991 (interna dokumentacija), SURS - Popis prebivalstva 2002. (Izračun je prikazan v Bevc et al., 2008)

^a Kvocienti za posamezno izobrazbeno kategorijo predstavljajo razmerje med (števec) deležem študentovih staršev (mame ali očeta) z dano izobrazbo med vsemi, ter (imenovalec) deležem žensk ali moških z enako izobrazbo v ustrezni starostni skupini žensk oziroma moških (40-59 let, v letu 2005 pa 40 do 60 let).

Slika 3. Primerjava izobrazbene strukture študentovih staršev z izobrazbeno strukturo žensk in moških v starostni skupini 40-60 let, Slovenija, 1991-2005 – kvocienti za posamezne izobrazbene kategorije

dohodka gospodinjstev, toda 12% v najrevnejših in 6% v najbogatejših gospodinjstvih.

6 Ekonomska učinkovitost terciarnega izobraževanja

Razlikujemo notranjo in zunanjo ekonomsko učinkovitost izobraževanja; v obeh primerih pa gre za razmerje med inputi in outputi (rezultati) izobraževanja,

6.1 Notranja ekonomska učinkovitost

Notranja učinkovitost izobraževanja označuje medsebojni odnos med "inputi" in rezultati izobraževanja na ravni izobraževalnih ustanov in šolajočega se. Vključuje ekonomsko učinkovitost (proizvodnja maksimalnega "outputa" z danimi sredstvi) in tehnično učinkovitost (proizvodnja maksimalnega "outputa" z določenimi "inputi" pri dani tehnologiji). Za merjenje notranje učinkovitosti izobraževanja se lahko uporabljajo različni preprosti kazalniki kot so na primer stopnja dokončanja študija, stopnja osipa, ipd., pa tudi celovitejši kvantitativni postopki (izobraževalna proizvodna funkcija, meja izobraževalne proizvodne funkcije, ipd.). Z izobraževalno proizvodno funkcijo je bila učinkovitost izobraževanja v Sloveniji doslej merjena le za osnovno in srednje izobraževanje

(Furlan, 1998; Torkar, 2000). Na drugi strani pa je bila v letu 2007 izdelana prva ocena tehnične učinkovitosti za visokošolske izobraževalne ustanove (Tajnikar, Debevec, 2007). V tem poglavju pa se bomo osredotočili na merjenje učinkovitosti študija (napredovanje študentov skozi visokošolski izobraževalni sistem), ki predstavlja osnovo za oceno notranje ekonomske učinkovitosti TI.

6.1.1 Učinkovitost/uspešnost študija

Učinkovitost študija oziroma prehodnost študentov skozi visokošolski izobraževalni sistem je mogoče meriti na podlagi longitudinalnih ali presečnih podatkov. *Longitudinalni pristop* (pristop dejanske generacije), kjer spremljamo isto generacijo v času, je najbolj verodostojen, vendar pa redko v uporabi. Zahteva namreč obstoj neke enotne številke za vsakega študenta, česar v večini držav nimajo. Dobro izkušnje z uporabo longitudinalnega pristopa k merjenju uspešnosti študija je mogoče najti za ZDA v Adelman (2004). Druge primere uporabe tega pristopa pa smo zasledili v OECD publikaciji o kazalnikih izobraževanja iz leta 1998 (OECD, 1998 – za tri države) in nedavno v publikaciji Eurostata o ključnih kazalnikih TI (Eurostat, 2007a – za nadaljnje tri države). Doslej sta bili v Sloveniji izdelani dve longitudinalni analizi učinkovitosti študija dodiplomskih študentov. S prvo (Stergar et al., 1988) je bila spremljana generacija, vpisana v prvi letnik leta 1976,

in z drugo (Bevc et al., 2001b) pa generacija, vpisana v prvi letnik leta 1991. Podobnosti med obema analizama so: (1) opazovana je bila celotna populacija študentov, (2) študenti so bili spremljani 8 let od vpisa v prvi letnik, (3) stopnja diplomiranja je bila nizka in se v 15 letih (časovni razmik med obema opazovanima generacijama) ni spremenila. Le 50% študentov je v 8 letih končalo študij.

Trije glavni kazalniki učinkovitosti študija, uporabljene v drugi navedeni analizi (Bevc et al., 2001b), so: stopnja diplomiranja, stopnja osipa, delež potencialno uspešnih študentov (tistih, ki so bili po 8 letih od vpisa v prvi letnik še vedno vpisani v TI). Med preučevanimi dejavniki uspešnosti študija v tej analizi je posebej zanimiv vpliv izobrazbe staršev. Opazovan je bil vpliv tega dejavnika na stopnjo diplomiranja in na vrsto pridobljene diplome. Stopnja diplomiranja je bila najvišja za študente z najmanj izobraženimi starši. Vpliv na strukturo diplom (višja stopnja: visoka stopnja) pa je bil naslednji: Delež diplomantov na visoki stopnji med vsemi diplomanti in v celi generaciji je premo-sorazmerno povezan z izobrazbo staršev (narašča s stopnjo izobrazbe staršev) oziroma delež diplomantov višje stopnje obratno-smerno povezan z izobrazbo staršev (je najvišji pri študentih z najmanj izobraženimi starši). Visoka stopnja diplomiranja študentov iz revnejših družin je torej predvsem posledica pridobitve diplome višje stopnje, torej na krajših izobraževalnih programih, ki so za državo cenejši od diplome visoke stopnje.

V zadnjih nekaj letih je bilo izdelanih nekaj ocen in izračunov učinkovitosti oziroma uspešnosti študija za slovenske študente z uporabo drugih pristopov – *presečnih podatkov* in sicer v nekaterih nacionalnih raziskovalnih projektih (Zgaga et al., 2004; Trunk et al., 2007) in v dveh mednarodnih študijah (Eurostat, 2007a; Schnitzer et al., 2005). Na podlagi analize, izdelane s strani Zgaga s sodelavci, se je učinkovitost dodiplomskega študija, merjena z dokončanjem študija, v drugi polovici 90. let povečevala, kar je domnevno posledica vpeljave zunanjega preverjanja znanja ob zaključku srednje šole (matura). Analiza Trunkove in drugih je pokazala, da se učinkovitost študija med univerzami ter študijskimi programi precej razlikuje. Na podlagi študije Eurostata o ključnih kazalnikih v TI (Eurostat, 2007a) pa je učinkovitost študija, ne glede na uporabljen kazalnik, vrsto programa in način študija (redni, izredni) v Sloveniji nižja kot v večini drugih držav EU. Nižjo uspešnost napredovanja slovenskih študentov skozi terciarno izobraževanje v primerjavi z drugimi državami EU kaže tudi mednarodna raziskava Eurostudent (Eurostudent, 2005).

Strošek omenjene nizke učinkovitosti študija v Sloveniji je visok (notranja ekonomska učinkovitost izobraževalnih ustanov je nizka). V primeru druge navedene longitudinalne analize (Bevc et al., 2001b), v kateri je v osmih letih študij končalo le 50% študentov, znaša 0,6% BDP, če so upoštevani tudi posredni stroški TI. To pa znaša skoraj polovico celotnih javnih izdatkov za TI.

6.2 Zunanja ekonomska učinkovitost

Od sredine 90. let in v tekočem desetletju se ekonomske koristi izobraževanja v Sloveniji povečujejo in so v primerjavi z razvitimi državami visoke. To velja zlasti za terciarno izobraževanje, če mejne ekonomske koristi izobraževanja merimo z relativnimi plačami ali stopnjo brezposelnosti tistih z visoko izobrazbo v primerjavi s tistimi s srednjo izobrazbo. V Sloveniji je bruto plača osebe z visoko izobrazbo 100% (povprečje za EU: 57%) višja, in stopnja brezposelnosti 50% (EU: 40%) nižja od osebe s srednješolsko izobrazbo⁸.

Individualna stopnja donosa izobraževanja, ocenjena s strani različnih avtorjev (Stanovnik, 1995, 1997; Vodopivec, 1997, 2006; Ahčan et al., 2006), in izračunana na različnih podatkovnih podlagah⁹, z uporabo enake metodologije (Mincerjeva funkcija zaslužkov oziroma plač) se v Sloveniji od začetka 90. let povečuje. Po Vodopivcu (2006) je v letu 2001 za višješolsko izobrazbo znašala 15% in za visokošolsko izobrazbo 20%; je višja kot v državah OECD, kjer je bila ta stopnja izračunana z enako metodo, a drugimi podatkovnimi podlagami (praviloma predvsem Evropski panel o gospodinjstvih, Mora et al., 2007). V 70 in 80. letih, obdobju socializma, pa sta bili tako družbena kot individualna stopnja donosa za TI z uporabo »celostne metode« in podatkov iz popisa vseh zaposlenih v Sloveniji, precej nižji kot v večini drugih držav s podobnimi izračuni (Bevc, 1993). Je pa bila enako kot drugje družbena stopnja nižja od individualne. Druga analiza v Sloveniji, temelječa na uporabi iste metode, in izdelana strani Polanca s sodelavci (2008), pa kaže za tekoče desetletje precej drugačno sliko – visoko družbeno in individualno stopnjo donosa za TI; družbena stopnja za štirileten dodiplomski študij je v letu 2004 znašala 7%.

7 Ekonomska sposobnost študentov in njihovih staršev za povečanje zasebnega financiranja terciarnega izobraževanja

Hipotetične izračune ekonomske sposobnosti staršev in študentov za povečan prispevek k financiranju rednega dodiplomskega študija je v začetku tekočega desetletja izdelala Bevc s sodelavci v raziskavi za Ministrstvo za šolstvo (Bevc et al., 2001a). Ekonomsko sposobnost staršev smo ocenili prek izračuna deleža dohodka gospodinjstev, ki bi bil potreben za plačilo šolnine ob različnih predpostavkah glede višine šolnine (kot delež stroškov poučevanja na študenta), po dohodkovnih decilih. Ekonomsko sposobnost študentov pa smo ocenili prek izračuna dolžine obdobja odplačevanja šolnine iz študentovih bodočih dohodkov (posojil za študij) ob predpostavki, da so posojila namenjena le za plačilo šolnine in

⁸ Viri podatkov: (a) plače v Sloveniji - Statistični letopis Slovenije, 2004 (podatki se nanašajo na leto 2002), (b) vsi ostali podatki (nanašajo se na leto 2005) - OECD, 2007.

⁹ Ocene Stanovnika temeljijo na anketi o porabi gospodinjstev, ostali dve oceni pa na upoštevanju vseh zaposlenih.

da letno breme odplačilnega dolga ne sme presežati 3-4% njihove bodoče plače.

V tem izračunu so bile upoštevane različne predpostavke: da študenti končajo študij v rednem roku, da se diplomanti takoj zaposlijo in da začno odplačevati študentsko posojilo s 25. letom, to je približno 2 leti po začetku zaposlitve (ob predpostavki 4-letnega študija). Glavni rezultat analize je, da bi vpeljava šolnine za redni študij na ravni 20-30% stroškov poučevanja na študenta zahtevala štipendije za najrevnejše, saj bi v najnižjem dohodkovnem decilu taka šolnina presežala 10% letnega dohodka gospodinjstev (arbitrarno določena raven, upoštevana tudi v podobnih analizah v svetu). Na drugi strani pa bi študenti zelo hitro (v 4 do 10 letih) odplačali študentsko posojilo (za šolnino).

Ocena obdobja odplačevanja šolnine prek posojila (iz študentovih bodočih dohodkov) je bila narejena ob predpostavki 0% obrestne mere za posojila ter neupoštevanju stroškov upravljanja programa posojil. Ob upoštevanju nekaterih bolj realnih predpostavk glede uspešnosti študija, hitrosti zaposlitve po diplomu, stroškov upravljanja programa posojil in možnih izgub pri odplačevanju posojil bi bila sedanja vrednost odplačil posojil v primeru majhnega programa posojil verjetno nizka. V tem primeru bi bilo za državo lahko cenejše namesto posojil dati študentom štipendije. Stanje je lahko precej drugačno, če gre za večji program posojil (ki je namenjen tudi pokrivanju študentovih življenjskih stroškov med študijem), če so izgube zaradi neodplačanih posojil majhne ter je majhno tudi državno subvencioniranje posojil.

Podobne rezultate o izvedljivosti vpeljave šolnin in študentskih posojil je dala tudi kasnejša raziskava, izdelana s strani Vodopivca in Gaberščaka (2002), ki sta simulirala učinke vpeljave »odložene šolnine« na ravni 20% stroškov poučevanja na študenta. Če se posojila za tako šolnino odplačujejo prek davčnega sistema, gre za avstralski model posojil.

8 Zaključki

Od leta 1990 se je v Sloveniji vpis na dodiplomski študij ob omejenih javnih izdatkih za TI zelo povečal. Ta prispevek kaže, kako je za dostop izobraževanja različnim socialnim slojem ter učinkovitost študija pomembno ravnotežje med javnim in zasebnim sektorjem pri financiranju TI, torej v delitvi stroškov med davkoplačevalce na eni strani ter družino/starše in študente in drugi strani. Sedanji sistem financiranja dodiplomskega študija v Sloveniji z zelo različno ceno poučevanja (šolnino) za redne in izredne študente v javnih ustanovah (za prve je šolnina enaka nič, za druge pa je postavljena v višini celotnih stroškov poučevanja), s štipendijami kot edino obliko neposredne državne pomoči študentom in omejenim vpisom na redni študij ter brez omejitev pri vpisu na izredni študij ne zagotavlja pravičnosti in učinkovitosti. Dostop tega izobraževanja ni enak za različne socialne skupine (dostopnost je za bogate višja kot za revne) in učinkovitost študija je nizka. Analiza delitve stroškov med različne nosilce kaže, da je za redni dodiplomski študij v javnih ustanovah pričakova-

ni prispevek davkoplačevalcev in staršev velik, pričakovani prispevek samega rednega študenta pa nizek. Redni študenti so privilegirani v primerjavi z izrednimi študenti in v primerjavi z nekaterimi kategorijami mladih, ki se ne morejo vpisati niti redno niti izredno iz ekonomskih razlogov.

Na podlagi opravljenih in v prispevku predstavljenih analiz je naše stališče, da je v Sloveniji potrebno in mogoče povečati zasebno financiranje dodiplomskega študija v javnih ustanovah s vpeljavo šolnine (na ravni 20-30% stroškov poučevanja na študenta) in državno podprtega programa študentskih posojil. Takšne spremembe bi imele za posledico zmanjšanje prispevka staršev in na dolgi rok tudi davkoplačevalcev na račun povečanja prispevka rednega študenta iz njegovih bodočih dohodkov. V Sloveniji obstajajo vsi ekonomski razlogi za povečano zasebno financiranje TI tako na nacionalni ravni, kot na ravni izobraževalnih ustanov in na ravni študenta. Ključni taki razlogi so: javna sredstva so omejena, pričakovani prispevek rednih študentov je majhen, notranja učinkovitost izobraževalnih ustanov je nizka, obenem ni zagotovljena socialna pravičnost v dostopnosti TI. Ocena ekonomske sposobnosti študentov in staršev kaže, da je vpeljava šolnine (in študentskih posojil) na navedeni ravni izvedljiva.

V zadnjih dveh letih je vlada spoznala potrebo po celoviti reformi sistema financiranja TI v Sloveniji ter nujnost razpoložljivosti nekaterih novih analiz o financiranju TI. Tako je naročila neodvisnim strokovnjakom izdelavo nekaj raziskav navedene tematike. To je verjetno tudi posledica dejstva, da so bile nekatere nedavne dejanske spremembe (vpeljava majhnega programa študentskih posojil ob koncu 90. let) ali napovedane spremembe (najava vpeljave šolnine za redni študij s strani ministra za visoko šolstvo, 2005-2006) niso dale pozitivnih učinkov. Številne druge delne parcialne reforme (mehanizem financiranja izobraževalnih ustanov, državna finančna pomoč študentom) so bile boljše pripravljene, toda nekatere med njimi še vedno zahtevajo nadgradnjo. Nedavni neuspehi poskus povečanja zasebnega financiranja, ki je izzval proteste študentov, je pokazal na to, da je reforma sistema financiranja terciarnega izobraževanja zahtevna naloga.

Glavni pogoji za realizacijo povečanega zasebnega financiranja terciarnega izobraževanja v Sloveniji so: (1) reforma mora upoštevati celovitost sistema financiranja (nujnost sočasnih sprememb sistema financiranja izobraževalnih ustanov in državne finančne pomoči študentom), (2) reforma mora biti zelo dobro pripravljena, (3) o glavnih elementih reforme mora biti doseženo soglasje med vsemi ključnimi subjekti, (4) spremenjena morajo biti nekatera splošna prepričanja, med njimi zlasti, da je terciarna izobrazba javna dobrina in da je šolnina nepravilna. Potrebno pa bi bilo spremeniti tudi ustavo, saj sedanja ne dovoljuje šolnine za redni študij. Uspešnost reforme pa je vsekakor odvisna tudi od politične volje in moči.

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Jože Jesenko / Manca Jesenko

Multivariatne statistične metode

UNIVERZA V MARIBORU
FAKULTETA ZA ORGANIZACIJSKE VEDE



Založba Moderna organizacija

Dejavnost družbe kot dejavnik pri izbiri davčne oaze

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Ekonomski uspeh davčnih oaz leži v njihovi politiki. Navsezadnje so to države/ozemlja, ki se trudijo gospodarsko uspeti tako, kot vse ostale države. Konkurenca med državami je velika, z globalizacijo pa se je v zadnjem obdobju še okrepila. So države, ki konkurirajo z znanjem, s socialno varnostjo, poceni delovno silo, z ekonomijo obsega, geografskim položajem itd. Davčne oaze so področja, ki imajo (najpogosteje) svoje ureditve prilagojene tako, da so čimbolj konkurenčne na fiskalnem in pravnem področju. Davčnih oaz je veliko, prav tako pa družb, ki iščejo primerna področja za svoje dejavnosti. Načrtno ali nenačrtno so se posamezne davčne oaze razvile oziroma veljajo za bolj primerne za določeno vrsto dejavnosti kot druge. Tako imajo nekatere davčne oaze zelo dobro razvito bančništvo, druge zavarovalništvo, nekatere pa so primernejše za ustanavljanje holdingov, za upravljanje s skladi ali za katero izmed drugih dejavnosti. Namen članka je dokazati tezo, da se davčne oaze med seboj razlikujejo glede na funkcionalnost.

Ključne besede: davčne oaze, mednarodna podjetja, offshore bančništvo, offshore skladi, e-trgovina, offshore holdingi

1 Uvod

Adam Smith je v svojem svetovno znanem, temeljnem delu s področja ekonomije, *Bogastvo narodov*, že leta 1776 zapisal, da previsoka obdavčitev prisiljuje ljudi, da selijo svoja podjetja v tista okolja, kjer bodo v večji meri deležni sadov svojega dela (Mitchell, 2007: 4).

Naraščajoč obseg gibanja blaga in storitev čez nacionalne meje kaže na vedno večje povezovanje svetovnih ekonomij. Meddržavne meje izgubljajo pomen, svet postaja globalen in izboljšujejo se transportne povezave. Izginjajo tudi ovire za čezmejne denarne transakcije, kar prispeva k porastu pomena mednarodnih financ. Za razvoj finančnih aktivnosti so še posebej pomembne nove komunikacijske tehnologije, saj so računalniki, internet in telekomunikacijski sateliti pomembno znižali stroške mednarodnih finančnih transakcij. Zahvaljujoč inovativnim tehnološkim rešitvam informacije po vsem svetu potujejo hitro in enostavno. Rezultat tega so hitro rastoča mednarodna podjetja, ki predstavljajo velik delež v svetovnem gospodarstvu. Poslovne enote teh podjetij po svetu

dnevno opravljajo na milijone transakcij, s tem pa se otežuje ugotavljanje dobičkov v državah, kjer delujejo.

Prav v dejstvu, da organizacijske in kapitalske povezave omejujejo transparentnost poslovanja posamezne poslovne enote, s čimer se otežuje proces obdavčevanja, so mednarodna podjetja našla svoj vir konkurenčne prednosti. Svojo celotno davčno obveznost znižujejo tako, da za prenos proizvodov ali storitev med povezanimi podjetji, ki delujejo v različno ugodnih davčnih okoljih, izberejo takšne prenosne cene¹, s katerimi prikazujejo višje dobičke v davčni oazi z nizko ali nično učinkovito davčno stopnjo, ter nižje dobičke v državi z visoko učinkovito davčno stopnjo.

2 Opredelitev in zgodovinski razvoj davčnih oaz

Davčne oaze so področja ali države, ki v svoji zakonodaji opredeljujejo nizko ali nično davčno stopnjo in ostale

¹ Prenosne cene so cene, ki se nanašajo na poslovne učinke, to je proizvode in storitve, ki prehajajo med organizacijskimi enotami v podjetju ali med povezanimi podjetji. V mednarodnem podjetju so to cene, po katerih so ovrednoteni prenosi proizvodov in storitev, ki potekajo znotraj skupine podjetij, to je med obvladujočim podjetjem in odvisnim podjetjem ali med dvema odvisnima podjetjema. Prenosne cene se nanašajo tudi na prenose surovin, polproizvodov in neopredmetenih dolgoročnih sredstev (na primer avtorskih pravic in licenčin za uporabo blagovnih znamk) med povezanimi podjetji (Zaman, 2003: 131). V angleškem jeziku se za notranje ali prenosne cene dosledno uporablja izraz *transfer prices* (izjemoma se v kontekstu prenosov med povezanimi podjetji uporablja tudi izraz *shadow prices* – glej npr. Durst, 2002: 97). V prispevkih slovenskih avtorjev pa se uporabljajo izrazi *notranje*, *prenosne* ali *transferne* cene.

ugodnosti za tuja podjetja oziroma nerezidente (Valant in Urbič, 2005: 5).

Organizacija za gospodarsko sodelovanje in razvoj² v svoji publikaciji *Harmful Tax Competition* davčne oaze opredeli s štirimi kriteriji (Harmful Tax Competition, 1998: 23):

1. nična ali samo nominalna davčna stopnja na relevantne prihodke (ta pogoj mora biti primarno izpolnjen, da se neko območje obravnava kot davčna oaza),
2. pomanjkanje učinkovite menjalne kontrole (davčne oaze imajo navadno zakone in administrativne ureditve urejene tako, da imajo družbe oziroma posamezniki zagotovljeno zaupnost informacij in ostalo zaščito pred tretjimi osebami),
3. pomanjkanje transparentnosti (pomanjkanje preglednosti poslovanja, pravnih in administrativnih določb) in
4. pomanjkanje osnovne dejavnosti v davčni oazi (odsotnost osnovne dejavnosti nakazuje, da skuša privabiti nove investitorje in/ali transakcije zaradi davčnih ugodnosti, ki jih omogoča).

Mednarodni denarni sklad³ pa opredeljuje davčno oazo z naslednjimi tremi značilnostmi (International Monetary Fund, 2007):

1. jurisdikcija, ki ima relativno veliko število finančnih institucij, primarno za poslovanje z nerezidenti,
2. finančni sistem z obsegom kapitala, ki je nesorazмерно večji od obsega, ki ga za financiranje potrebuje domače gospodarstvo in
3. središče, ki ponuja storitve za nično ali zelo nizko stopnjo davka, enostavno finančno regulacijo ter bančno tajnost lastnika računov.

V svetovni in domači literaturi se poleg izraza *davčna oaza* pogosto uporabljajo tudi izrazi »offshore«⁴, davčni paradiz, davčni raj in proste cone.

Davčne oaze obstajajo tako dolgo kot obdavčevanje. Zgodovina sicer navaja, da začetki davčnih oaz segajo v antično Grčijo, ko so trgovci hranili blago na otokih blizu Aten, v želji, da se izognejo 2-odstotnemu uvoznemu davku. V 15. stoletju je Flandrija, ki je bila takrat mednarodno trgovsko središče, imela le malo ali nič omejitev pri izmenjavi blaga. Od 16. do 18. stoletja je bila znana davčna oaza Nizozemska, njena pristanišča so zato postala največja na svetu.

Prvi primer novodobne davčne oaze je Švica. Mnogo pred drugo svetovno vojno se je ta država razvila v raj za kapital. Anonimni bančni računi so omogočali, da je v času nemirov kapital pobegnil iz Rusije, Nemčije, Južne Amerike, Španije in z Balkana. Z drugo svetovno vojno pa se je dotok kapitala v Švico še povečal, saj so davki dru-

god po svetu naraščali, da bi zadovoljili socialne potrebe in potrebe po obnovi. Švica je bila pri tem izjema, saj davki niso naraščali kot drugod, ker je bila država neodvisna in ni bila neposredno vpletena v vojne (Tun, 1999: 4).

Resničen razmah davčnih oaz je bil v 60-ih in 70-ih letih prejšnjega stoletja, ko so davčne oaze postale resna grožnja prvorazrednim državam, katerih davčne stopnje so nenehno rasle. Te države, ki so v davčnih oazah videle nevarne tekmece, so v 80-ih letih pričele pritiskati na davčne oaze in si prizadevati za njihovo ukinitve. Mnoge so v tem obdobju popustile zunanjim zahtevam, nekaj pa jih je obdržalo svoje ureditve in se niso pustile ustrahovati (Barber, 2006: 15). Z razvojem sodobne telekomunikacijske tehnologije v zadnjih dveh desetletjih so se davčne oaze še intenzivneje razvijale in nove dejavnosti so se selile v davčne oaze.

Velik zasuk na področju davčnih oaz je sledil po 11. septembru 2001 in terorističnih napadih na Združene države Amerike. Šest tednov po napadih je ameriška vlada izdala ameriški patriotski akt, katerega pomemben del je povezan z bančništvom v davčnih oazah in preprečevanjem pranja denarja.

3 Davčne oaze danes in njihova prihodnost

Dejstvo je, da davčne oaze privabljajo tuje investicije v mnogo večjem obsegu kot ostale primerljive države ali območja, ki nimajo značilnosti davčnih oaz. Kritiki davčnih oaz trdijo, da davčne oaze lahko do neke mere spodbujajo davčno politiko držav z visoko davčno stopnjo. Ta trditev ne drži popolnoma, saj davčne oaze spodbujajo novo investiranje, med dodatnimi investicijami pa je mnogo takšnih, ki se vračajo v države z višjo davčno stopnjo, kar pomeni, da davčne oaze stimulirajo tudi ekonomske aktivnosti izven samih davčnih oaz. Zato je v večini držav z višjo davčno stopnjo težko ovrednotiti vse posledice, oziroma izdelati končne ekonomske bilance prednosti in slabosti davčnih oaz. Iz tega razloga je malo verjetno, da bi kljub velikemu nasprotovanju prišlo do kolektivnega boja za ukinitve davčnih oaz.

Da so davčne oaze ekonomsko uspešne, pričra primerjava svetovne rasti bruto domačega proizvoda (BDP) z rastjo BDP v davčnih oazah med letoma 1982 in 1999: svetovna rast je znašala 1,4 % letno, rast v davčnih oazah pa 3,3 % letno (Hines, 2004: 1). Zanimivo je tudi dejstvo, da je med petnajstimi najbogatejšimi državami na svetu kar enajst davčnih oaz (Mitchell, 2007: 5), letno pa naj bi se v davčnih oazah ustanovilo približno 150.000 novih podjetij (Mesar, 2004: 5). Natančne podatke o davčnih oazah je zaradi tajnosti podatkov in anonimnosti lastništva zelo tež-

² Organization for Economic Cooperation and Development (OECD)

³ International Monetary Fund (IMF)

⁴ Offshore v dobesednem prevodu pomeni eksteritorialni del ali drugače povedano »izven obale«, kar je bila tudi značilnost nekaterih davčnih oaz, še posebno v preteklosti. Še danes obstaja veliko davčnih oaz, ki ustrezajo tej terminologiji, kot so npr. naslednje otožne davčne oaze: Kajmanski otoki, Bahamski otoki, Ciper, Vanuatu, Deviški otoki in druge. Vendar pa izraz offshore danes vsebinsko ni več ustrezen, saj obstaja veliko število davčnih oaz, ki nimajo teh značilnosti (npr. Švica, Luksemburg, Gibraltar itd).

ko oziroma nemogoče pridobiti, po nekaterih ocenah pa naj bi več kot 50 % vseh svetovnih transakcij že potekalo prek davčnih oaz (Valant, 2005: 21).

Na davčnem področju je izredno zanimiv primer skandinavskih držav, ki imajo visoko davčno stopnjo, kljub temu pa relativno malo fizičnih in pravnih oseb, ki se poslužujejo davčnih oaz. Odgovor na vprašanje, zakaj za te države ne drži teza, da se podjetja selijo v davčne oaze zaradi izogibanja plačila davkov, je treba najverjetneje iskati v dejstvu, da davkoplačevalci državi sicer veliko dajo, vendar pa jim država tudi veliko (po)vrne. Skandinavske države so namreč znane po svoji socialni varnosti in učinkovitosti državnega aparata, predvsem pa po poštenosti in nepohlepnosti.

Čprav je geografskih razdelitev davčnih oaz veliko, se davčne oaze geografsko najpogosteje delijo na naslednja območja (Global Money Consultants, 2007):

- Afrika in Indijski ocean: Mauritius, Liberija, Sejšeli;
- Karibsko otočje⁵: Bahami, Angvila, Bermudi, Deviški otoki, Kajmanski otoki, Dominika, Nizozemski Antili, Saint Kitts in Nevis, Saint Vincent in Grenadines, Otočji Turks in Caicos;
- Centralna in Južna Amerika: Kostarika, Belize, Panama;
- Evropa: Švica, Ciper, Gibraltar, Guernsey, Jersey, Liechtenstein, Luksemburg, Malta, Otok Man, Albanija, Črna gora, Ukrajina, Srbija, Makedonija, Romunija, Bolgarija;
- Bližnji vzhod: Združeni arabski emirati;
- JV Azija in pacifiško otočje: Vanuatu, Cookovo otočje, Hong Kong, Marshallovi otoki, Niue, Zahodna Samoa.

Meniva, da bodo davčne oaze tudi v prihodnosti imele pomembno vlogo v svetovni davčni politiki. Najverjetneje bo na strani tradicionalnih davčnih sistemov na eni strani prišlo do uvajanja posebnih davčnih ugodnosti, na drugi strani pa do omejevanja transakcij s podjetji, ki poslujejo v davčnih oazah. V Sloveniji smo že priča slednjemu, saj je slovenska vlada z novo davčno zakonodajo, ki je bila sprejeta jeseni 2006, spremenila obdavčitev povezanih oseb in s tem povezanih transference cen. Novi zakon o davku od dohodkov pravnih oseb (ZDDPO-2) tako dodatno preprečuje neobdavčeno odlivanje dobičkov oziroma dohodkov v tujino (Kuhar, 2007: 276).

Prihodnost davčnih oaz je odvisna tudi od delovanja mednarodnih institucij. Leta 1998 je Organizacija za gospodarsko sodelovanje in razvoj v svoji publikaciji »Škodljiva davčna konkurenca, porajajoč globalni problem⁶«, vzpostavila neke vrste mednarodni standard, ki naj bi bil osnova za boj proti škodljivim davčnim praksam. Leta 2000 je ista organizacija izdala seznam davčnih oaz, tako imenovano »črno listo«, ki ustrezajo kriterijem iz te publikacije in od tedaj naprej tekoče nadgrajujejo seznam⁷.

4 Dejavnost družbe kot dejavnik pri izbiri davčne oaze

Med davčnimi oazami je veliko podobnosti, kljub temu pa so nekatere bolj primerne za določene dejavnosti od drugih. Govorimo o funkcionalni razdelitvi davčnih oaz, pri čemer je pomembno, kako davčna oaza ureja in upravlja različne poslovne sektorje in pravne subjekte. Tako so nekatera območja bolj zanimiva in primerna za bančništvo, druga za upravljanje skladov, za razvoj e-trgo-



Slika 1: Zemljevid davčnih oaz. Vir: Global Money Consultants, 2007.

⁵ Za potrebe ameriških družb in ameriških lastnikov kapitala so se razvile davčne oaze na Karibskem otočju, za potrebe kapitala iz celinske Evrope so se razvile nekatere davčne oaze na evropski celini, za potrebe japonskih vlagateljev in družb pa so pomembne predvsem davčne oaze v jugovzhodni Aziji in na pacifiškem otočju.

⁶ *Harmful tax competition, An Emerging Global Issue* (1998).

⁷ Ena pomembnejših prednosti davčnih oaz je zaupnost informacij, kar pa se je v veliki meri spremenilo po terorističnih napadih na Združene države Amerike leta 2001. Od tedaj so davčne oaze pod večjim pritiskom glede razkrivanja informacij in so prisiljene sodelovati z Organizacijo za ekonomsko sodelovanje in razvoj (Crnomarkovič, 2002: 19).

vine, registracijo plovil, registracijo holdingov, dejavnost zavarovalništva, igralništva ali pa za zaščito intelektualne lastnine.

Začetki poslovanja v davčni oazi so podobni začetkom v kateri koli drugi državi, le da gre pri tem poslovanju pogosto za primere, kjer fizična prisotnost ni načrtovana, zato je zelo pomemben način oziroma možnost poslovanja na velike razdalje. Potrebno je poudariti, da davčne oaze niso večne in da je med davčnimi oazami mnogo takšnih, ki garantirajo nadaljevanje trenutne davčne ureditve vsaj še za določeno število let. Pred tridesetimi leti je bila izbira primerne davčne oaze mnogo preprostejša, kot je danes, ko je v svetu že prek 50 davčnih oaz (Lowtax, 2007). Poleg same lokacije in infrastrukturne ureditve posamezne davčne oaze je potrebno posebno pozornost nameniti vprašanju, kakšno prednost ponuja glede na dejavnost, ki jo podjetje opravlja. Z ekonomskega vidika je potrebno pretehtati med koristmi in stroški, ki so povezani s selitvijo v davčno oazo. Dodatna previdnost pri izbiri pa je potrebna pri objektivnosti informacij, saj se posamezne davčne oaze trudijo, da bi pritegnile čim večje število potencialnih ustanoviteljev in investitorjev, zato uporabljajo marketinške trike, ki ponavadi olepšajo sliko dejanskega stanja.

Da se izognemo vsem pastem in nevarnostim, mora biti proces izbire primerne davčne oaze skrbno načrtovan. Proces izbire lahko razdelimo na dve stopnji:

- proučitev različnih vidikov poslovnega okolja davčnih oaz ter
- analiza davčnih oaz glede na dejavnost družbe;

4.1 Proučitev različnih vidikov poslovnega okolja davčnih oaz

Pri izbiri davčne oaze je pomembno proučiti nekatere značilnosti poslovnega okolja različnih davčnih oaz. Področja, ki jim je potrebno nameniti največ pozornosti so: politična in ekonomska stabilnost, zakonodaja, stroški ustanovitve in delovanja družbe, prilagodljiva korporativna ureditev, infrastruktura, komunikacije, jezik in razvitost bančnega sistema (Šešok, 2002: 9-11).

Politična in ekonomska stabilnost: davčna oaza mora biti varna, zagotovljena mora biti zaupnost in družbena stabilnost. Trdimo lahko, da je to najpomembnejši kriterij, kajti če v državi davčne oaze izbruhne vojna ali pride do gospodarskega zloma, podjetje utrpí največjo škodo.

Zakonodaja: posebno pozornost je potrebno nameniti različnim pravnim sistemom. Veliko davčnih oaz uporablja anglosaški pravni sistem, ki se bistveno razlikuje od kontinentalnega. Bistveno pa je, da je zakonodaja učinkovita, fleksibilna, moderna in enostavna.

Stroški ustanovitve in delovanja družbe: kljub ugodnejšim davčnim stopnjam so lahko ostali stroški, kot so npr. stroški registracije, administracije, letnih provizij in ostalih storitev, visoki.

Prilagodljiva korporativna ureditev: preveriti je potrebno najpomembnejše elemente korporativne ureditve,

kot so minimalni ustanovitveni kapital, število direktorjev, odgovornost itd.

Infrastruktura: davčne oaze so privlačne tudi zaradi enostavnih ureditev in postopkov. Zato je pomembno, da je vsa infrastruktura, ki je neposredno ali posredno povezana z dejavnostjo, dobro razvita in servisirana. Med najbolj osnovne spadajo pravne in svetovalne službe, računovodske in revizijske storitve, promet, zdravstvo in sodstvo.

Komunikacije: čeprav je vedno več davčnih oaz, ki se ne nahajajo več v eksotičnih krajih, pa je takih še vedno precej, zato so pomembne tudi letalske in druge transportne povezave. Podjetja, ki se selijo v davčne oaze, pričakujejo dobre povezave s svetom, predvsem z največjimi poslovnimi središči.

Jezik: pri izbiri davčne oaze imajo večinoma prednost angleško govoreča območja oziroma območja, kjer je jezik domačega prebivalstva (ali široko razširjen jezik) eden od svetovnih jezikov.

Bančništvo: banke morajo nuditi celovite storitve oziroma moderno bančništvo. Za veliko davčnih oaz je znano, da imajo banke precej liberalna oziroma prilagodljiva pravila poslovanja, po drugi strani pa je pomembna tudi visoka zaupnost informacij.

4.2 Analiza davčnih oaz glede na dejavnost družbe

Po proučitvi značilnosti poslovnega okolja je potrebno ovrednotiti davčne oaze z vidika funkcionalnosti, kar pomeni, da je potrebno preveriti, ali bo podjetje želena dejavnost lahko uspešno izvajalo v izbrani davčni oazi.

V nadaljevanju je opisanih pet dejavnosti, ki se najpogosteje selijo v davčne oaze. Ob tem so pri vsaki izmed njih najprej na kratko opisane značilnosti posamezne dejavnosti, nato pa sta izmed možnosti, ki se ponujajo, podrobneje predstavljene po dve davčni oazi, ki se uvrščata v skupino davčnih oaz, ki najbolje servisirajo posamezno izbrano dejavnost. V ta namen sva izbrala naslednje dejavnosti in primere davčnih oaz:

- bančništvo s primeroma davčnih oaz Kajmanski otoki in Švica,
- upravljanje skladov s primeroma davčnih oaz Hong Kong in Irska,
- e-trgovina s primeroma davčnih oaz Gibraltar in Dubaj,
- registracija plovil s primeroma davčnih oaz Panama in Liberija ter
- holdingi s primeroma davčnih oaz Britanski Deviški otoki in Luksemburg.

4.2.1. Bančništvo

Danes imajo skoraj vse davčne oaze dobro razvito bančništvo, saj je bančništvo temelj finančnega sektorja. Nekatere davčne oaze razlikujejo med domačimi in offshore bankami, s tem da so slednje najpogosteje neobdavčene, plačujejo pa stroške licenčnine. Splošna značilnost banč-

ništva v davčnih oazah je tajnost, ki je pogosto določena kar v zakonih in statutih. Potrebno je poudariti, da ima v zadnjem času vedno več davčnih oaz mednarodne sporazume o razkrivanju podatkov v primeru posebnih okoliščin (terorizem), kar pomeni, da obstaja vedno manj možnosti za nelegalno poslovanje.

Največji razmah je offshore bančništvo doživelo med letoma 1960 in 1970, ko so industrijske države krepile reguliranost finančnega sektorja. V začetku 60-ih let se je število offshore bank povečalo za štirikrat, od tega četrtina v karibskem območju in petina v evro območju. Bilančna vsota offshore bank je v tem času zrasla za sedemkrat. Ta silen razmah bančništva v davčnih oazah je v 60-ih in 70-ih letih povzročil še več zahtev po razkrivanju finančnih podatkov, visoko stopnjo obdavčitev v nekaterih državah OECD, kontrolo pretoka kapitala, restriktivno politiko novih finančnih produktov, zviševanje obrestnih mer in obvezne depozitne rezerve. V času restriktivne politike mednarodnih finančnih institucij so se mednarodne finance s pomočjo davčnih oaz močno razširile. V Aziji se je offshore bančništvo razvilo po letu 1968, pionirska država na tem območju je bil Singapur. V Evropi je predvsem Luksemburg s svojo liberalnejšo politiko do davkov in strogo politiko na področju razkrivanja podatkov povzročil privlačno območje za tuje investitorje. Na Bližnjem vzhodu je bila v sredini 70-ih let najpomembnejša davčna oaza Bahrajn. Ta trend se je nekoliko umiril šele v začetku 90-ih let, vendar je offshore bančništvo še vedno vzporedna alternativa visoko reguliranim finančnim trgov (Luca in Musalem, 1999: 16).

Bančništvo je dejavnost, ki je dobro razvita v skoraj vseh davčnih oazah. V nadaljevanju sta predstavljeni dve: Kajmanski otoki in Švica, ki sta privlačna centra za offshore bančništvo, razlika med njima pa je kljub temu precejšnja.

Kajmansko otočje

Tehnični podatki (Barber, 2006: 225):

- pravni sistem: anglosaški pravni sistem,
- uradni jezik: angleški,
- na offshore področju zelo dobro razvito bančništvo, registracija plovil, investicijski skladi in zavarovalništvo,
- davkov in nadzora blagovne menjave ni, prav tako ne nadzora tujega lastništva.

Kajmansko otočje z vsega 50.000 prebivalci je skupek treh otokov med Kubo in srednjeameriškim celinskim mostom, kar jo uvršča med karibske davčne oaze. Prvi začetki offshore dejavnosti segajo v leto 1785, ko je angleški kralj otočju podelil poseben status, s čimer je prebivalce razbremenil služenja vojaškega roka in plačevanja davkov. Vendar se je offshore dejavnost razvila šele po letu 1954, ko so na otoku zgradili letališče (Bornscheuer, 1999: 235). Offshore dejavnost je imela koristi predvsem od osamosvojitvenih teženj na Bahamskem otočju v začetku 70-ih let, zaradi česar so številne banke preselile svoje sedeže na

Kajmanske otoke, ki so bili v tistem času politično precej bolj stabilni. Močan pozitiven vpliv je imel tudi prenos kapitala iz Hong Konga ob prehodu le-tega pod Kitajsko. V preteklosti je bilo Kajmansko otočje vključeno na črno listo OECD, kasneje pa je bilo s te liste umaknjeno, saj se veljavna zakonodaja zelo dosledno izvaja, država pa ima tudi visoko kompetenten pravosodni državni sistem, zaradi česar je v državi zelo malo korupcije in kriminala. Zakoni so enostavni in lahko razumljivi, država pa uspešno varuje in krepi temeljne vrednote svobodne družbe.

Kajmanski otoki slovijo kot največja davčna oaza na področju bančništva s kar 350 bankami (Lowtax, 2007). Na tem območju so prisotne skoraj vse pomembnejše svetovne banke, vendar gre pogosto zgolj za formalno prisotnost, saj je veliko število bank prisotnih zgolj s poštnim nabiralnikom. Vse banke na Kajmanskih otokih nadzira Kajmanska monetarna oblast⁸, na otoku pa deluje tudi prek 40.000 tujih podjetij, ki so lahko potencialne stranke.

Švica

Tehnični podatki (Barber, 2006: 159):

- pravni sistem: kontinentalno pravo,
- uradni jeziki: nemški, francoski, italijanski, retoromanski in angleški,
- na offshore področju je daleč najbolj razvito bančništvo, razviti pa so tudi investicijski skladi in zavarovalniški produkti,
- izredno kompleksna dvostopenjska (federativna in kantonska) davčna struktura – davčna stopnja v povezavi s prvo je približno 10-odstotna, v povezavi z drugo pa približno 15 do 32-odstotna. Ob tem pa so za posebne oblike podjetij možne mnogo nižje obdavčitve;
- kontrole blagovne menjave ni.

Ta alpska država je ena izmed politično in ekonomsko najbolj stabilnih držav na svetu. Že stoletja je znana kot država, ki ima izredno dobro razvito bančništvo. Ne sodi v kategorijo novodobnih davčnih oaz, vendar je vseeno pogosto zelo primerna izbira za bančništvo. Švica ni država, ki bi imela nične davčne stopnje, niti ne pomanjkljivih in prilagodljivih zakonov. Za določene dejavnosti ima sicer nizke davke, hkrati pa je tudi birokratska, počasna in draga. Švica še vedno velja za največji svetovni center zasebnega bančništva, in več kot tretjina svetovnega denarja je naložena v švicarskih bankah (Barber, 2006: 50). Švica je ostala nevtralna tudi med obema svetovnima vojnoma in zato predstavlja dolgoročno varnost, bančna tajnost pa je zapisana v zakonih in se strogo izvaja, kljub številnim mednarodnim pritiskom. Švica ima razmeroma dobre odnose z Evropsko Unijo, je pomembna članica OECD in ima sporazume o izogibanju dvojnega obdavčenja z več kot 50 različnimi državami. Pomembno je dejstvo, da Švica ni članica EU in ji zato ni potrebno spoštovati zakonov, ki preprečujejo davčne oaze (Lowtax, 2007).

⁸ Cayman Islands Monetary Authority (CIMA)

4.2.2. Dejavnost upravljanja skladov

Podobno kot banke, so tudi družbe za upravljanje skladov⁹ prišle do ugotovitve, da bi lahko s pomočjo davčnih oaz znižale stroške in tako naredile sklade donosnejše in privlačnejše. V zadnjem obdobju smo priča trendu, ko veliko družb seli upravljanje svojih skladov v davčne oaze, kamor selijo tudi svoje oddelke za transakcije, podporno tehnologijo in ostalo operativno. Raziskava družbe Deloitte (2005: 4) kaže, da se je samo med letoma 2003 in 2004 kar 46 % finančnih institucij za upravljanje skladov preselilo v davčne oaze. Mednarodni finančni centri v davčnih oazah ponujajo ugodno okolje za družbe, ki se ukvarjajo z investicijami. Možne so mnoge oblike investicijskih vlaganj, glavna prednost pa je seveda nična oziroma nižja stopnja obdavčitve. Najbolj razširjene davčne oaze, ki so primerne za tovrstne storitve, so: Hong Kong, Karibsko otočje (Bahami, Britanski Deviški otoki in Kajmanski otoki), Bermudi, Kanalski otoki, Otok Man, Irska in Luksemburg (Molloy, 2007: 1; Deloitte, 2005: 4).

Ker offshore skladi ponujajo visoke donose in pogosto visoka tveganja, mnoge države prepovedujejo investicije v takšne sklade za svoje državljane, prav tako pa tudi oglaševanje takih skladov. Pogosto rezidenti držav z visoko davčno stopnjo, ki želijo vlagati v takšne sklade, z vlaganjem ne pridobijo veliko, saj njihove države od dobičkov pobirajo davke. Zato se offshore skladi poslužujejo raznih načinov, s katerimi preložijo obdavčitev na čas, ko se dividende razdelijo ali ko se enote skladov prodajo.

Hong Kong

Tehnični podatki (Barber, 2006: 183):

- pravni sistem: anglosaški pravni sistem,
- uradna jezika: kitajski in angleški,
- offshore dejavnosti: investicijski skladi, bančništvo, registracija plovil, holdingi, zavarovalništvo in trgovina,
- imajo davke, vendar ne na prihodke, ustvarjene v tujini,
- kontrole blagovne menjave ni.

Hong Kong je bivša britanska kolonija, ki leži na jugovzhodu Kitajske. Od leta 1997 ponovno pripada Kitajski, prej pa je področje 150 let sodilo pod Veliko Britanijo. Kljub temu, da pripada Kitajski, se je v Hong Kongu ohranil kapitalistični sistem in ima večino poslovnih in pravnih ureditev skladnih z zahodnimi standardi. Glavna razloga ekonomskega uspeha Hong Konga sta kombinacija nediskriminacijske politike nizkih davkov, kjer so obdavčeni samo prihodki, ustvarjeni na tem ozemlju, in njegova geografska lega, ki predstavlja vrata na veliki kitajski trg. Vlada je v Hong Kongu ustvarila ugodno poslovno okolje in poskrbela za odprtost in enostavnost poslovanja, zato danes Hong Kong slovi kot vodilni svetovni center, ki privablja največ tujih podjetij. Izmed 500 največjih svetovnih

družb po reviji Forbes, je v Hong Kongu prisotnih več kot 200 (Lowtax, 2007), ta trend pa še narašča, saj število tujih podjetij raste z nekaj odstotno letno stopnjo. Na tem področju je prisotnih tudi veliko mednarodnih bank, med njimi kar 80 izmed 100 največjih (Lowtax, 2007). Država je zavezana načelu svobode in načelu proste trgovine brez intervencij.

Hong Kong igra pomembno vlogo pri razvoju in upravljanju skladov vse večje ekonomske velesile Kitajske. Kitajski trg skladov je še razmeroma majhen, trg pa že kaže povečane zahteve po tovrstnih finančnih storitvah. Zato bodo hongkonški upravljalci skladov imeli možnost sodelovati pri razvoju kitajskega trga skladov.

Irska

Tehnični podatki (Lowtax, 2007):

- pravni sistem: anglosaški pravni sistem,
- uradni jezik: angleški,
- na offshore področju so dobro razviti investicijski skladi, licenciranje franšiz in patentov, bančništvo in zavarovalništvo,
- davčna stopnja za offshore dejavnosti je 12,5 %,
- kontrole blagovne menjave ni.

Irska velja za eno izmed izjem na področju davčnih oaz, saj je ena redkih članic Evropske Unije, ki je hkrati tudi davčna oaza. Pred nekaj leti je postala država z najvišjo gospodarsko rastjo v EU. Irski vladi je s številnimi ukrepi uspelo privabiti tuje investicije in promovirati Irsko kot davčno oazo. Dejstvo je tudi, da je poleg Velike Britanije Irska edina evropska država, v kateri je uraden angleški jezik, kar je dodaten dejavnik, da je zelo privlačna za ameriška podjetja, ki Irsko jemljejo kot priložnost za osvajanje evropskega trga.

Glavna značilnost offshore sektorja na Irskem je 12,5-odstotna davčna stopnja za določene dejavnosti, ki skupaj z investicijami v visoko tehnologijo pritegne veliko tujih investicij, še posebej ameriških. To dokazuje tudi podatek, da je v vzajemnih skladih kar 45 % vseh investicij iz Združenih držav Amerike, v primerjavi s Luksemburgom, kjer je ameriških investicij 20,1 % (Bertoncelj, 2005: 38).

O uspehu Irske v zadnjih desetih letih priča podatek, da je leta 2004 sektor skladov zrasel za 30 % glede na predhodno leto. V tej državi trenutno deluje skoraj 300 različnih družb, ki se ukvarjajo z upravljanjem skladov, skupno pa ponujajo prek 4.200 različnih skladov (Lowtax, 2007).

4.2.3. E-trgovina

Internet je omogočil veliko novih priložnosti za rast svetovne ekonomije. Ena izmed dejavnosti, ki se je z njegovim razvojem močno razmahnila je trgovina prek interneta oziroma e-trgovina. Le-ta je pravi razmah doživela v poznih 90-ih letih, ko se je vrednost trgovanja podvojila

⁹ Sklad je institucija, ki združuje denarna sredstva številnih vlagateljev. Ta denarna sredstva upravljalci sklada vlagajo v različne naložbe, skladno z namenom in politiko investiranja. Zaradi velikega števila investitorjev predstavlja tak način vlaganja manjše tveganje, kot bi ga predstavljalo neposredno vlaganje v delnice podjetij, ker so vložki razpršeni v različne naložbe.

vsakih sto dni. Po zaslugi svojih fleksibilnih ureditev so to rast s pridom izkoriščale predvsem davčne oaze, v katerih je e-trgovinska dejavnost najhitreje rasla.

Da bi davčna oaza lahko zadovoljila pričakovanja po kvalitetnem razvoju trgovinske dejavnosti, mora imeti dobre transportne povezave, razpoložljivo in primerno delovno silo, geografski položaj v bližini trgov, enostavno vzpostavitev začetnih delovnih dovoljenj in preprost sistem ustanavljanja offshore podjetij, učinkovit bančno-komercialni sektor, moderno telekomunikacijsko in e-trgovinsko infrastrukturo ter možnost prostih carinskih con (Lowtax, 2007). Večino teh kriterijev izpolnjujejo naslednje davčne oaze: Bahami, Barbados, Bermudi, Britanski Deviški otoki, Kajmanski otoki, Kostarika, Ciper, Gibraltar, Guernsey, Otok Man, Jersey, Luksemburg, Malta, Mauricius in Panama (Lowtax, 2007). Pri odločitvi, katero od teh davčnih oaz izbrati, se podjetja soočijo z dejstvom, da je končna odločitev odvisna od vrste storitve ali blaga. Na področju e-trgovine lahko največje prihranke pri stroških in davkih ustvarijo podjetja, ki se ukvarjajo z distribucijo elektronskih dobrin, kot so npr. e-založništvo, on-line rezervacije, telekomunikacijske storitve, prevajanje, izobraževanje, pravno svetovanje, tehnična pomoč pri programski opremi in raziskave.

V nadaljevanju predstavlja dve davčni oazi, primerne za e-trgovinsko dejavnost in sicer Gibraltar, ki je zaradi svoje geografske lege že stoletja znan po trgovski dejavnosti, in Dubaj, ki je bil kot del arabskega sveta že od nekdaj vključen v trgovino. Tako v Gibraltarju kot Dubaju želijo oblasti v zadnjem času načrtno povečati e-trgovinsko dejavnost.

Gibraltar

Tehnični podatki (Barber, 2006: 180):

- pravni sistem: anglosaški pravni sistem,
- uradni jezik: angleški,
- na offshore področju je daleč najbolj razvito bančništvo, zavarovalništvo, investicijski skladi, registracija plovil in e-trgovina,
- nekatere pravne oblike podjetij (t. i. izvzete družbe) dobijo garancijo, da 25 let ne bodo plačevale nikakršnega davka,
- kontrole blagovne menjave ni.

Ko je Gibraltar postal kolonija Velike Britanije, so se zaostriili odnosi s Španijo, prišlo je do izolacije in gospodarske krize. Vodstvo kolonije je poskušalo krizo ublažiti z ureditvami, ki so podjetjem omogočale velikodušne davčne ugodnosti. Gibraltar se je uveljavil kot privlačna davčna oaza za podjetja iz Azije, saj je služil kot most za dostop do Evrope. Uradni jezik je angleški, vendar pa je razširjen tudi španski jezik. Gibraltar ima razmeroma visoke davke, vendar omogoča tudi zelo nizke davke tako za pravne kot

tudi za fizične osebe. Ima dobro razvit poslovni sektor, v katerega sodijo: bančništvo, zavarovalništvo, investicijski skladi, plovba, holdingi in trgovina (Lowtax, 2007).

Bistvo offshore področja je zakonodaja, ki posebnim vrstam družb (t. i. izvzete družbe¹⁰) omogoča posebno ugodnost, in sicer 25-letno oprostitev davka od dohodka. Ta določba pa ima dve omejitvi in sicer mora biti promet podjetja v celoti ustvarjen izven ozemlja Gibraltarja, poleg tega pa se mora dobiček razdeliti med osebe, ki nimajo stalnega prebivališča v Gibraltarju (Lowtax, 2007).

Dejstvo, da je razvitost e-trgovinske dejavnosti močno odvisna od razvitosti telekomunikacijskega sektorja, je zelo pomembna prednost Gibraltarja, v katerem so oblasti leta 2004 uvedle popolno liberalizacijo telekomunikacijskega sektorja. Gibraltar ima ambiciozne cilje postati vodilni ponudnik globalne e-trgovine. Vlada je v ta namen ustanovila poseben svetovadni organ za svetovanje v e-poslovanju. V svetovanje so vključeni vladni uradniki, oddelek za svetovanje na področju informacijske tehnologije, ministrstvo za trgovino in ministrstvo za telekomunikacije (Government of Gibraltar, 2007).

Dubaj

Tehnični podatki (Barber, 2006: 178):

- pravni sistem: zvezni sodni sistem,
- uradni jezik: arabski, v poslovnem svetu pa je v uporabi angleški jezik,
- na offshore področju sta najbolj razviti e-trgovina in bančništvo,
- posebne prostocarinske cone brez davkov,
- kontrole blagovne menjave ni.

Dubaj se geografsko nahaja med Afriko in Srednjim vzhodom, hkrati pa predstavlja most med Evropo in Daljnim vzhodom, kar ga uvršča med strateško izredno pomembna geografska območja. Je del Združenih arabskih emiratov in naj bi po zadnjih podatkih imel več kot milijon prebivalcev, od tega približno 50 % prebivalcev arabskega porekla in 50 % tujcev. Trenutno v Dubaju gradijo največje letališče na svetu, že sedaj pa je dubajsko pristanišče najpomembnejše na Bližnjem vzhodu in sodi med največje na svetu.

Dubaj sodi med hitro razvijajoče se davčne oaze, dubajska vlada pa zavestno stimulira e-trgovino in je v ta namen leta 2000 začela z izgradnjo dubajskega internetnega mesta¹¹, ki je prosta trgovinska cona za e-trgovino in visoko tehnologijo.

4.2.4. Registracija plovil

Za registracijo plovil v davčnih oazah se uporablja tudi izraz »zastave ugodnosti«. Gre za znan pojav v pomorstvu, ko se neko plovilo registrira v tuji državi z namenom zni-

¹⁰ Izvzeta družba (angl.: exempt company) je družba, katere celotno delovanje mora biti vezano na poslovanje izven določene jurisdikcije. Takim družbam vlade v nekaterih davčnih oazah dajejo garancijo, da ne bodo obdavčene za določeno časovno obdobje, npr. 20, 30, 40 ali več let (Barber, 2006: 68).

¹¹ *Dubai Internet City (DIC)*

žanja stroškov ali izogitvi državni regulativi. Registracija plovil v ugodnejših režimih se je začela že v 20-ih letih prejšnjega stoletja, ko so Američani, da bi se izognili prohibiciji na alkohol, registrirali plovila v Panami. Registracija plovil se je razcvetela v 50-ih letih, po korejski vojni, ko je bila naftna industrija na Bližnjem vzhodu v razmahu. Družbe, delujoče na področju naftne industrije so registrirale svoje tankerje v Panami, kasneje v Liberiji in nato tudi v Hondurasu. Američanom so sledili lastniki grških plovil, ki so prav tako spoznali vse prednosti registracije plovil v državah z ugodnejšimi režimi. Leta 1948 je le 4 % vseh plovil plulo pod t. i. zastavo ugodnosti (angl.: flags of convenience), leta 1990 pa je delež narasel na 34 %. Po nekaterih ocenah (Picciotto, 1999: 13) naj bi bilo na prelomu tisočletja teh plovil že 50 %. Pomemben je tudi podatek, da se kar 80 % vsega prometa blaga odvija po morju, skoraj dve tretjini tega prometa pa opravijo plovila, ki plujejo pod eno od zastav ugodnosti.

Večina lastnikov plovil želi zaupnost glede lastništva, zato je večina plovil v lasti družb, s čimer se prikrije identiteta. Pri izbiri ustrezne davčne oaze je potrebno upoštevati nekaj dejavnikov, med katerimi so najpomembnejši naslednji: višina stroškov registracije in letnih pristojbin, ugled davčne oaze oziroma zastave, pod katero pluje, davčna ureditev, narodnost lastnika plovila in pričakovan razpon dejavnosti. Davčne oaze, primerne za registracijo plovil so:

- Evropa: Ciper, Gibraltar, Guernsey, Jersey, Otok Man, Luksemburg, Madeira, Malta, Monako, Velika Britanija;
- Azija in Bližnji vzhod: Dubaj, Hong Kong, Singapur;
- severna in južna Amerika: Antigva in Barbuda, Aruba, Bahami, Barbados, Belize, Bermudi, Britanski Deviški otoki, Kajmanski otoki, Dominica, Nizozemski Antili, Panama, St. Kitts in Nevis, St. Vincent in Grenadini, Turks in otoki Coicos;
- Avstralija in Pacifik: Cookovi otoki, Vanuatu, Nova Zelandija, Marshallovi otoki, Samoa;
- Afrika: Liberija, Mauricius, Sejšeli;

Rezultati raziskave z naslovom »*Grožnja sindikatov in politikov globalnemu pomorstvu*« (Mitchell, 2004: 2) kažejo, da davčne oaze, ki ponujajo registracijo plovil, prek zniževanja cen plovil in povišane učinkovitosti te dejavnosti pozitivno vplivajo na rast svetovne trgovine in gospodarstva. S tem, ko lastniki plovil lahko izbirajo, pod katero zastavo bodo pluli, davčne oaze tekmujejo v ponudbi najboljših pogojev registracije, davčnih stopenj in kvalitetnih storitev. Vse to je znatno znižalo stroške te industrije, največ pa so pridobili prav lastniki plovil.

Panama in Liberija sta dolgo časa veljali za najbolj poznani davčni oazi, namenjeni plovilom, ki plujejo pod zastavo ugodnosti. Danes je takšnih davčnih oaz več, vendar so tako po številu plovil kot po tonaži daleč za Panamo in Liberijo.

Panama

Tehnični podatki (Barber, 2006: 217):

- pravni sistem: civilno pravo,

- uradni jezik: španski, v poslovnem svetu pa je široko uporabljen tudi angleški jezik,
- Panama sodi med najstarejše davčne oaze, katere začetki segajo v leto 1920, na offshore področju slovi kot država z največjim številom registriranih plovil na svetu,
- ni davkov na prihodke, ustvarjene v tujini,
- ni kontrole blagovne menjave.

Panama se je v preteklosti upravičeno znašla na črni listi OECD, vendar pa je s sodelovanjem z mednarodnimi institucijami in izboljšano ureditvijo na področju preprečevanja pranja denarja in trgovine z drogo dosegla izbris s črne liste in danes uživa razmeroma dober sloves. Panamski prekop je območje, kjer je dejaven offshore sektor, ki v državno blagajno prispeva 10 % bruto domačega proizvoda. Panamski prekop je zelo pomemben za državo, saj ima status svobodnega območja (*The Colon Free Trade Zone*), tamkajšnja ladijska matična knjiga pa je najobsežnejša v svetovnem merilu, saj je bilo leta 2005 v Panami registriranih 4.400 velikih plovil.

Panamski zakon za registracijo plovil je zelo enostaven. Ena njegovih glavnih značilnosti je, da je provizija oziroma pavšal neodvisen od velikosti in teže plovila. Lastniki plovil ne plačujejo nobenega davka, tistim, ki želijo pluti pod panamsko zastavo, pa zadostuje veljavno varnostno spričevalo za plovilo. Drugih zahtev, ki bi jih moralo izpolnjevati plovilo, da bi se lahko registriralo, ni. Zakon pa dopušča tudi možnost, da plovilo ni registrirano v Panami, pa vseeno začasno pluje pod Panamsko zastavo.

V Panami je čutiti močan vpliv ZDA, saj slovi kot država z visokimi mednarodnimi standardi, trdnim bančnim sektorjem in ugodno poslovno klimo. Obdavčeni so samo prihodki, ustvarjeni na Panamskem ozemlju, vsi prihodki, ustvarjeni v tujini, pa niso obdavčeni. Tako lahko lastnik ali zakupnik plovila registrira plovilo v Panami, storitev opravlja drugje in ne plačuje davka na prihodek (Lowtax, 2007).

Liberija

Tehnični podatki (Lawtax, 2007):

- pravni sistem: anglosaški pravni sistem,
- uradni jezik: angleški,
- na offshore področju je najbolj razvito registriranje plovil pod t.i. zastavo ugodnosti,
- nerezidenčne družbe in družbe s tujimi lastniki niso obdavčene,
- kontrole blagovne menjave ni.

Liberija leži na zahodnem delu Afrike, liberijske družbe pa so večinoma namenjene lastništvu plovil, ki so najpogosteje tudi registrirane v Liberiji. Leta 1950 je Liberija odprla register plovil, ki je kmalu postal drugi največji v svetovnem merilu, takoj za Panamo. Lastniki plovil prihajajo z vsega sveta, saj Liberija slovi po kvaliteti, učinkovitosti, varnosti in dobrih servisnih storitvah. Je podpisnica glavnih mednarodnih pomorskih konvencij, ki upoštevajo mednarodne dogovore in pravila. Plovilo lahko registrira vsakdo, ki je lastnik pravnega subjekta v Liberiji, plovilo

pa mora biti mlajše od 20 let in mora zadostiti visokim varnostnim kriterijem.

Za Liberijo velja, da ima privlačno kombinacijo gospodarskega prava, ki garantira anonimnost, močno hipotekarno tajnost in nično davčno stopnjo za prihodke, ustvarjene v tujini. V primerjavi s Panamo ima bolj razvito področje zakonodaje, zato je z vidika varnosti, kot tudi z vidika kvalitete ostalih storitev v prednosti pred drugimi davčnimi oazami.

4.2.5. Dejavnost holdingov

Offshore holding je najpogosteje družba, ki upravlja in financira podjetja, ki niso locirana v davčnih oazah, dobički pa se stekajo v davčno oazo. Mnogo davčnih oaz ima predpise, ugodne za te oblike podjetij, tako da so iz obdavčitev izvzeti ravno ti pravni subjekti. Poleg fiksnih dajatev holdingi nimajo nobenih davčnih obveznosti na tem teritoriju, seveda pa morajo upoštevati določila, da poslovanje v davčni oazi ni dovoljeno. Ta podjetja morajo biti namenjena zgolj upravljanju podjetij v tujini (Andalucia, 2007).

Pri izbiri primerne davčne oaze za ustanovitev holdinga so zelo pomembni dogovori o izogibanju dvojnega obdavčenja¹².

Med drugo svetovno vojno so nemška podjetja za prikrievanje identitete lastništva ustanavljana holdinške družbe v Švici. Sredi 60-ih let so Nizozemski Antili postali nekakšna baza holdingov ameriških in evropskih multinacionalk, med drugim tudi za podjetja, kot so Shell, Siemens, Esso, Gulf & Western, Pan American Overseas Capital, Sears Roebuck, itd. (Brittain-Catlin, 2007: 24). V davčnih oazah je relativno veliko holdinških družb, kar je potrdila raziskava avtorjev Desai, Foley in Hines (2005: 8), s katero so avtorji ugotovili, da je v državah, ki niso davčne oaze, v povprečju manj kot 6 % vseh registriranih družb holdingov, v davčnih oazah pa je ta delež mnogo večji in sicer znaša 12 %.

Med davčne oaze, ki so najbolj primerne za ustanovitev holdinga, se uvrščajo: Kajmanski otoki, Luksemburg, Jersey, Malta, Panama, Britanski Deviški otoki, Ciper, Hong Kong, otok Man, Bermudi in Bahami. Kot primera davčnih oaz za dejavnost holdingov v nadaljevanju predstavljata Britanske Deviške otoke in Luksemburg.

Britanski Deviški otoki

Tehnični podatki (Barber, 2006: 159):

- pravni sistem: anglosaški pravni sistem,
- uradni jezik: angleški,
- z offshore vidika so Britanski Deviški otoki primerni za registracijo patentov, registracijo plovil, zavarovalništvo, bančništvo in za holdinge,
- ni davkov,
- ni kontrole blagovne menjave.

Britanski Deviški otoki se nahajajo v Karibskem otočju in spadajo pod Združeno kraljestvo Velike Britanije. Velik vpliv na uspeh te davčne oaze je imela politična nestabilnost v Latinski in Srednji Ameriki in prehod Hong Konga nazaj pod Kitajsko. Britanski Deviški otoki slovijo kot zelo atraktivna davčna oaza, ki ponuja stabilnost, visoko stopnjo zaupnosti, fleksibilno zakonodajo, angleški jezik, odlično poslovno infrastrukturo in dobre telekomunikacijske povezave. Gospodarstvo države temelji na turizmu, ki ustvarja kar 75 % BDP. Država ima ugoden mednarodni ugled, saj je vlada aktivna v boju pri preprečevanju pranja denarja. Britanski Deviški otoki štejejo 23.000 prebivalcev, v državi je registriranih skoraj 700.000 podjetij, število podjetij pa se vsako leto poveča za 50.000 podjetij.

Podobno kot na Bermudih, se tudi na Britanskih Deviških otokih oblasti niso odločile za pospeševanje razvoja bančništva, pač pa za pospeševanje dejavnosti mednarodnih poslovnih podjetij oziroma finančnih holdingov, ki so neobdavčeni (Lowtax, 2007).

Luksemburg

Tehnični podatki (Barber, 2006: 197):

- pravni sistem: civilno pravo,
- uradni jeziki: luksemburški, francoski, nemški in angleški,
- z offshore vidika je zelo primeren za bančništvo in holdinge,
- gre za davčno oazo, ki ima visoke davke, toda veliko davčnih vzpodbud, še posebej za holdinge,
- kontrole blagovne menjave ni.

Luksemburg je zelo bogata država, katere bruto domači proizvod na prebivalca znaša 56.000 \$, kar predstavlja 208 % evropskega povprečja. Država ima sicer visoko davčno stopnjo, vendar pa so iz tega sistema izvzeti holdingi, ki jih je več kot 12.000 in so neobdavčeni. Luksemburg je zaradi članstva v Evropski Uniji nenehno v precepu med zakonodajo Evropske Unije, ki prepoveduje davčne oaze, ter prednostmi, ki jih kot davčna oaza uživa (Lowtax, 2007).

Luksemburg ponuja privlačno davčno ureditev za holdinge, saj ima sklenjenih 39 sporazumov o izogibanju dvojnega obdavčenja (Lowtax, 2007).

5 Sklep

Davčne oaze niso niti novost niti trenutni trend. Obstajajo tako dolgo, kot obstajajo davki in verjetno je tudi njihova prihodnost povezani s tem dejstvom. Namen družb, ki selijo poslovanje v davčno oazo, pa nikakor ni izključno izogibanje davkom, pač pa obstajajo še drugi razlogi, kot so na primer boljša poslovna klima, manj administrativnih ovir, bližina trgov, širjenje poslovanja in druge.

¹² Če ponazorimo s primerom: neka družba želi prek holdinga upravljati družbe, ki so v državi A in B. Sedaj mora preveriti, katere davčne oaze imajo sklenjene sporazume o izogibanju dvojnega obdavčenja z državama A in B. Te oaze so primerne za ustanovitev holdinga, ki bo upravljal z družbami v državah A in B.

Ekonomski uspeh davčnih oaz leži v njihovi politiki. Navsezadnje so to države oziroma ozemlja, ki se trudijo gospodarsko uspeti, tako kot se trudijo druge države. Konkurenca med državami je velika, z globalizacijo pa se je v zadnjem obdobju še okrepila. So države, ki konkurirajo z znanjem, s socialno varnostjo, poceni delovno silo, z ekonomijo obsega ali z geografskim položajem, davčne oaze pa so v tem smislu področja, ki imajo svoje ureditve prilagojene tako, da so čimbolj konkurenčne na davčnem področju.

Davčnih oaz je veliko, prav tako pa tudi družb, ki iščejo primerna področja za svoje dejavnosti. Načrtno ali nenačrtno posamezne davčne oaze veljajo za bolj primerne za določeno vrsto dejavnosti kot druge. V članku sva opisala pet dejavnosti, ki se najpogosteje selijo v davčne oaze in ugotavljala, katere so tiste davčne oaze, ki posamezno dejavnost najboljše servisirajo.

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Gregor Miklič, je zaposlen v Zavarovalnici Triglav, d.d. Nekaj let je deloval v mednarodnem podjetju, kjer se je ukvarjal s področjem transfernih cen med povezanimi podjetji. V okviru svojega delovanja je proučeval prednosti poslovanja s posameznimi davčnimi oazami in nevarnosti, ki jih offshore dejavnosti prinašajo.

Maja Zaman je zaposlena kot docentka na Ekonomski fakulteti v Ljubljani. Sodeluje pri izvedbi predmetov Temeljni računovodstva, Revizija in Revizija poslovanja. V okviru raziskovalne dejavnosti je osredotočena na raziskave s področja finančnega računovodstva in revizije, s prispevki sodeluje na domačih strokovnih posvetovanjih in na znanstvenih konferencah v tujini. Ima licenco Slovenskega inštituta za revizijo za opravljanje nalog revizorja in je članica upravnega odbora Zveze računovodij, finančnikov in revizorjev Slovenije

Mitja J. Tavčar



Kulture, etika in olika managementa

II. dopolnjena izdaja



Založba Moderna organizacija

UNIVERZA V MARIBORU - FAKULTETA ZA ORGANIZACIJSKE VEDE

**Milan Ambrož,
Martina Praprotnik**

Organisational Effectiveness and Customer Satisfaction

This paper presents a test of the relationship between organizational culture as a crucial indicator of organizational effectiveness and customer satisfaction using service-unit data from two health resorts. Ensuring survival of the service organisation in the long run requires adaptations which are oriented towards achieving maximum customer satisfaction. This study intended to unveil the effect organisational factors have on customer service orientation from the customer and employee point of view within a two health resort service setting. The finding suggests that when trying to predict the comparative degree which organisational effectiveness factors have in satisfying customers' needs, performance, adaptability and mission can be of the highest importance. Some effects like performance were uniform for employees and customers, while others varied depending on the organisation and the customer or employee group. Furthermore, findings suggest that service performance and organisation mission of the service organisation predict customer satisfaction based on established and proven health services. In this context there is no room for innovation, despite the fact that employees and customers do not share similar views about the impact of organisational effectiveness. Developing an effective service organisation can provide a competitive advantage to the organisation. Critical for the success of the service organisation is that organisational agents have a clear view of the existing organisation effectiveness and a clear view of the customer expectations in this area.

Key words: organisational effectiveness, customer satisfaction, customer complexity, service orientation, survival, adaptability

Darja Peljhan, Metka Tekavčič

The Impact of Management Control Systems - Strategy Interaction on Performance Management: A Case Study

We study the interaction between management control systems and strategy and its impact on organisational performance considering the way in which multiple aspects of control systems and dimensions of context combine in a variety of ways to enhance performance. Our purpose is to investigate the relationship among management control systems, strategy and organisational performance in a particular company. The contribution of this study is that it upgrades the existing theory in that it does not only establish a relationship between strategy and management control systems, but also considers how this relationship impacts on organisational performance. The study shows that the combination of performance-driven behaviour and regular use of management control systems leads to improved results. The second contribution of the study is that it incorporates a wider range of controls, including informal controls as being equally important as formal controls, to provide a more comprehensive analysis, as opposed to the majority of prior studies focusing on a more limited range of controls. In this way, this paper contributes to the literature in terms of examination of the broader components of management control systems than was previously done.

Key words: management control systems, strategy, levers of control, performance, performance management

**Pakize Taylan,
Gerhard-Wilhelm Weber**

Organization in Finance Prepared by Organization in Finance Prepared by Stochastic Differential Equations with Additive and Nonlinear Models and Continuous Optimization

A central element in organization of financial means by a person, a company or societal group consists in the constitution, analysis and optimization of portfolios. This requests the time-dependent modeling of processes. Likewise many processes in nature, technology and economy, financial processes suffer from stochastic fluctuations. Therefore, we consider stochastic differential equations (Kloeden, Platen and Schurz, 1994) since in reality, especially, in the financial sector, many processes are affected with noise. As a drawback, these equations are hard to represent by a computer and hard to resolve. In our paper, we express them in simplified manner of approximation by both a discretization and additive models based on splines. Our parameter estimation refers to the linearly involved spline coefficients as prepared in (Taylan and Weber, 2007) and the partially nonlinearly involved probabilistic parameters. We construct a penalized residual sum of square for this model and face occurring nonlinearities by Gauss-Newton's and Levenberg-Marquardt's method on determining the iteration step. We also investigate when the related minimization program can be written as a Tikhonov regularization problem (sometimes called ridge regression), and we treat it using continuous optimization techniques. In particular, we prepare access to the elegant framework of conic quadratic programming. These convex optimization problems are very well-structured, herewith resembling linear programs and, hence, permitting the use of interior point methods (Nesterov and Nemirovskii, 1993).

Key words: Stochastic Differential Equations, Regression, Statistical Learning, Parameter Estimation, Splines, Gauss-Newton Method, Levenberg-Marquardt's method, Smoothing, Stability, Penalty Methods, Tikhonov Regularization, Continuous Optimization, Conic Quadratic Programming.

Milena Bevc**Funding, Efficiency and Equity of Tertiary Education in Slovenia**

The paper is based on the fact that the system of funding tertiary education (TE) may have important influences on efficiency of educational institutions (internal efficiency), returns to education (external efficiency), aggregate enrolment, and social equity of TE (equity in access to TE for different socio-economic groups). Characteristics of the funding system of undergraduate tertiary education in the public institutions in Slovenia are presented. The paper also deals with the effects of the funding system on the above-mentioned dimensions of the TE development. The trends in enrolment are presented as well. We have observed that the funding system results in a low internal economic efficiency (expressed by students' study progress) and social inequity, so we propose the changes in the funding of educational institutions and the state financial support to students in order to increase the efficiency and equity of TE. This may be achieved by an increase in private funding. All dimensions of TE observed in the paper (enrolment, expenditure, system of funding, internal and external economic efficiency, and equity) are analysed in the time perspective (trends within the country) and in international perspective (comparisons with the EU and OECD countries). The economic feasibility of the increased private funding is presented as well. The paper ends with summarizing the main conclusions.

Key words: efficiency, equity, funding, Slovenia, tertiary education

Gregor Miklič, Maja Zaman**Type of Activity as a Factor in the Process of Tax Haven Selection**

Economic success of tax havens derives from their established policies. Countries or territories, known as tax havens are eager to gain economic success as well as their competitor countries or territories that are not considered tax havens. Strong competition exists among them and globalization has participated its share increasing the worldwide competition among countries. On one hand, some countries compete on basis of knowledge, others on basis of high level of social security, cheap labor, economies of scale, geographic position etc.. On the other hand, tax havens compete with preferable and more flexible tax legislations. Numerous tax havens have developed worldwide and there is an increasing number of corporations searching for a territory with optimal conditions to carry out their activities. Individual tax havens have, in majority, developed competitive advantages for specific activities. Consequently, some of them have become more suitable for banking, other for insurance services, establishment of holding companies, investment funds or other activities. The purpose of the article is to support the initial assumption that different tax havens are more supportive for development of some activities than others.

Keywords: tax havens, international companies, offshore banking, offshore funds, e-trading, offshore holding companies;

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Lipnica 8, 4245 KROPA

MERCATOR - TRGOAVTO d.d. - Trgovina, servis

Pristaniška 43/a, 6000 KOPER

MERCATOR - PC GRADIŠČE d.d.

Golijev trg 11, 8210 TREBNJE

MERCATOR-OPTIMA - Inženiring d.o.o.

Breg 14, 1000 LJUBLJANA

MERKUR - Trgovina in storitve d.d. KRANJ

Koroška cesta 1, 4000 KRANJ

MESNA INDUSTRIJA PRIMORSKE d.d.

Panovška 1, 5000 NOVA GORICA

MICROSOFT d.o.o.

Šmartinska cesta 140, 1000 LJUBLJANA

MOBITEL d.d.

Vilharjeva 23, 1537 LJUBLJANA

OBČINA RADOVLJICA

Gorenjska cesta 19, 4240 RADOVLJICA

Opravljanje del z gradbeno mehanizacijo**MARJAN RAZPOTNIK s.p.**

Krače 8, 1411 IZLAKE

OPTIMA - Podjetje za inženiring in trgovino d.o.o.

Ulica 15. maja 21, 6000 KOPER

PALOMA SLADKOGORSKA - Tovarna papirja d.d.

Sladki vrh 1, 2214 SLADKI VRH

PIVOVARNA UNION d.d.

Pivovarniška ulica 2, 1001 LJUBLJANA

POSLOVNI SISTEM MERCATOR d.d.

Dunajska cesta 107, 1000 LJUBLJANA

POSLOVNI SISTEM - ŽITO LJUBLJANA d.d.

Šmartinska cesta 154, 1000 LJUBLJANA

POSLOVNO PRIREDITVENI CENTER -**GORENJSKI SEJEM Kranj d.d.**

Stara cesta 25, 4000 KRANJ

POŠTA SLOVENIJE d.o.o.

Slomškov trg 10, 2000 MARIBOR

RIMORJE d.d.

Vipavska cesta 3, 5270 AJDOVŠČINA

REGIONALNI CENTER ZA RAZVOJ d.o.o.

Cesta zmage 35, 1410 ZAGORJE OB SAVI

SATURNUS - AVTOOPREMA d.d.

Letališka c. 17, 1001 LJUBLJANA

SAVA - Gumarska in kemična industrija d.d.

Škofjeloška 6, 4502 KRANJ

SIEMENS d.o.o.

Dunajska cesta 22, 1000 LJUBLJANA

SLOBODNIK JOŽE

Generalni častni konzul RS v Kanadi

SLOVENIJALES PRODAJNI CENTRI

Dunajska cesta 22, 1000 LJUBLJANA

SLOVENSKE ŽELEZNICE d.d.

Kolodvorska ulica 11, 1000 LJUBLJANA

SVEA LESNA INDUSTRIJA d.d.

Cesta 20. julij 23, 1410 ZAGORJE OB SAVI

SUROVINA d.d. MARIBOR

Pobreška cesta 20, 2000 MARIBOR

TELEKOM SLOVENIJE d.d.

Cigaletova 15, 1000 LJUBLJANA

TERME MARIBOR Zdravstvo, turizem, rekreacija d.d.

Ul. heroja Šlandra 10, 2000 MARIBOR

TERMO d.d. - Industrija termičnih izolacij

Trata 32, 4220 ŠKOFJA LOKA

TERMoeLEKTRARNA TOPLARNA Ljubljana d.o.o.

Toplarniška 19, 1000 LJUBLJANA

TOVARNA KLOBUKOV ŠEŠIR d.d.

Kidričeva 57, 4220 ŠKOFJA LOKA

TRIMO Inženiring in proizvodnja montažnih objektov d.d.

Prijateljeva 12, 8210 TREBNJE

UNITAS - Tovarna armatur d.d.

Celovška cesta 224, 1107 LJUBLJANA

USTANOVA SLOVENSKA ZNANSTVENA FUNDACIJA

Štefanova 15, 1000 LJUBLJANA

ZAVAROVALNICA TRIGLAV, d.d.

Miklošičeva cesta 19, 1000 LJUBLJANA

ZVEZA RAČUNOVODIJ, FINANČNIKOV IN REVIZORJEV SLOVENIJE

Dunajska cesta 106, 1000 LJUBLJANA

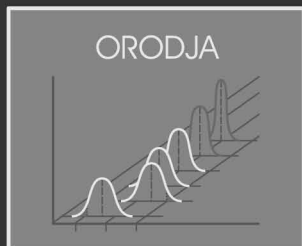
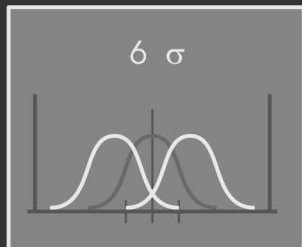
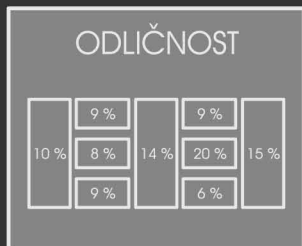
ŽIVILA KRANJ - Trgovina in gostinstvo d.d.

Cesta na Okroglo 3, 4202 NAKLO

ŽITO GORENJKI d.d.

Rožna dolina 8, 4248 LESCE

UNIVERZA V MARIBORU - FAKULTETA ZA ORGANIZACIJSKE VEDE



Janez Marolt
Boštjan Gomišček

Management kakovosti