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Abstract

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One of the main sources of economic growth lies in the successful development and application of new knowledge and innovation. This paper empirically examines innovative practices in Croatian export firms. The survey investigates innovative activity in the last five years. Institutional theory is used to explain the initial lack of innovation in the early 90's with respect to the current explosive growth of innovation, as Croatia is a transition economy that was previously socialist. Our findings suggest that few firms actually are innovative and that innovation is used to become more efficient and to have a high quality product. We also found that larger firms are more innovative than smaller firms.

Key words: Knowledge diffusion, Eastern Europe innovation, institutional theory, R&D, firms, Croatia.

Izvleček

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Eden od glavnih virov ekonomske rasti je uspešen razvoj in uporaba novega znanja in inovacij za proizvode, procese in podporne sisteme znotraj organizacij. Članek empirično preverja inovacijske dejavnosti pri hrvaških izvoznikih. Pregledali smo inovacijske aktivnosti zadnjih petih let. Začetno pomanjkanje inovacij v zgodnjih devetdesetih letih primerjamo z njihovo eksplozivno rastjo danes. Vzroke za to razložimo v okviru institucionalne teorije, saj je Hrvaška tranzicijsko gospodarstvo, ki je bilo v preteklosti socialistično. Rezultati kažejo, da je dejansko inovativnih malo podjetij. Inovacije uporabljajo za doseganje boljše učinkovitosti in višje kakovosti izdelkov. Naši rezultati tudi kažejo, da so večja podjetja bolj inovativna od manjših. Ključne besede: širjenje znanja, inovacije v vzhodni Evropi, institucionalna teorija, raziskave in razvoj, podjetja, Hrvaška

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AN EXPLORATORY STUDY OF INNOVATION IN CROATIA AFTER INDEPENDENCE**Raziskovalna študija inovacij na Hrvaškem po neodvisnosti****Introduction**

"...to stay in place you have to run very, very hard and to get anywhere you have to run even harder..."

The red queen's advice to Alice in Lewis Carroll's, Through the Looking Glass

Nations endowed with knowledge-generating capabilities that have supportive infrastructure ensure that their domestic firms are competitive in the global market (Peria, 2002; Cui et al., 2006). The importance of knowledge starts with individuals who are able to compete for better paying jobs and career paths that are oriented to the 21st Century. Therefore, a generation of knowledge at all levels (individuals, firms and nations) is the focus of everyone who wishes to compete effectively in today's global market (Grant, 2003). In essence, most contemporary developed economies are knowledge-based, while transitional economies such as Croatia are attempting to develop these competencies.

Previous country-level research of knowledge has examined the association between human capital stocks and flows within a country with the subsequent aggregate changes in national economic conditions; the barriers and rate of social and economic mobility in a country analysis (Meyer-Krahmer and Reger, 1999); the direct impact of education and vocational training on the opportunities that improve human capital knowledge; the emigration of elite segments of a country to another country (i.e. the "brain drain" and "brain gain"); and the externalities of improving human capital in a society, and the related governmental policies and programs aimed at improving the structure of a country's human capital (Adjibolosoo, 1996; Psacharopoulos, 1984; Shaw, 1991; Conway, 1994; Delbrück, 1994; Husz, 1998; Iredale, 1999; Dulleep and Regets, 1999; Ofer and Polterovich 2000). The primary focus of much of this country-level research has been on identification of the causal link between endogenous improvement/degradation of human capital and their knowledge, and the economic prosperity and growth of a country. This research focuses on the Croatian transition economy and its continued thrust towards the encouragement of knowledge generation and innovation. This transition, from a socialist economy to one that is free-market focused, is fraught with historical barriers and institutional pressures. We investigate how effectively the governmental policies have affected the individual firm's potential for innovation and generation of knowledge.

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During the first decade of Croatia's transition, attention was mainly focused on macroeconomic issues and only the most important structural reforms. Macroeconomic stabilisation and the opening of the marketplace to the international community were among the major goals attempting to initiate change against the present socialistic institutional forces. Due to these governmental actions, high inflation and economic instability have been eliminated. Also, major structural transformations, including privatisation of government-owned enterprises (GOE), and factor and product market deregulation, have caused firms to reorganize in order to compete more effectively.

Governmental policies encouraging transition from socialist protectionism to free-market global competition are thought to soon improve efficiency in the production process and generation of new knowledge processes within the nation's individual firms. We examine this assumption and development and application of knowledge through innovation in the context of Croatia.

In summary, this empirical research adds to the literature of transitional economies in terms of knowledge and innovation. Research often focuses on either the firm or individual level of knowledge generation, while our contribution illustrates the interconnectivity of governmental and firms' actions in regard to this knowledge generation and innovation, encumbered by the entrenched socialistic institutions.

This paper focuses on Croatia, because Croatia offers some of the greatest opportunities to be found in transitional economies. Early indicators of the economic impact of the improved business environment are promising: GDP growth rose 4.8% in 2006, up from 3.8% in 2004. Croatia takes the sixty-first place on the Global Competitiveness Report 2006/07 (Competitive Index 2007). Figures for the first quarter of 2007 show a dramatic improvement in respect to the same period in 2006. Net inflows from FDI rose to 7.8% of GDP in 2006, and unemployment, although still in double digits, has fallen to a ten year low. This growth has been accompanied by economic stability, with inflation a little over 2% for the first few months of 2007. The last evidence (2005) show that EU27 invest about 1.84% of GDP for R&D. The majority of investment (about 55%) comes from the business sector; the government sector invests about 35% of total investments; and foreign investments are about 8% of total investments. With respect to the situation in Europe, significant national differences are still observed. In 2005 investments in R&D declined (only 1% of GDP) after they had had constant growth in the four year period 2001-2004 (2001: 1.07%; 2004: 1.22%). The same trend was evident in the period 1997-2000 (the share increased from 0.77% of GDP to 1.23% of GDP). Subsequently in 2001 it decreased to 1.07% of GDP. Explanation for those two trends' R&D growth cycles (business cycle of four years) indicated that they were probably caused by investments coming from the business sector (manufacturing industries), the business sector's investments in R&D and probably

the influence of the public sector (government). Public and business R&D expenditures have shown a positive trend from 2002 to 2004, even if business R&D expenditures are still far from the European average. Organizational inefficiency within the innovative process can therefore arise from all kinds of obstructions or defects made the linkage of public policies, economic and institutional structures and the behaviour of operators involved in innovation, either within a specific stage of the process (R&D, innovation or diffusion) or throughout the process (Figure 1).

The growth is mainly a result of domestic demand, especially the growth of private investments and increased public spending. Continued strong credit growth, more trust on the part of consumers, and a gradual repayment of the outstanding debt of the state to retirees will affect the growth of personal spending in the next two years.

The conversion to a market oriented economy has brought opportunities and challenges to Croatian citizens, as well as hardships, especially economy-wise (Cui et al., 2006). In addition, Croatia is more open to processes of economic integration and globalization in the world that postulates new social and business paradigms of life. While the formal constraints governing the market have been relaxed, Croatia's economic transition is far from complete. The road ahead for Croatia is not without challenges. Croatia's two main assets are the high quality of its innovative workforce and its geographical location, halfway between the developed markets of Western Europe and the fast growing Southeast (Dabic and Pejic, 2006). While market transaction mechanisms, free competition, limited governmental intervention and open access to information are characteristics of developed Western markets, barriers to these key economic aspects remain in Croatia.

Institutional and economic environments have a substantial and direct impact on a firm's ability to operate. Country-specific environments shape the nature and intensity of the competition and influence the dynamics of local industries and competitive market positions. Environments are characterized by several distinctive and operational dimensions, such as dynamism and competitive intensity, which can influence the strategic configuration of an organization (Hafsi and Thomas, 2005; Tihanyi and Roath, 2002). These environmental distinctions influence competitive actions of firms within that market (Hafsi and Thomas, 2005). For example, MNC subsidiaries in transitional environments face a high degree of uncertainty due to governments' attempts to address market imperfections as well as fluctuating competitor and consumer conditions (Tihanyi and Roath, 2002). These perceived uncertainties in the operating environment only underscore the importance of knowledge generation and innovation for effective competition.

Institutional theory

Institutional theory has recently gained prevalence as a 'practice turn' in the social sciences. Development of the institutional theory has led to insights in description of the

institutions' actions due to their internal and external environmental pressures and concerns (Scott, 1987; Hendry and Seidl, 2003). The institutional theory views organizations as social entities that seek approval for their performances in socially constructed environments. Organizations conform to gain legitimacy and acceptance, which facilitates survival (Meyer and Rowan, 1977). Internally, institutionalization arises out of formalized structures and processes, as well as informal or emergent groups and organizational processes. Forces in the external environment include those that are related to a state (e.g. laws and regulations), professions (e.g. licensure and certification), and other organizations, especially those within the same sector. The socialistic forces in Croatia have pervaded the institutions, but in the past decade governmental pressures have been attempting to bring about transition of the economy into a free market. For example, the Industrial Research Institute was established to assist research and development actions, and encourage individual firms to participate in research and development consortia.

Institutional theory may be the antithesis of transaction cost theory (Williamson, 1985), which concerns the efficiency of an organization as it demonstrates how non-choice behaviours can occur and persist through the exercise of habit, convention, conveniences, or social obligation (Oliver, 1991), while rejecting the idea that organizational phenomena are the products of rational choice based upon technical consideration (Westney, 1993). This phenomenon continues to exist in transition economies because in post-communist economies many firms found ways to work around the system (ironic freedom) (Springer and Czinkota, 1999), and to actually work against the socio-economic system, or exploit the former exploiters (institutionalized hypocrisy) (White, 1979). Under the communist or totalitarian government, onerous tax burdens, duties, tithes, and other destructive controls compounded the costly effects of living within the socio-economic system.

For emerging and transition economies, as in the case of Croatia, missing institutional features such as thin capital markets, infrastructure problems, privatization problems and foreign firms' public suspicion have deterred inward foreign direct investment (Child and Czegledy, 1996; Devlin et al., 1998). The privatization process has failed to trigger new productive investments. Also, equipment is obsolete or in poor condition. As a result, transitional economies are required to attempt to establish well-defined and enforced property rights and to continue to build institutional capacity to attract foreign direct investment (Mansfield, 1994; Rondinelli, 1998). The internal growth of firms in transitional economies is limited by institutional constraints (Peng and Heath, 1996), and institutions can also facilitate firms' adaptive ability if they are allowed to move beyond their institutional constraints (Oliver, 1991).

The move towards a more innovative and technologically advanced country, with high quality products based on local capabilities, has been surprisingly weak. Countries

with large scientific and technical capacities like Croatia, Russia and Czech Republic did not succeed in turning their assets into successful commercial ventures. To some extent it is due to the backward nature of these capabilities, but in many instances it is a result of the inefficient use of available resources. This creates great opportunities for better allocation of scientific and technical resources and for firms' increased performance potential (Academy of Management Journal, 2001). In this respect, the situation of transition economies contrasts sharply with that of developing countries where scientific and technical resources are in short supply and where the knowledge gap is important and makes the adoption of external knowledge difficult (Cohen and Levinthal, 1989). Cooper (1993) noted that as firms strive to bridge the barriers between functional areas, information critical to the product's formation and function could be withheld, misunderstood, or lost. Sometimes participants may even withhold information because of their lack of trust. Good communication has long been viewed as a critical element in new product development success (Cooper, 1993; Rothwell et al., 1999; Gieskes and Hyland, 2003). Because employees are the custodians and developers of intellectual capital, when they work together or collaborate, they constitute a strategic asset (Wilson and Jarzabkowski, 2004; Grant, 1998; Meso and Smith, 2000; Spitzer, 1996; Nonaka, 1991). Regardless of an incremental change, the transition between socialism and the free market is, unfortunately, fraught with institutional barriers that are hindering collaboration.

In summary, in the socialist socio-economic system, there was little reward for improved efficiency in the enterprise. The whole cost of transformation of production processes, reallocation of the work force or new training has to be fully supported. Therefore, it is no surprise that scientific achievement in the socialist socio-economic system could go along with technical backwardness, low quality goods, and inefficient processes. Change of these institutional pressures will continue to be a time-sensitive evolution in Croatia. Therefore, we currently expect few firms to be innovative, but over time we expect more firms to develop innovations.

Innovation

"The literature on organizational innovation is rich in lessons ... describes processes that are also prevalent in the natural universe. Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries. Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren't there before." (Wheatley, 1992)

Innovation is considered a fundamental component of entrepreneurship and a key element of business success (Nonaka and Takeuchi, 1995; Nonaka et al., 1996). D'Aveni

(1994) categorizes global competition with its constant change due to innovation in its extreme form as “hyper-competition.” As firms cannot do it alone, new forms of organizations are developing in order to acquire and develop knowledge for innovation (Hamel et al., 1998). The characteristics of technological innovation are increasingly forcing firms to access external sources of knowledge and information, such as “centres of excellence” in knowledge production, key customers, suppliers and competitors. To do this, firms increasingly become part of networks in which resources, knowledge and information circulate at low cost, and strongly rely on collaborations and partnership (Teece, 1986; Kogut and Zander, 1993; Luo and Peng 1999). Firms must change their perception of work and begin to work collectively (Johannesen et al., 2001). Limited resources, especially in transition countries, imply that organizations and enterprises form alliances for combined abilities and efforts for complex solutions, and that they have visions for further development of these core competencies. However, the road from inception to applications is long and difficult, especially in Croatia, as the governmental institutions are slow to change and develop collaborations which were in the past alien to the socialistic country (Cui et al., 2006).

Innovation has been defined in many different ways in the organizational innovation literature. Kimberly (1981) categorizes definitions of innovation into two groups. The first definition defines innovation as a process which brings a new method into an organization. This view may either focus on just the implementation of an innovation process, or may require that its implementation result in “a ‘fundamental’ change in a ‘significant number of tasks’” in an organization (Wilson, 1966, p.196). The second definition sees innovation as a “discrete product or a program” that an organization adopts (Kimberly, 1981, p. 85). As Radosevic (1999) points out, the problem of the underlying knowledge base of new technologies can be summarized in the question: Are new technologies based on tacit or formalized knowledge? It has been suggested that “to explain innovation, we need a new theory of organizational knowledge creation the key to knowledge creation lies in the mobilization and conversion of tacit knowledge” (Nonaka and Takeuchi, 1995, p. 56).

Five types of knowledge transfer systems available for innovation are applicable to today’s marketplace (Harvey et al., 2002):

- Innovation Value System - The innovation value system is dynamic and shows all the interdependent relationships that must be developed for successful innovation.
- Strategic Business Network - Encourages the flow of knowledge between partners, customers, suppliers, research organizations and other stakeholders, including competitors, in the innovation process.
- Collaborative Learning - Competitive strategies create win-lose scenarios, often competing for a share of the same intellectual pie. Collaborative strategies encourage win-win situations through symbiotic relationships. Knowledge grows and the pie gets bigger for all.
- Customer Success - Customer satisfaction meets today’s articulated need. Focusing on the success of your customer helps you identify future unarticulated needs as the source of a firm’s growth and future success.
- Collaborative Research - A common base of knowledge must be established and then expanded on by collaborative partners (i.e., assumes that the flow of knowledge is two-way rather than a one-way flow from the West to the East).

In summary, for firms to compete effectively in the global market, knowledge capabilities and innovations are required (Skyrme and Amidon, 1998). Croatia has had a central planning authority that assisted protection of its industries, and innovation was a disincentive. As the institutions within Croatia are now forced to confront the free market, firms are attempting to develop the innovative processes that will enable them to stand out. However, institutional change is slow and firms in Croatia are still adapting to the new competitive environment.

Data

A survey of innovative practices was administered to 300 Croatian firms that export products. The objective was to determine innovative activities of these firms in the last five years, to determine the level and structure of investments in innovations, and to discover the strongest incentives for innovative activities.

The inquiry involved mailing a questionnaire to randomly selected firms from a list of all Croatian firms that export products obtained from the Croatian Chamber of Commerce. The questionnaire was developed according to the Oslo Manual methodology. The survey instrument was translated into English by an independent translator and translated back by the committee (Brislin, 1980; Sperber et al., 1994). The survey instrument was checked for form and meaning equivalence with adjustments made as necessary (Sperber et al., 1994). After the initial mailing, a second wave was sent after three weeks to non-respondents. As a result, 91 usable completed questionnaires were received (30.33% response rate).

Firms from 11 industry types responded. The largest number of firms manufacture electrical and optical equipment or leather and leather products. Most of the firms in our sample are large firms (51.6%), 38.5% are medium-sized firms and only 8.8% are small firms. According to the definition by the European Community, firms with fewer than 50 employees are small, those with 50-250 employees are medium-sized, and firms with more than 250 employees are considered large firms.

The average amount of investment in innovation per firm is € 1,331,618. The minimum amount invested in innovative activity is € 10,211, while the maximum amount

is € 21,618,421. Most of the firms that received the questionnaire invest 1% or 2% of their total revenue in innovative activities.

Results of the survey

Level of Innovation in Croatian Firms

Innovative activities in Croatia were analyzed according to three different groups: (1) Notified innovations¹ are the innovations made known, but still in the recognition process; (2) Accepted but not applied are the innovations which are recognized and accepted, but not implemented; (3) Applied innovations are recognized, accepted and implemented. As noted earlier, due to institutional pressures, only about a quarter (25%) of the firms that replied to the questionnaire register and apply inventions as innovations (Table 1). This finding confirms the difficulty in development of new processes and change of the old socialist institutions. As new institutional pressures, or support for innovation processes, have occurred, the degree to which inventions applied as innovations have continuously grown is quite encouraging. In the five-year period presented, the amount of innovation has more than doubled.

Of interest to us in this exploratory study were (1) reasons for the purpose of innovative-type investment by these firms, and (2) whether innovative activity caused any organizational and structural changes. The largest amount of investments included 1) test production, education of employees, technical groundwork, 2) research and development, and 3) projection and design of products (Table 2). The new competitive dynamics of the Croatian marketplace pressed firms to focus on quality and to develop a customer base. In the old socialist socio-economic system, there was little reward for improved efficiency in the enterprise, and little support for transformation of production processes or reallocation of the work force. Due to these disincentives, the socialist socio-economic system provided a basis for technical backwardness, low quality goods, and inefficient processes. Of even further interest is that the investments generally 1) increased productivity, and 2) increased the specialization of production (Table 2a). Innovation investment in Croatia is propelling, albeit slowly, to increased efficiency and quality products.

Incentives for Innovations in Croatian firms

Another goal of our research was to discover the strongest incentives for innovative activities in Croatia. Incentives for innovation are analyzed according to three groups: (1) market position, (2) production process, and (3) improvements. We asked the respondents to indicate which incentives are very important to their firms. Overwhelmingly the results suggest that Croatian firms need to focus on their domestic market (Tables 3 and 3a). This result is not surprising as international borders opened and a flood of high-

quality international products entered the market. Former protectionist policies and monopoly building in Croatia are now not effective in the transitional market. Croatian firms that were previously dominated by socialistic institutional constraints are aware that they need to refocus, and still may regain their market share. By understanding their own population, i.e. customers' needs and wants, they can again become competitive through efficient production and quality products.

Confirming the "catch up" mentality of firms in Croatia due to their past socialistic institutional constraints as they understand the importance of innovation for competition, our research suggests that innovation in the production process was aimed at achieving efficiency (Table 4). In the former socialist market, manufacturing firms' purpose was not efficiency, but to provide jobs and to produce an adequate product. Data illustrate that not only was the introduction of new technology an incentive for innovation, but it was also an incentive to cut the costs associated with production, or in effect to become more efficient. Also, these firms understand that foreign producers are competing for their market's customers, hence quality must be increased (Table 4a). This aspect of a quality product provision is different from the old socialist standpoint where monopolies dictated customer preferences and quality. The firms in transitional economies understand that innovation will be required in order to compete effectively, and this is done through provision of efficient production and improvement in the quality of the product.

Relationship of Innovations with the Size of the Firm

A further aspect stressed by the literature is the role of firm size. The traditional economic approach to understanding innovation suggests that large firms have the advantage in innovation (Schumpeter, 1943; Rogers, 2000). Some other results show that small firms may have an advantage. Small firms may be faster at recognizing opportunities. They may be more flexible in adjusting research plans or in the implementation phase of innovation processes. Small firms have more innovations per employee, as shown by the analysis of the SPRU major innovations data set for the UK (Rothwell and Dodgson, 1994). However, Tether (1998) showed that the number of innovations is not the same as measuring the value of innovation. Using SPRU data, Tether finds that the firm size-innovation relationship will vary according to the specific technological and market conditions. Acs and Isberg (1991) found empirically "that for large firms innovation tends to be more equity financed, while for small firms innovation appears to rely more heavily on debt."

We investigated the relationship between firm size (measured in both number of employees and total revenue) and investments in innovative activity, and the number of innovations (Tables 5 and 5a). Pearson's correlation coefficient was calculated for the combinations of the above-mentioned variables. We were surprised that the results

¹ Notified innovations and not-applied innovations are not innovations but rather inventions, as suggested by the EU/OECD definition in the 1995 "Green paper on Innovation."

suggested that larger Croatian firms had higher innovative activity. We had anticipated that these institutions would be too difficult to change, and that smaller, more nimble firms, would lead the way in innovation. However, other institutional literature supports this finding.

Recently, instead of an organization playing a passive role, researchers have been incorporating its ability to react to the environment. A seminal study that incorporated both institutionalism and resource-dependency illustrated that organizations can and do actively react to environmental pressures (Oliver, 1991). For example, when faced with environmental pressures, organizations can acquiesce, compromise, defy. These decisions are founded upon both the type of pressure and the variables of an organization, so managers must weigh both the issues and expected outcomes. Even these decisions are affected by institutional pressures and isomorphism as it appears that the most legitimate firm will change first, while acquiescence may very well be the only choice for less legitimate firms (Scherer and Lee, 2002). Larger Croatian firms have legitimacy and are instigating the drive for innovative practices, thus causing institutional reform.

A Hegelian dialectical approach applied to institutional theory illustrates that change can occur within the institutional framework (Scherer and Lee, 2002). The dialectical approach suggests an open system viewpoint and those organizations are open to change. There is the construction of reality, totality, contradiction, and then praxis. The construction of reality is the development of norms and relationships and how they interact, while the totality infers that all interactions (internal and external) must be included as a network of associations.

Contradiction exists where there are opposite viewpoints or seeming issues that are opposed, and praxis is the ability and desire to change the contradiction. From an institutional perspective, these contradictions could cause adaptation that affects adaptability, isomorphism that affects production/productivity (loose coupling), inter-industry conformity that conflicts with intra-organizational issues, and conformity that conflicts with stakeholders (e.g. vendors, customers, etc.). The abrupt change in the Croatian marketplace has forced larger firms to initiate innovation in order to compete effectively in a transition economy. As the construction of reality for these firms has changed, and the governmental pressures and support to innovate and become competitive has increased, larger firms, which have greater resources than smaller firms, are able to innovate.

Discussion

The current knowledge-based marketplace is a new economy characterized by new technologies, globalization and an ever-increasing emphasis on intangibles (Sullivan, 2000; Pfeffer and Sutton, 1999; Loyd and Thurow, 1997). Capital, natural resources and labour are not the most valuable resources in today's economy; instead, knowledge and knowledge workers play the central role (Drucker,

1985). Knowledge has emerged as the most strategically significant resource of organizations because an increasing turbulence of the external business environment has focused attention upon resources and organizational capabilities (Grant, 1998; Quinn et al., 1996). The application of this knowledge and innovation will lead firms to boost their competitive advantage as asymmetries in knowledge explain performance differences between organizations (Conner and Prahalad, 1996). Also, innovation is considered a fundamental component of entrepreneurship and a key element of business success (e.g. Nonaka, 1991; Nonaka, Takeuchi, 1995).

Central and Eastern European (CEE) transition economies represent major business opportunities, though complex, as socio-economic problems (e.g., high inflation and debt, high unemployment, organized crime) are still present (Tihanyi and Roath, 2002). Even with these issues, CEE has attracted considerable foreign direct investment (i.e., \$110 billion) by 1999 (UNCTAD, 2000). Croatia, as a former socialist republic, offers some of the greatest opportunities of all transitional economies, hence it is the focus of this paper.

As a transitional economy, Croatia's institutional environment is still evolving from a socialist to a free-market economy. Although institutions greatly influence how firms act within a given environment, changes made by the government are pressing firms to adopt free market reforms and to require new innovative practices. We investigated the use of and reasons for innovation in Croatian firms.

The results of our survey of 300 Croatian firms that export products (91 responses) illustrate the difficulties in competition which are faced by firms in transitional economies. Although the sample size is smaller than anticipated, we suggest some conclusions which cannot be generalized. Only a quarter (25%) of the firms who answered the questionnaire registered and applied innovation processes and their outcomes. This finding confirms the difficulty in the change of the socialistic institutional environment, which has actually discouraged innovation and change.

The innovation that has occurred has focused on developing both efficiency as well as higher quality of products. Former socialist manufacturing firms were institutionalized to maintain jobs and to produce an adequate product. As competition with foreign products was nearly non-existent due to their monopoly power, these firms were not required to mount an effective strategy to acquire and maintain customers. Today, Croatian firms are "catching up" in both quality of product, and in the production process (Dabic, 1998).

Another interesting finding was that the incentive for innovation was increasing the domestic market share. These firms understand their consumer and want to develop their domestic market first. Larger firms also tend to innovate more than smaller firms. This finding initially surprised us, as we considered larger firms to be more constrained by past

institutional forces, the inflexibility of large bureaucratic firms, and core rigidities. However, their access to greater resources and, from an institutional dialectics viewpoint, external pressures could very well induce change within these structures. A loose coupling of institutional measures and internal firm influences negatively affect innovation processes, which have evolved to allow knowledge development and innovation.

Management implications

Due to the complexity and heterogeneity of the field, this contribution is necessarily selective and limited. Further research and analysis are needed, but nevertheless, we attempted to summarize the discussion and results presented in this article into 5 suggestions on how firms should act in order to create and maintain their “catching up” process:

1. To maintain the “catching up” process, firms need to focus on innovation processes within the firm in order to benefit from the creative potential inherent in the firms’ employees.
2. Focus on organizational learning/knowledge development is needed.
3. Innovation is not an event - it’s a process. It consists not just of invention, but innovation as success in its market deployment. It involves not only the installation of a new plant, but also the continuous management of technological and other firm’s capacity in order to meet the needs of current and future customers. The changes must be recognized and understood within the firm’s context for a firm to take advantage of changes in technology, market and competition. Lesson to be learned: Businesses and boundary spanners must have the capacity and inclination to recognize opportunities associated with breakthrough innovations especially, but not exclusively.
4. Innovation requires beneficial change, and firms in Croatia must accept and embrace innovation. Management techniques and tools for managing different aspects of this change must be implemented (e.g., Total Quality Management; business process re-engineering; diagnostics - assessment of technological and innovative capabilities and failings; a rational, step by step approach to investment resources on premises and plant research; benchmarking - comparative assessment of key performance indicators against defined standards for the sector; technology watch management – monitoring and management of the technological gap between the firm and its competitors; diagnostics of creativity tools - mobilization of the innovative capabilities of all personnel; and value analysis for cost reduction through focus on customer perception).
5. Collaboration in the form of technology-based joint ventures, strategic alliances, and multi-partner R&D projects, is an increasingly important feature of the generation and diffusion of innovation. Vertical (user-supplier) links play a central role in the innovation process. Horizontal links also assist the innovation process (Freeman, 1991; Dodgson, 2000).

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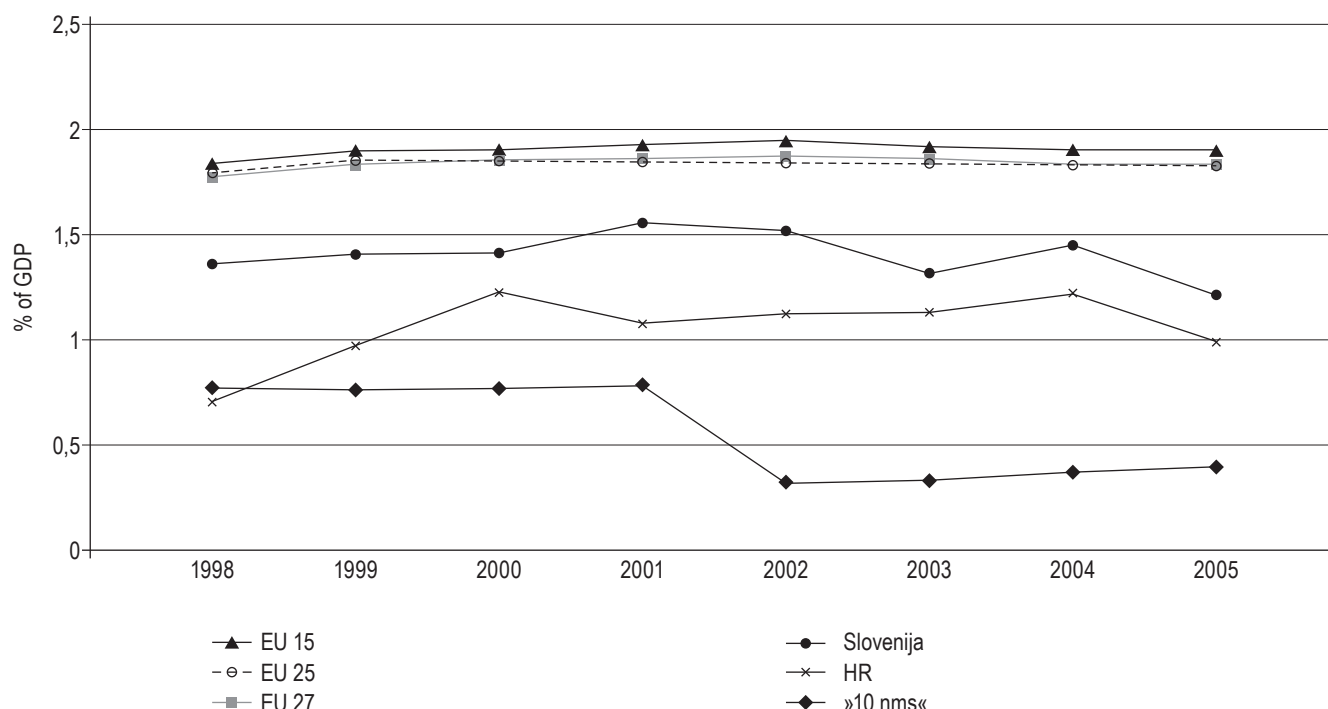
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Appendix

Figure 1. *Croatian Investment in R&D (GERD) 1998-2005, Croatia vs EU as % of GDP*



Source: Eurostat, DZS: RH 1998-2001.

Table 1. *Innovative activities of Croatian firms (1996-2000) – percentage of firms that reported innovative activity*

Innovative activity	1996	1997	1998	1999	2000
Notified innovations	11.0%	18.7%	19.8%	19.8%	23.1%
Accepted but not applied innovation	3.3%	8.8%	12.1%	8.8%	11.0%
Innovations	13.2%	14.3%	20.9%	24.2%	25.3%

* Note: notified innovations and not-applied innovations are not innovations but inventions, as suggested by the EU/OECD definition.

Table 2. *Structure of investments in innovative activities in Croatian firms in 2000*

Investments in innovative activities	Mean percentage
Research and development	28.9
Registering patents and licenses	14.2
Projecting and design of products	27.9
Test production, education of employees, technical groundwork	34.5
Market research	20.3
Other	41.0

Table 2a. *Organizational and structural changes caused by innovative activities*

Type of change	Percentage
Increase in specialization of production	51.1%
Increase in productivity	64.0%
Introduction of new functions	29.3%
New organizational units	30.0%

Table 3. *Reasons for innovative activity by market:* 1 - not important, 2 - small importance, 3 - important, 4 - very important, 5 - greatest importance.

Market	Average mark of importance
Croatia	4.33
EU	3.82
CEFTA	3.80
Other European countries	3.80
USA	2.25
ASIA	1.94
ARAB COUNTRIES	2.06
OTHERS	2.00

Table 3a. *Incentives for innovative activities – market position*

Incentive for innovative activities	Percentage of firms that consider the incentive as very important
Increase of market share	57.8%
Capturing new market segments – Croatia	46.7%
Capturing new market segments – EU	28.%
Capturing new market segments – other developing European countries	31.1%
Capturing new market segments – CEFTA	31.1%
Capturing new market segments – USA	8.9%
Capturing new market segments – Asian countries	6.7%
Capturing new market segments – Arab countries	8.9%

Table 4. *Incentives for innovative activities – production process*

Incentive for innovative activities	Percentage of firms that consider the incentive as very important
Introduction of new technology / equipment	44.9%
Reduction of labour costs	32.6%
Reduction of material costs	32.6%
Reduction of energy costs	25.8%
Reduction of production time	12.4%
Reduction of project and design costs	22.5%
Increase in production flexibility	16.7%

Table 4a. *Incentives for innovative activities – improvements*

Incentive for innovative activities	Percentage of firms that consider the incentive as very important
Improved product quality	55.1%
Improved organization of work	34.4%
Better treatment of environment	28.1%
Improved conditions of work and security issues	33.3%

Table 5. *Correlations between total revenue and innovative activity*

Variable	Pearson Correlation	Sig. (2-tailed)
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* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.10 level (2-tailed).

Table 5a. *Correlations between number of employees and innovative activity*

Variable	Pearson Correlation	Sig. (2-tailed)
Investments	.265*	.057
Number of registered innovations (1996-2000)	.304**	.004

* Correlation is significant at the 0.10 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 6. *Forces affecting firm development*

	Factors	"strugglers"	"achievers"
Internal factors	Investments	3.53**	4.43**
	Innovative capability of R&D	3.73**	4.22**
	Ability to win new technologies	3.69**	4.31**
	Capability for innovations in production process	3.79**	4.25**
	Capability for product innovation	3.83**	4.33**
External factors	Cost of capital	2.06**	3.00**
	Availability of capital	2.49**	3.64**
	Legal surroundings in country and abroad	2.74**	3.3**

* $p < 0.1$, ** $p < 0.05$