

Proizvodna strategija, podprta s teorijo proizvodnih virov: študij primera v podjetju Primat

An Operations Strategy Supported with Resource-Based Theory: A Case Study at the Primat Company

Krsto Pandža · Borut Buchmeister · Andrej Polajnar · Iztok Palčič

Zamisel o uporabi proizvodnje kot strateškega orožja za doseganje konkurenčnih prednosti je stara vsaj toliko kolikor proizvodnja sama. Vendar se vsebina raziskovalnega področja proizvodnih strategij glede na razvoj gospodarskega okolja močno spreminja. V teoretičnem delu prispevka je predstavljena teorija proizvodnih virov in njen potencial, da postane vodilna teoretična zamisel raziskovalnega področja proizvodnih strategij. V nadaljevanju je predstavljena raziskava, ki s svojimi izsledki prispeva k razvoju teorije proizvodnih virov. Štiri uspešna proizvodna podjetja so ponudila okolje za raziskavo. V prispevku je podrobneje predstavljen študij primera iz podjetja Primat. V razpravi so podane ugotovitve, ki so nastale na podlagi induktivne analize med vsemi štirimi študijami primerov.

© 2002 Strojniški vestnik. Vse pravice pridržane.

(Ključne besede: strategije proizvodne, teorija proizvodnih virov, akumulacija sposobnosti, perspektive evolucijske)

The idea of using manufacturing as a strategic weapon to achieve competitive advantage is as old as manufacturing itself. The content of operations-strategy research, however, has changed a great deal due to the development of the economic environment. The theoretical part of this paper presents resource-based theory and its potential in becoming a leading theoretical concept for operations-strategy research. After that a case study is presented, the results of which add to the development of resource-based theory. Four successful manufacturing organisations provided the framework for the research. A case study of the manufacturing organisation Primat is presented in detail. The results of the inductive analysis of all four case studies are also presented.

© 2002 Journal of Mechanical Engineering. All rights reserved.

(Keywords: operations strategy, resource-based theories, capabilities accumulation, evolution perspectives)

0 UVOD

Uspešnost in učinkovitost poslovnih procesov postajata ključnega pomena za uspešno poslovanje proizvodnih podjetij. Proizvodni procesi so integralni del poslovnih procesov. Še več, proizvodni procesi se vedno bolj obravnavajo kot celotna veriga dejavnosti, ki jo je treba upravljati, da izdelek zadovolji vrednote kupca. Proizvodni menedžment¹ se zato uveljavlja kot eno najpomembnejših področij organizacije in upravljanja. Znanstveno raziskovanje razmerja med proizvodnimi procesi in doseganjem konkurenčnih prednosti proizvodnega podjetja je zaokroženo v okviru raziskovalnega področja proizvodnih strategij.

Tradicionalna zamisel proizvodnih strategij, ki temelji na kompromisih med konkurenčnimi kriteriji, tj. prilagodljivostjo, stroški, kakovostjo, zanesljivostjo in hitrostjo dobav ter inovativnostjo,

0 INTRODUCTION

The success and efficiency of business processes are of key importance for the successful operations of manufacturing organisations. Manufacturing processes represent an integral part of business processes. What is more, manufacturing processes have been treated as a chain of activities that should be managed if the product is to meet customers' demands. Operations management¹ has therefore become one of the most important fields of management. Relationships between an organisation's operations processes and the attainment of competitive advantages are studied within the scientific field of operations strategy.

The traditional concept of operations strategy, which is based on trade-offs between competitive criteria such as flexibility, innovativeness, costs, quality, reliability of deliveries and speed of deliveries, has re-

ostaja kljub spremembam v industrijskem poslovnem okolju izjemno robusten [1]. Najpomembnejša strateška odločitve v zvezi s proizvodnimi procesi je izbira ravni konkurenčnih kriterijev, s katerimi bodo podprte konkurenčne prednosti podjetja. Odločitve o izbiri konkurenčnih kriterijev terjajo kompromise, saj se nekateri konkurenčni kriteriji medsebojno izključujejo [2]. Kljub svoji robustnosti pa tradicionalna zamisel proizvodnih strategij vse teže razlaga dogajanja v sodobnem poslovnem okolju. Tradicionalna zamisel sama zase ne more pojasniti in razložiti uspeha ali neuspeha proizvodnega podjetja ([1] in [3]). Začne se iskanje nove zamisli, ki bo ponudila teoretični okvir področju proizvodnih strategij.

Z uveljavitvijo sodobnih proizvodnih zamisli, ki so temeljito zamajale nekatere predpostavke tradicionalne zamisli proizvodnih strategij, so poskušali nadomestiti zamisel proizvodnih strategij. Začetek devetdesetih postreže z zamisljo vitke proizvodnje [4]. Najpopularnejšim organizacijskim tehnikam, združenim pod imenom vitka proizvodnja, se pridružijo še proizvodne zamisli, to so agilna proizvodnja, fraktalno podjetje in množinska prilagodljivost.

Omenjene zamisli zavračajo heterogenost proizvodnega podjetja, kot temelj strateškega obnašanja v podjetju. Proizvodna podjetja so heterogena glede na vire in sposobnosti, zato proizvodna strategija še vedno pomeni biti predvsem zmožen delati drugače od konkurence. Iskanje nadomestila za proizvodne strategije v sodobnih proizvodnih zamislih pomeni ponovno vračanje v obdobje *taylorizma*, ko obstaja *le en* najboljši način za obvladovanje proizvodnih procesov [5].

Zamisel vitke proizvodnje izhaja iz okolja japonske avtomobilske industrije. Še več, gre za zamisel, ki je nastala na podlagi raziskovanja poslovne prakse v *Toyoti*. Ni težko ugotoviti, da zamisel, ki temelji na specifičnosti avtomobilske industrije in celo enega samega primera, ni prenosljiva v vsa poslovna okolja.

Vodilni avtorji zamisli agilne proizvodnje [6] in [7], fraktalnega podjetja [8] in množinske prilagodljivosti [9], poskušajo našteje zamisli predstaviti kot generično strategijo z namenom, postaviti skrajno prilagodljiv sistem, ki naj bi bil imun za stroške, povezane z rastjo kompleksnosti. Takšen sistem bi naj bilo mogoče doseči predvsem z uporabo napredne proizvodne tehnologije in sodobnih informacijskih sistemov. Avtorji sicer priznavajo, da sama tehnologija še ni dovolj [6]. Dodajajo še kopico sodobnih poslovnih procesov, to so strateške zveze, ploščenje organizacijske strukture in osredotočenost na ključne kompetence. Tako te zamisli pomenijo predvsem lepljenko večine sodobnejših poslovnih zamisli, ki so se pojavili v sodobni literaturi o menedžmentu.

Sodobnim proizvodnim zamislim ne gre odrekat pomena, ki ga imajo za afirmacijo proizvodnih

mained extremely robust in spite of changes in the industrial business environment [1]. The most important strategic decision with respect to manufacturing processes is the selection of competitive criteria that will support the competitive advantages of an organisation. Decisions about the selection of competitive criteria require compromises as some competitive criteria exclude each other [2]. In spite of its robustness, the traditional concept of operations strategy is becoming increasingly inadequate when it comes to explaining events in the modern business environment. On its own, the traditional concept cannot explain and remedy the success, or lack of success, of a manufacturing organisation ([1] and [3]). A new concept is being searched for that will offer a theoretical frame for the field of operations strategy.

The creation of modern manufacturing concepts has utterly shaken some of the assumptions about the traditional operations-strategy concept: it was to be replaced by something else. The beginning of the nineties featured the concept of lean production [4]. To most popular organisational techniques under the joint term of lean production were added such manufacturing concepts as agile manufacturing, fractal organisation and mass customisation.

These concepts reject the heterogeneity of a manufacturing organisation as the basis for strategic behaviour in the organisation. Manufacturing organisations are heterogeneous with respect to resources and capabilities; operations strategy thus still means to be capable of working differently than one's competitors. In the modern manufacturing concept, searching for a replacement for operations strategies means returning into the era of *taylorism* with only *one* best way to manage manufacturing processes [5].

The concept of lean production comes from the Japanese automobile industry. What is more, the concept is based on a study of business practices in *Toyota*. It is not hard to understand that a concept which focuses specifically on the car industry is not transferable to all business environments.

The leading authors of agile manufacturing [6] and [7], fractal company [8] and mass customisation [9] try to present their concepts as a generic strategy with the aim of establishing an extremely flexible system that should be immune to costs arising from complexity. Such a system could be attained, especially with the use of advanced manufacturing technology and modern information systems. The authors admit, however, that technology itself is not sufficient [6]. They add a bundle of modern business approaches, such as strategic alliances, the empowerment of the organisational structure and focusing on key competences. These concepts thus represent a mosaic of the most recent business concepts that have appeared in modern management literature.

Modern manufacturing concepts should not be denied the important role they play in the affirma-

procesov, vendar same zase ne morejo postati zamenjava za proizvodno strategijo. Proizvodne zamisli niso same sebi namen, pač pa sredstvo, ki odpira nove priložnosti. Vsaka od proizvodnih zamisli mora biti prilagojena specifični situaciji podjetja in njegovemu položaju v poslovnem okolju. Ali povedano drugače, biti mora v okviru proizvodne strategije podjetja.

Nov teoretični okvir, na katerem bo temeljilo raziskovalno področje proizvodnih strategij, mora omogočiti razlago dogajanja v sodobnih proizvodnih podjetjih. Približati se mora statusu paradigme, kakor jo definira Kuhn [10]. Paradigma identificira in definira raziskovalna vprašanja, s katerimi se bodo spopadli raziskovalci s področja proizvodnih strategij. Teorija proizvodnih virov, ki se je uveljavila na področju strateškega menedžmenta in na področju teorije industrijskih organizacij, se pojavlja kot teoretični okvir, znotraj katerega bo temeljilo področje proizvodnih strategij. Raziskovalna vprašanja, s katerimi so se spopadli raziskovalci v okviru raziskave, predstavljene v tem prispevku, izhajajo iz teoretične zamisli teorije proizvodnih virov.

1 TEORETIČNO OZADJE

Bistvo teorije proizvodnih virov se kaže v trditvi, da je konkurenčni položaj podjetja definiran s skupkom edinstvenih virov in sposobnosti ter odnosov med njimi [11]. V njenem osrčju je predpostavka o heterogenosti podjetij. Ne obstajata namreč dve enaki podjetji. Vsako se ponaša s svojo edinstveno bazo virov in sposobnosti. Tudi isti vir bo v različnih podjetjih različno učinkovit. Viri in sposobnosti so nemobilni ali omejeno mobilni. Podjetje, ki v svoji bazi nima vira ali sposobnosti, potrebnih za dosego konkurenčne prednosti, jih ne more kar preprosto (brez stroškov) prenesti iz baze drugega podjetja.

Literatura teorije proizvodnih virov intenzivno opisuje lastnosti, ki jih morajo imeti viri in sposobnosti, da postanejo temelji konkurenčne prednosti ([12] do [14]). Biti morajo redki, neposnemljivi, nepregledni, kompleksni in historično odvisni.

Pozornost teorije proizvodnih virov je bila ob njenih začetkih usmerjena k raziskovanju pomena virov, ki jih je predstavljala kot specifično premoženje za podjetje. Ti viri so lahko oprijemljivi ali neoprijemljivi. Mednje sodijo tehnologija, patenti, avtorske pravice, individualno inženirsko znanje, ekspertno razvojno - tehnološko znanje, sloves. V zadnjem času se pozornost teorije proizvodnih virov preusmerja iz proučevanja statičnih virov k proučevanju dinamičnega procesa razvoja sposobnosti [15]. Sposobnosti pomenijo procese, ki omogočajo, da podjetja učinkovito in uspešno izbirajo in izvajajo dejavnosti, potrebne za

tion of manufacturing processes, yet they cannot, by themselves, become a replacement for operations strategy. Manufacturing concepts are not intended for themselves, rather they are a means to open up new possibilities. Every manufacturing concept needs to be adapted to the specific situation of an organisation and its position in the business environment. In other words, it should feature in the context of an organisation's operations strategy.

A new theoretical frame for operations-strategies research should make it possible to explain the events in modern manufacturing organisations. It should approach the status of a paradigm, as defined by Kuhn [10]. The paradigm identifies and determines the research questions that will be tackled by scholars from the operations-strategy field. Resource-based theory, which was created within the fields of strategic management and industrial organisation theory, has become a theoretical frame within which the operations-strategy field will be placed. The research questions tackled by the authors of the research presented in this paper result from the theoretical context of resource-based theory.

1 THEORETICAL BACKGROUND

The essentials of resource-based theory lie in the assertion that the competitive position of an organisation is determined by the sum of its unique resources and capabilities, and the relationships between them [11]. It is centred on the presumption of the heterogeneity of organisations, i.e. that two equal organisations cannot exist. Each organisation is characterised by its unique resource base and capabilities. The same resource will result in different levels of productivity in different organisations. Resources and capabilities are either immobile or of limited mobility. The organisation that lacks a resource or the capability necessary to achieve a competitive advantage, cannot simply adopt, without costs, the resources or capabilities of another organisation.

The literature on resource-based theory describes in detail the features that resources and capabilities should possess to become the fundamentals for a competitive advantage ([12] to [14]). They should be rare, inimitable, non-transparent, complex and path-dependent.

In the beginning, the attention of resource-based theory was focused on studying the importance of resources, which, according to the theory, meant the specific assets of an organisation. These resources can be either tangible or intangible. They encompass technology, patents, copyright, engineering knowledge, expert R&D knowledge, technological knowledge and image. Lately, the attention of resource-based theory has shifted from the study of static resources to the study of the dynamic process of capabilities development [15]. Capabilities represent the processes that enable the organisation to effectively and successfully select and implement the activities that are necessary to meet cus-

zadovoljevanje potreb kupcev izdelkov ali storitev [16]. Sposobnosti so tiste kombinacije virov in procesov, ki pomenijo temelje konkurenčne prednosti za izbrano podjetje, ki posluje v določenem poslovnem okolju [17].

Viri in sposobnosti so integralni del proizvodnih procesov, zato teorija proizvodnih virov s svojo introvertiranostjo pomeni ustrezen teoretični okvir za raziskovalno področje proizvodnih strategij. Gagon [18] poudarja, da je teorija proizvodnih virov lahko teoretični okvir za razlago vsebine, ki na področju proizvodnih strategij povzroča največ nesoglasij. Teorija proizvodnih virov odpravlja reaktivno in obrambno vlogo proizvodnje, ki jo ta zaseda v hierarhiji strateškega načrtovanja. V nasprotju s tradicionalno zamisljo ne obravnava statičnih odločitev med konkurenčnimi kriteriji. Poudarja dinamične poti, s katerimi proizvodno podjetje prehaja na različne proizvodne ravni [3]. Hayes in Pisano [19] poudarjata strateško prilagodljivost podjetja, ki omogoča spreminjanje narave kompromisov in doseganje različnih kombinacij konkurenčnih kriterijev v nekem obdobju. Teorija proizvodnih virov osvetli uporabo sodobnih proizvodnih zamisli v novi luči. Sodobnih proizvodnih zamisli, ki so se uveljavile kot najboljša praksa, teorija proizvodnih virov ne predstavlja kot splošno rešitev za proizvodne probleme, ampak jih predstavlja kot dokaz, da podjetje, ki metodično razvije sposobnosti in zavestno išče priložnosti za njihovo uporabo na trgu, lahko doseže izrazito konkurenčno prednost.

Kljub popularizaciji teorije proizvodnih virov na področju proizvodnih strategij ([17] do [22]), sta njena uporabnost in sposobnost opisovanja poslovnih stvarnosti odvisna od pojasnitve nekaterih nedorečenosti. Raziskovalci intenzivno opisujejo značilnosti, ki jih morajo imeti sposobnosti, da postanejo temelj konkurenčne prednosti. Predstavljajo primere, ki dokazujejo pomen sposobnosti v proizvodnih podjetjih. Proučevanje procesa, kako se sposobnost akumulira, pa ostaja zunaj raziskovalne agende. Raziskovalci predpostavljajo, da podjetja že *kako* razvijejo sposobnosti, ki s svojim pomenom pomenijo na trgu temelj konkurenčne prednosti. Obravnavanje sposobnosti skozi statično perspektivo ima za posledico, da se sposobnost predstavlja kot nekaj, kar je že po definiciji vredno na trgu. Kako sposobnost doseže razvojno stopnjo, ki ji zagotavlja vrednost na trgu, pa ostaja nepojasnjeno.

Motivi za raziskavo, predstavljeno v tem prispevku, so izhajali iz želje, pojasniti dinamiko procesa akumulacije sposobnosti. Vsebinsko raziskave lahko predstavimo v dveh splošnih raziskovalnih vprašanjih:

- Kakšen je mehanizem, po katerem poteka dinamični proces akumulacije sposobnosti v proizvodnem podjetju?

tomers' needs, when it comes to buying either products or services [16]. Capabilities are those combinations of resources and processes that represent the fundamentals of competitive advantage for a selected organisation operating in a certain business environment [17].

Resources and capabilities are an integral part of manufacturing processes, therefore resource-based theory, with its introversion, represents a theoretical basis for operations strategy research. Gagon [18] argues that resource-based theory can represent a theoretical frame for the explanation of the content, which is the source of most conflicts in operations strategy. Resource-based theory does away with the reactive and defensive role of manufacturing in the hierarchy of strategic planning. Unlike traditional concepts, resource-based theory does not place static decisions among competitive criteria. It stresses dynamic ways that raise a manufacturing organisation to different manufacturing levels [3]. Hayes and Pisano [19] point to the strategic flexibility of an organisation that allows it to vary the nature of trade-offs and to achieve different combinations of competitive criteria in a definite time period. Resource-based theory puts the use of modern manufacturing concepts in a new light. It does not take modern manufacturing concepts that have proved to be the best practice as a general solution for manufacturing problems, but as a proof that an organisation can achieve a competitive advantage as long as it systematically develops capabilities and willingly seeks opportunities to use them on the market.

In spite of the popularity of resource-based theory in the field of operations strategy ([17] to [22]), its applicability and capability to describe business reality depend on the want of clearness and precision. Scholars describe in detail features that capabilities should possess to become the basis of a competitive advantage. They present examples showing the importance of capabilities in manufacturing organisations. The study of the capability-accumulation process, however, is not put on the research agenda. Scholars presume that an organisation *somehow* develops the capabilities that are important on the market as a source for competitive advantage. When capabilities are studied through the results arising from a static perspective they are presented as being valuable on the market, by definition. It remains unexplained, however, how capability achieves a level that would ensure the company's value on the market.

The motivation for the research presented in this article originated in a wish to explain the dynamics of the capability-accumulation process. The contents of the research can be grouped into two general research questions:

- What is the mechanism of a dynamic capability-accumulation process in a manufacturing company?
- Is the capability in the accumulation process al-

- Ali je sposobnost v procesu akumulacije vedno pomembna in vredna v poslovnem okolju?

ways important and valuable in the business environment?

2 METODOLOGIJA

2 METHODOLOGY

Štiri uspešna slovenska proizvodna podjetja so ponudila okolje za poglobljeno raziskavo. Raziskava je potekala v podjetjih Primat d.d., Eti d.d., Gorenje d.d. in v strateški poslovni enoti Sava Print iz podjetja Sava d.d. V okviru tega prispevka je nemogoče predstaviti vse študije primerov, zato je v poglavju Rezultati predstavljen študij primera iz podjetja Primat. Ugotovitve, predstavljene v poglavju Razprava, so pridobljene na podlagi induktivne analize med vsemi štirimi študijami primerov.

Raziskava je izvedena v skladu s procesom induktivnega oblikovanja teorije [23]. Objekt raziskave je proces akumulacije sposobnosti. Zanj je značilna kompleksnost, slaba strukturiranost in dinamična historična odvisnost. Uporabljena metodologija študija primerov je ustrezno orodje za spopad s takšnim pojavom. Godfrey in Hill [24] poudarjata, da so kakovostne metodologije, kakršne so študije primerov in etnografske raziskave, najboljši način za proučevanje značilnosti strategij, na katerih temelji teorija proizvodnih virov. Postopek induktivnega oblikovanja teorije in izbrana metodologija študija primerov ustrežata, saj mora pojasnitev rezultatov zagotoviti opis in razlago dinamike procesa akumulacije sposobnosti in ne rigoroznega definiranja vzročno-posledičnih razmerij.

V raziskavi je uporabljena razvojna in vzdolžna perspektiva. Večina empiričnih raziskav s področja proizvodnih strategij uporablja prečno perspektivo. Uporaba evolucijske in vzdolžne perspektive, uporabljene v pričujoči raziskavi, pomeni pomemben metodološki prispevek k raziskovanju na področju proizvodnih strategij. Logika in mehanizem procesa akumulacije sposobnosti se zaradi dinamične historične odvisnosti ustrežneje proučuje skozi vzdolžno perspektivo. Van de Ven [25] predlaga definiranje teorije procesa, ki jo uporabljajo raziskovalci pri svoji raziskavi. Proces akumulacije sposobnosti je na podlagi induktivne pojasnitve dogajanja v podjetjih opisan kot življenjski cikel. Lastnosti posamezne faze življenjskega cikla je mogoče opisati z evolucijsko teorijo procesa.

Izvedba raziskave je od raziskovalcev zahtevala, da v podjetju identificirajo sposobnost, sledijo procesu akumulacije sposobnosti, razumejo poslovni okvir, v katerem je identificirana sposobnost vredna in pomembna na trgu, in opredelijo posredna merila za spremljanje razvoja sposobnosti. Winter [26] poudarja, da je sposobnosti mogoče posredno meriti z za podjetje specifičnimi merili izvedbe, ključnimi kriteriji ali celo vrednotami.

Intervjuji, poslovna dokumentacija in opazovanja so bili metode zbiranja podatkov,

Four successful Slovenian manufacturing organisations offered to provide a framework for an in-depth field research. The research was performed in the following joint-stock companies: Primat, Eti, Gorenje, and in the strategic business unit Sava Print, a part of Sava, also a joint-stock company. It is impossible to present all four case studies in this article, therefore only the case study of Primat will be presented in the Results section. The findings in the Discussion section were obtained with the inductive analysis of all four case studies.

The research was performed with inductive-theory building [23]. The object of the research was the capability-accumulation process. This process is characterised by complexity, bad structure, idiosyncrasy and path-dependency. The applied case-study methodology was an appropriate tool to tackle such a phenomenon. Godfrey and Hill [24] point out that qualitative methodology, such as case studies and ethnographic research, present the best way to study the idiosyncratic characteristics of strategies on which the resource-based theory is grounded. The inductive approach to design the theory and the selected case-study methodology are adequate because the interpretation of results must ensure the description and dynamics of the capability-accumulation process and not the rigorous definition of cause-consequences relationships.

Evolution and longitudinal perspective are used in the research. The majority of empirical investigations from the field of operations strategy use transversal perspectives. The application of evolution and longitudinal perspective in this research represents an important methodological contribution to the research into operations strategies. The logic and mechanisms of the capability-accumulation process are studied through the longitudinal perspective due to path-dependency. Van de Ven [25] suggests defining the process theory used by scholars in their research. The capability-accumulation process is described as a life cycle of an organisation due to the inductive interpretation of events. The characteristics of the individual phases of a life cycle can be described with the process-evolution theory.

The research required from scholars to identify capabilities, study the capability-accumulation process, understand the business context within which the identified capability is valuable and important on the market, and set indirect measures to study capability development in an organisation. Winter [26] argues that capabilities can be indirectly measured with specific performance measurements, key criteria and even the values of an organisation.

Interviews, business documentation and observations were all methods for collecting the neces-

uporabljenih v raziskavi. Intervjuji s ključnimi osebami v podjetjih so običajno trajali 2 do 3 ure. Vsi intervjuji so bili posneti. Poslovna dokumentacija in arhivski dokumenti so bili ob intervjujih drugi vir podatkov. Uporaba več različnih virov je izboljšala notranjo veljavnost raziskave. Za raziskavo je bila pomembna vsa poslovna dokumentacija, ki je omogočala spoznavanje kompleksne poslovne stvarnosti, in tista, ki kakovostno kakor tudi količinsko podpira podatke, pridobljene z intervjuji. Tretji vir zbiranja informacij so opazovanja, ki pa so bila vključena zgolj v študiju primera iz podjetja Primat. Pri tem velja omeniti, da je bil raziskovalec štiri leta neposredno vključen v operativne dejavnosti podjetja. Raziskava v okviru tega študija primera ima zato zelo izrazito etnografsko komponento.

Analiziranje podatkov in zamisli so potekali v skladu z značilnostmi induktivnega oblikovanja teorije. Gre za iterativni proces zbiranja podatkov, analiziranja in interpretacije. Iterativni krog se ne konča s prvo interpretacijo. Tej sledi ponovno preverjanje ali zbiranje novih podatkov na podlagi novih spoznanj.

3 REZULTATI

Primat d.d. je podjetje, ki v zadnjih letih, z 290 zaposlenimi, stalno ustvarja dobiček. Za ugodne poslovne rezultate v zadnjih letih gre zahvala predvsem proizvodnemu programu varnostne opreme. Ob njem so Primatovi izdelki zaokroženi še v programu kovinskega pohištva, ki zagotavlja 30 % prihodkov od prodaje in programu skladiščne opreme, ki prispeva 10% prihodka.

V podjetju identificirana sposobnost hitrega razvoja izdelkov po naročilu je učinkovita predvsem v poslovnem okviru, v katerem mora podjetje hitro razviti izdelek ustrezne varnostne stopnje po naročilu kupca. Mehanska varnost je opredeljena z ustrežno varnostno stopnjo. Ta ne pomeni zgolj neke najmanjše tehnične ravni, ki jo mora zagotoviti izdelek, kar je značilno za overitve v mnogih industrijskih panogah. Varnostna stopnja, ki jo ugotovi neodvisen preskuševalni laboratorij in zanjo izda potrdilo, pomeni pomembno konkurenčno merilo, s katerim podjetje pridobiva naročila na trgu. Poslovni okvir, v katerem je identificirana sposobnost najuspešnejša in najučinkovitejša, predstavlja tržni segment blagajn za bančne avtomate, ki zagotavljajo skoraj 30% celotnega prihodka podjetja.

Bančni avtomat je zapleten izdelek, ki ga sestavljajo finomehanske komponente za poslovanje z gotovino, računalniško krmilje z elektronskimi komponentami in blagajna, v kateri se nahaja gotovina. Za proizvajalca bančnega avtomata pomeni blagajna, ki zagotavlja mehansko varnost, nabavni izdelek. Proizvajalec blagajne je dobavitelj proizvajalca bančnega avtomata. Takšna povezava zahteva od

sary data for the research. Interviews with key people in the organisation lasted 2-3 hours on average. All the interviews were recorded. Besides interviews, business documentation and archival documents were also used as a source of data. The use of different sources enhanced the internal validity of the research. For the research all the business documents that led to an understanding of business reality were important, as were those which supported the data obtained in interviews, either qualitatively or quantitatively. The third source of data collection was observation; it was, however, only used in the case of Primat. It should be pointed out here that for a period of four years the researcher was directly involved in the operative activities of the organisation. Within this case study, the research thus bears a clear ethnographic component.

The analysis of data and conceptualisation were performed in agreement with the characteristics of inductive-theory generation. This was an iterative process of data collection, analysis and interpretation. The iterative cycle does not end with the interpretation of the initial data. The repetition of verifications and the collection of new data based on new findings necessarily follow.

3 RESULTS

The joint-stock company Primat, which has 290 employees, has recently been making a profit. Favourable business results in the last years are due, in particular, to the manufacturing of safety equipment. The company also manufactures metal furniture, which accounts for 30 % of the sales revenue, and warehouse equipment, which accounts for 10 % of the revenue.

The company's capability to quickly develop products to order is efficient, especially in such a business context in which the organisation, by order of a buyer, must quickly develop a product with a suitable safety level. The mechanical safety of a product is determined by the safety level. According to certificates in numerous industrial branches, the safety level is the minimum technical level that a product must guarantee. In contrast, the safety level established by an independent laboratory and the subsequently issued certificate, represent an important competitive measure that ensures the company's orders on the market. The business context, within which Primat's capability is most successful and efficient, is the market segment of strongboxes for automatic teller machines (cash dispensers), which accounts for almost 30 % of the total income of the organisation.

An automatic teller machine is a complex product consisting of fine mechanical components to manipulate cash money, a computer control consisting of electronic components, and a strongbox containing cash. The strongbox, which ensures the mechanical safety, is a purchasing product for a producer of automatic teller machines. The manufacturer of strongboxes is his supplier. Such trading conditions

proizvajalca mehanske varnosti ustrezen nabor sposobnosti in virov.

Narava poslovanja pri dobavljanju blagajn proizvajalcu bančnih avtomatov je, glede na tipologijo proizvodnih procesov, sestavljena iz dveh korakov. V prvem koraku gre za razvoj po naročilu. Proizvajalec blagajne mora razviti izdelek ustrezne varnostne stopnje. Izmere definira naročnik. Problem razvoja se ne skriva neposredno v izmerah blagajne. Kar zadeva njih, bi lahko bil proces definiran kot prilagajanje standardne izvedbe po naročilu. Problem se skriva v zagotavljanju varnostne stopnje. Za preskuševalni laboratorij gre za popolnoma nov izdelek, ki ga je treba znova preskušati. Proizvajalec blagajne se torej sreča z izzivom, prilagoditi že znane rešitve novim zahtevam ali razviti nove rešitve in kombinacije. Imeti mora izvedeniško znanje na področju zagotavljanja mehanske varnosti, da lahko hitro in učinkovito najde rešitev za konstrukcijo blagajne. Pri tem pomaga poznavanje preskuševalnih procesov, ki jih uporabljajo preskuševalni laboratoriji. Hiter razvoj prototipov terja obvladovanje napredne proizvodne tehnologije, predvsem računalniško podprtega konstruiranja in računalniško krmiljenih obdelovalnih sistemov ter dobro organizacijo prototipne delavnice. Še tako dobro strokovno znanje in obvladovanje sodobne tehnologije pa ne bi bilo dovolj, če se podjetje ne bi bilo pripravljeno hitro odzivati in prilagajati zahtevam kupca.

Uspešno razvit in preverjen izdelek pa še ne pomeni konca poslovne zgodbe. Ta se v svojem tržnem pomenu šele prav začinja. Uspešen razvoj po naročilu je potreben pogoj za pridobitev posla. Po podpisu pogodbe preide proizvodni postopek razvoja po naročilu v proizvodni postopek, ki je nekakšna mešanica med izdelavo po naročilu in izdelavo na zalogo. Slednji pa zahtevajo drugačne sposobnosti. Zagotoviti je treba kakovost procesa izvedbe naročil, obvladovati stroške serijske proizvodnje, zagotavljati zanesljivost in hitrost dobav ter obvladovati nabavne poti.

V Primatu so pridobili sposobnosti, ki so potrebne za obvladovanje procesov po načelu izdelave po naročilu in izdelave na zalogo. Vendar se sposobnosti, ki ga razlikujejo od konkurence, skrivajo v razvoju po naročilu. Štirje meseci od začetnega povpraševanja do uspešne overitve izdelka, kar so dosegli v Primatu, pomenijo za industrijsko panogo resnično malo časa. Tisti, ki je zmožen razviti blagajno ustrezne varnostne stopnje v štirih mesecih, ima sposobnost, ki je v tem poslovnem smislu predstavlja konkurenčno prednost.

Sposobnost hitrega razvoja izdelkov z zahtevano varnostno stopnjo po naročilu kupca je dandanes na trgu priznana. Vendar je svojo vrednost na trgu dosegla v življenjskem ciklu, opredeljenem z evolucijsko dinamiko. Pandža in Polajnar [27] strukturirano predstavljata kronologijo dogajanja.

require from a producer of technically safe products a set of capabilities and resources.

In supplying strongboxes to the producer of automatic teller machines, business operations are done in two steps, regarding the typology of the operations processes. The first step is the development of the product to order. The strongbox manufacturer must develop a product with a certain safety level. The product's dimensions are set by the buyer. The problem of product development does not lie in the product's dimensions. With respect to them, the process could be defined as an adaptation of standard types to order. The problem lies in ensuring safety levels. The strongbox is a completely new product that must be tested anew by the testing laboratory. The strongbox producer is therefore faced with the challenge to adapt known solutions to new requirements or to develop new solutions and combinations. He should possess expert knowledge in the field of mechanical safety assurance to find quick and efficient solutions for designing the strongbox. The knowledge of testing procedures used by testing laboratories is of great help. The rapid development of prototypes requires a knowledge of up-to-date manufacturing technology, especially that of computer-supported design and CNC systems as well as good organisation of a prototype workroom. Expert knowledge and the application of modern technologies, however, would not be sufficient if the company were not willing to respond and adapt to the customer's demands.

A successfully developed and certified product is, however, not the end of the business story. The commercial part of it is still to come. The successful development of a product to order is a prerequisite to arrange a deal. After signing the contract, the process of product development to order is transformed into a process that is a mixture between manufacture to order and manufacture to stock. The latter, however, requires different capabilities. It is necessary to ensure the quality of the order-realization process, manage mass-production costs, ensure the reliability and speed of deliveries, and master the purchasing channels.

Primat has acquired the capabilities required for mastering production processes to order and to stock. However, capabilities that distinguish Primat from its competition lie in the development to order. It cannot be denied that four months from the initial demand to the successful certification of the product is an extremely short period of time. A company that is capable of developing a strongbox of a suitable safety level in a four-month period possesses a capability that represents a competitive advantage in this business context.

Primat's capability to quickly develop products to order with a required safety level is nowadays recognized on the market. However, its value on the market was achieved in an evolutionary dynamic life cycle. The chronology of events is presented by Pandža and Polajnar [27].

Začetna faza procesa (1989-1991)

Na obnašanje podjetja v začetni fazi, ki jo opredeljuje razkorak med sposobnostmi, ki jih poslovno okolje zahteva, in sposobnostmi, ki jih podjetje obvladuje, vplivata dva segmenta. Strateški načrt, s katerim se je želelo podjetje ustaliti v poslovnem okolju, postavi okvir za akumulacijo izvedenska tehničnega znanja s področja mehanske varnosti. Vzporedno pa podjetje se odzove na spremenjene zahteve na trgu, ki narekujejo hiter odziv na zahteve kupcev, in si tako pripravi temelje za sposobnost hitrega razvoja izdelkov po naročilu kupca. V začetni fazi akumulacije sposobnosti v podjetju, sposobnosti hitre reakcije in razvijanja izvedenska znanja na področju varnostne opreme še niso povezovali. Združili sta se v evolucijskem razvoju.

Faza učenja (1991-1995)

Za obdobje učenja je v podjetju značilno zelo intenzivno akumuliranje izvedenska znanja s področja mehanske varnosti. Eksperimentiranje z materiali, konstrukcijskimi rešitvami in tehnološkimi procesi je pripeljalo do izvedenskih znanj. Ta so se akumulirala z intenzivno interakcijo med Primatom in preskuševalnimi laboratoriji. Ti so s svojo logiko preskuševalnih procesov narekovali razvoj tehničnega znanja, pa tudi nekaterih organizacijskih ukrepov in obenem predstavljali organ, ki izbira ponujene rešitve. Če so preskuševalni laboratoriji z overjenjem Primatovih izdelkov potrjevali obstoj sposobnosti, pa to ni mogoče trditi za druge dele poslovnega okolja. Kljub temu, da so se Primatovi izdelki začeli pojavljati v pregledih overjenih izdelkov, ki jih objavljajo preskuševalne ustanove, in se je krog mogočih kupcev povečeval, preglednica 1 pokaže, da so overjeni izdelki zgolj simbolično prispevali k prihodkom podjetja. Kljub neobstoju oprijemljivih finančnih učinkov ni bilo mogoče kar zamenjati strateške smeri. V podjetju so vztrajali na izbrani poti tudi zaradi tega, ker je poslovno okolje prek preskuševalnih laboratorijev potrjevalo vrednost akumuliranega tehničnega znanja.

Faza potrditve (1995-1996)

Posel z bančnimi avtomati pomeni prvo izrazito potrditev poslovnega okolja, da so v podjetju akumulirane sposobnosti dobile vrednost na trgu. Preglednica 1 prikazuje velik skok pri deležu prihodkov od preskušanih izdelkov mehanske varnosti. Skok je posledica prihodkov, pridobljenih s poslom z mednarodnim podjetjem, ki mu je Primat začel dobavljati blagajne za bančne avtomate. Za fazo potrditve je v Primatu značilno, da je podjetje hitro in odločno reagiralo na

Initial phase (1989-1991)

Two segments affect the behaviour of the company in the initial phase. This phase is characterized by the gap between the capabilities required by the business environment and those mastered by the company. The strategic plan with which the company wanted to position itself in the business environment was a framework for the accumulation of expert engineering knowledge in the field of mechanical safety. Simultaneously, the company reacted to the changing demands of the market that dictate a quick response to customers' demands. It thus prepared the foundations for the quick development of products to the buyer's orders. In the initial phase of capabilities accumulation, the company found no links between quick reactions and expert-knowledge development in the field of safety equipment. The two were only to be linked in the evolutionary development.

Learning phase (1991-1995)

The learning phase is characterized by the intensive accumulation of expert knowledge in the field of mechanical safety. Experimenting with materials, structural solutions and technological processes lead to the acquisition of expert knowledge. It was accumulated with intensive interaction between Primat and testing laboratories. With their testing logic, the laboratories dictated the development of engineering knowledge, but also made their influence felt in some organizational measures. The laboratories represented an authority for deciding on offered solutions. While the testing laboratories, by certifying Primat's products, confirmed the existence of capabilities, this cannot be said for other segments of the business environment. In spite of the fact that Primat's products started to appear in lists of certified products, which are regularly published by testing organizations, and the circle of potential buyers increased, spreadsheet 1 shows that the certified products only symbolically enhanced the company's income. In spite of the non-existence of tangible financial effects, the strategic orientation of the company could not be simply changed. The company persisted with the selected orientation also because the business environment, via the testing laboratories, confirmed the value of accumulated engineering knowledge.

Confirmation phase (1995-1996)

The business with the automatic teller machines was the first to gain a clear confirmation from the business environment that company's accumulated capabilities had gained value on the market. Spreadsheet 1 shows a great jump in the income share from products tested for their mechanical safety. The jump resulted from the income gained through cooperation with a multinational organisation to which Primat started to deliver strongboxes for automatic teller machines. The confirmation phase is characterized by the company's quick and determined reaction

Preglednica 1. *Merljivi podatek za oceno sposobnosti*
Table 1. *Quantitative data for capability performance measurement*

Leto Year	Prihodki od prodaje overjenih izdelkov (DEM) Revenues from sales of certificated products (DEM)	Delež overjenih izdelkov v skupnih prihodkih od prodaje [%] Share of certified products in net revenues from sales [%]
1991	579.743	3,2
1992	/	/
1993	1.056.168	7,7
1994	769.996	4,6
1995	1.017.737	6,3
1996	5.461.725	30,3
1997	5.756.398	27
1998	4.105.921	20
1999	8.452.888	35,8

priložnost, ki se je pojavila na trgu. Eksperimentiranje z razvojem novih izdelkov in preskušanje v preskuševalnih laboratorijih, ki je bilo rezultat smotrne odločitve o doseganju primerljivosti izdelkov s konkurenti, je pripeljalo do akumulacije izvedenskega znanja. To se je ob poslu s proizvajalcem bančnih avtomatov ztilo s sposobnostjo hitrega reagiranja na zahteve kupcev, katere zametki so se pojavili v začetku devetdesetih kot nujna reakcija, ki jo zahteva poslovno okolje. Obe sta se v življenjskem ciklu ztili v sposobnost hitrega razvoja izdelkov z ustreznimi varnostnimi stopnjami po naročilu kupca.

Faza eksploatacije (1996-1999)

Za fazo eksploatacije je značilno, da podjetje uporablja že akumulirane sposobnosti pri poslovnih priložnostih, ki se pojavljajo na trgu. Poslu z mednarodnim podjetjem se pridružijo še drugi podobni posli. Podjetje poskuša z investicijami v proizvodno tehnologijo in organizacijske ukrepe vzdrževati raven akumulirane sposobnosti. V okviru razvoja družine blagajn Starprim v Primatu poskušajo razširiti uporabnost sposobnosti na tržni segment, v katerem akumulirana sposobnost ni tako značilna. Akumulacija sposobnosti ni več izrazito krmiljena s signali poslovnega okolja. V podjetju se zavedajo pomena akumulirane sposobnosti, zato jo z različnimi ukrepi in investicijami želijo dograjevati in vzdrževati.

Pobudna faza (1999-)

Za pobudno obnašanje podjetja je značilen odmik od preproste uporabe sedanjih sposobnosti za pojavljajoče se poslovne priložnosti k dejavnemu ustvarjanju priložnosti. Primat v odnosu do kupca blagajn za bančne avtomate nima več zgolj reaktivne vloge in mu podreja svoje sposobnosti, ampak mu na

to the opportunity that emerged on the market. Experimenting with the development of new products and the testing of products in testing laboratories, which was the result of a rational decision to attain comparability with competitors' products, led to an accumulation of expert knowledge. In doing business with the producer of automatic teller machines, expert knowledge mingled with the capability of a quick response to customers' demands, which originates from the necessary reaction demanded by the business environment at the beginning of the nineties. Expert-knowledge accumulation and the capability to respond quickly to customers' demands were combined with the capability to rapidly develop products with adequate safety levels to the buyer's demands.

Exploitation phase (1996-1999)

The exploitation phase is characterised by the company's exploitation of accumulated capabilities in business opportunities emerging on the market. Other business is added to the business with multinational organisation. With investments into manufacturing technology and with organisational measures, the company tries to maintain the level of accumulated capabilities. With the development of the family of Starprim strongboxes, Primat tries to expand capability applicability to the market segment in which accumulated capability is not as characteristic as in the first one. The accumulation of capabilities is no longer controlled by signals from the business environment. The company is aware of the importance of accumulated capability, therefore it is trying to maintain and upgrade it with different measures and investments.

Proactive phase (1999-)

The proactive phase is characterized by the shift from simple exploitation of the existing capabilities for emerging business opportunities towards the active generation of opportunities. Primat no longer plays a reactive role, subordinating its capabilities to the buyer of strongboxes for automatic teller machines, but ac-

podlagi že akumuliranih sposobnosti dejavno predlaga mogoča poslovna sodelovanja. V Primatu so med prvimi v Evropi overili blagajno za bančne avtomate V. varnostne stopnje, čeprav zanjo niso dobili neposrednega naročila.

4 RAZPRAVA

Namen raziskave je bil zagotoviti opis procesa akumulacije sposobnosti. Kompleksnost in dinamična historična odvisnost proučevanega pojava omejujeta možnost matematičnega opisa proučevanega procesa. Kljub temu je v tem članku predstavljen matematični opis, brez ambicij po rigoroznem matematičnem modeliranju odnosov med spremenljivkami.

Razlaga rezultatov raziskave je pokazala, da je dinamiko procesa akumulacije sposobnosti mogoče opisati kot življenjski cikel, sestavljen iz petih faz:

$$\{CAP\} = \sum_{i=1}^5 \{P_i\} \quad (1),$$

pri čemer sta CAP proces akumulacije sposobnosti in P_i faze življenjskega cikla. Obstoj različnih faz, s katerimi je opisan obravnavani proces, je mogoče prepoznati na podlagi empiričnih podatkov.

Proces akumulacije sposobnosti vsebuje logiko razvoja, ki ga usmerja od faze do faze. Vsaka faza je definirana s prejšnjo. Na ta način je zajeta historična odvisnost procesa:

$$\{P_i\} = f(\{P_{i-1}\}) \quad (2).$$

Proces akumulacije sposobnosti je mogoče predstaviti kot kumulativno in vezano zaporedje faz, ki si sledijo, pri čemer vsaka prispeva k naslednji fazi. Vsaka faza torej izhaja iz prejšnje. Vsaka faza je tudi kompleksnejša glede na akumulirane sposobnosti.

Faze se medsebojno razlikujejo po vplivu, ki ga imajo različni vplivni dejavniki na razvoj akumulacije sposobnosti. Te je mogoče predstaviti kot vplivne dejavnike podjetja, označene z indeksom f , in vplivne faktorje poslovnega okolja, označene z indeksom m . Dimenzije faz življenjskega kroga so predstavljene z vektorjem:

$$\{B\} = \{C_f, R_f, CU_m, c_m, S_m, T_m\} \quad (3),$$

pri čemer so C_f sposobnosti podjetja, R_f viri podjetja, CU_m kupci, c_m konkurenti, S_m dobavitelji in T_m razvoj tehnologije.

Vpliv posameznih dejavnikov na faze procesa akumulacije sposobnosti je predstavljen z utežnim vektorjem:

$$\{I\} = \{\alpha, \beta, \gamma, \delta, \varepsilon, \zeta\} \quad (4),$$

tively suggests possible business cooperation based on accumulated capabilities. Primat was among the first companies in Europe to certify a strongbox for an automatic teller machine of the 5th safety level, although the company has not received a direct order.

4 DISCUSSION

The aim of this discussion was to set a stylised mathematical description of the capability-accumulation process. The complexity and path-dependence of the studied event limit the possibility of its mathematical description. The mathematical description presented in this article has no ambition to rigorously model mathematical relationships between the variants.

The interpretation of the research results shows that the dynamics of the capability accumulation process can be described as a life cycle consisting of five phases:

where CAP is the capability accumulation process and P_i are the phases of a life-cycle. The existence of different phases, with which the studied process is described, can be identified with empirical data.

The capability accumulation process contains development logic which directs it from one phase to another. Each phase is determined by the previous one. Path-dependence is thus ensured:

The capability accumulation process can be presented as a cumulative and linked sequence of phases that follow one another, with each one adding to the next one. Each phase thus results from the previous one and is more complex with respect to accumulated capabilities.

Phases differ according to the effect of different influential factors on the capability-accumulation process. These can be represented as organisation-oriented impact factors described with the index f , and market-oriented impact factors described with the index m . The dimensions of the life cycle phases are represented with the vector:

where C_f are the capabilities of the organisation, R_f are the resources of the organisation, CU_m are the buyers, c_m are the competitors, S_m are the suppliers and T_m is the technological development.

The influence of individual factors on the phases of the capability-accumulation-process phases is presented with the vector

pri čemer so α koeficient vpliva akumuliranih sposobnosti podjetja, β koeficient vpliva virov podjetja, γ koeficient vpliva kupcev, δ koeficient vpliva konkurentov, ε koeficient vpliva dobaviteljev in ζ koeficient vpliva tehnološkega razvoja. Vrednosti utežnega vektorja se od faze do faze spreminjajo. Zapišemo lahko:

$$\{P_i\} = \{B\} \cdot \{I_i\} \quad i=1, \dots, 5 \quad (5).$$

Vplivni dejavniki v posameznih fazah različno vplivajo na postopek akumulacije sposobnosti.

Koeficienti vpliva niso medsebojno neodvisni. Med koeficienti vpliva podjetja prihaja do sinergijskih učinkov pri prehodih iz ene faze v drugo. Isto velja tudi za koeficiente vpliva poslovnega okolja. Mogoče je definirati dva sistema, kar omogoči dvodimenzionalno predstavitev obravnavanega procesa:

$$S_f = (\alpha, \beta) \quad (6)$$

$$S_m = (\gamma, \delta, \varepsilon, \zeta) \quad (7),$$

pri čemer sta S_f sistem vplivnih koeficientov podjetja in S_m sistem vplivnih dejavnikov poslovnega okolja. Med koeficienti obeh sistemov prihaja do sinergijskih učinkov, ki jih predstavlja sinergija vplivnih dejavnikov podjetja σ_f in sinergija vplivnih dejavnikov okolja σ_m .

Empirični podatki dokazujejo, da vplivni dejavniki okolja izrazito usmerjajo proces akumulacije sposobnosti v prvih fazah. V zadnjih fazah procesa pa odločilno vlogo za usmerjanje procesa akumulacije sposobnosti pripada vplivnim dejavnikom podjetja. Ali drugače, sinergijski učinki med vplivi okolja so večji v prvih fazah procesa, v zadnjih fazah pa prevladujejo sinergijski učinki med viri in že akumuliranimi sposobnostmi. Evolucijska dinamika vplivnih dejavnikov in njihov vpliv na postopek akumulacije sposobnosti so prikazani na sliki 1. Posamezni vplivni dejavniki imajo različne numerične ali simbolne vrednosti, pri čemer slika 1a predstavlja njihovo splošno gibanje.

V začetni fazi in v fazi učenja poslovno okolje izrazito usmerja postopek akumulacije sposobnosti. Gre za odzive na zahteve poslovnega okolja in jasne znake, da obstaja razkorak med zahtevanimi in sedanjimi sposobnostmi. Za fazo potrditve je značilno, da poslovno okolje potrdi ustreznost v evolucijskem procesu akumuliranih sposobnosti. V fazi eksploatacije podjetja zelo izrazito in ciljno usmerjeno dograjujejo in vzdržujejo na trgu potrjene sposobnosti. V pobudni fazi pa gradijo svojo strateško razpoznavnost na akumuliranih sposobnostih. Za zadnji dve fazi življenjskega kroga akumulacije sposobnosti je torej

where α is a coefficient of the impact of capabilities accumulated in the organisation, β is a coefficient of the impact of resources of the organisation, γ is a coefficient of the impact of buyers, δ is a coefficient of the impact of competitors, ε is a coefficient of the impact of suppliers, and ζ is a coefficient of the impact of technological development. The value of the weight vector changes from one phase to another. Thus we can write:

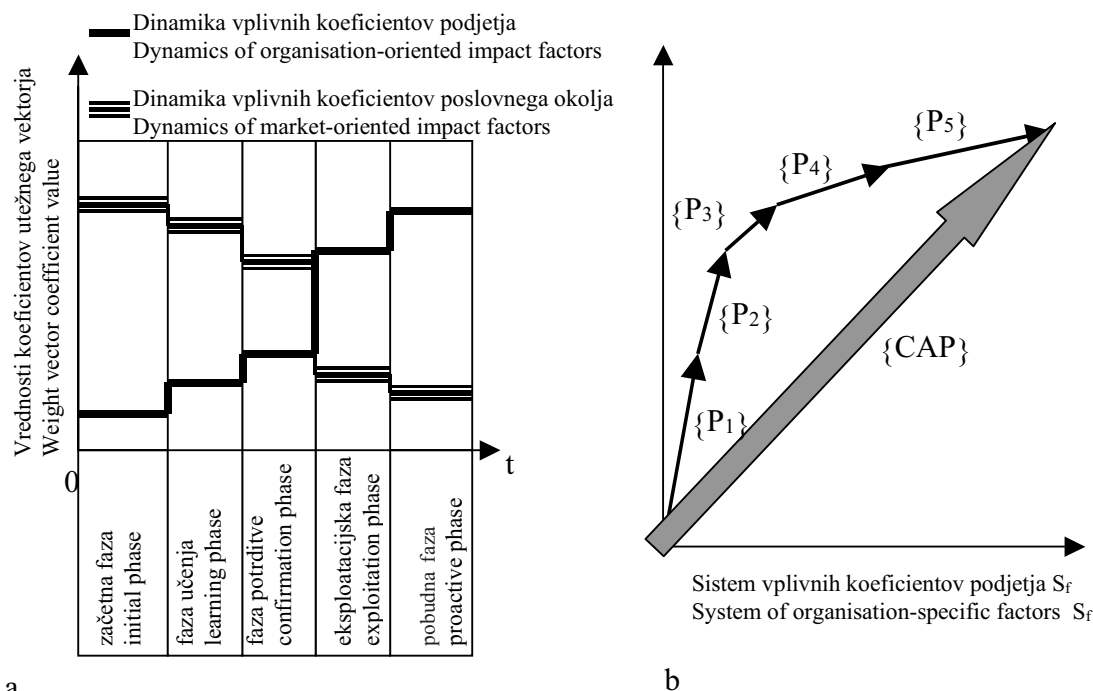
Impact vectors differently affect the capability-accumulation process in different phases.

Impact coefficients are not mutually independent. Synergistic effects occur among organisation-oriented impact factors in passing from one phase to another. The same is true for market-oriented impact factors. Two systems can be determined, which enables a two-dimensional representation of the studied process:

where S_f is the system of organisation-oriented impact coefficients, and S_m the system of market-oriented impact coefficients. There are synergistic effects between both systems, i. e. the synergy of organisation-oriented impact factors σ_f and the synergy of business-oriented impact factors σ_m .

Empirical data show that the capability-accumulation process is clearly directed by market-oriented impact factors in the first phases. In the last phases of the process, however, a decisive role in directing the capability-accumulation process is given to organisation-oriented impact factors. Or, in other words, synergistic effects of the business environment are greater during the first phases of the process, while during the last phases, synergistic effects between resources and already-accumulated capabilities prevail. The evolution dynamics of impact factors and their influence on the capability-accumulation process are shown in Figure 1. Individual impact factors have different numerical or symbol values; Figure 1 presents their general movements.

In the initial and learning phases the business environment clearly directs the capability-accumulation process. The business environment reacts and gives clear signs that there is a gap between the required and the existing capabilities. The confirmation phase is characterized by the fact that the business environment confirms the adequacy of the capabilities accumulated in the evolution process. In the exploitation phase the organisation clearly and purposefully upgrades and maintains capabilities confirmed by the market. The last two phases of the capability-accumulation life cycle are characterised by the level of accumulated capabilities that deci-



a
Sl.1. Evolucijska dinamika vplivnih koeficientov in njihov vpliv na postopek akumulacije sposobnosti
Fig. 1. Evolution dynamics of impact factors and their influence on the capability-accumulation process

značilno, da raven že akumuliranih sposobnosti odločilno vpliva na postopek. Ali drugače povedano, sinergijski učinek med vplivnimi dejavniki podjetja usmerja postopek akumulacije sposobnosti.

Omenjene ugotovitve izzovejo dosedanja teoretična spoznanja. Avtorji s področja teorije proizvodnih virov predpostavljajo, da sta poslovno okolje in proces akumulacije sposobnosti neodvisna. Priznavajo edino, da morajo sposobnosti trgu ustrezati. Njihova perspektiva je izrazito statična in obravnava podjetja v ozkem časovnem obdobju. Obravnavanje procesa skozi vzdolžno perspektivo je pokazalo, da postopek akumulacije sposobnosti ni neodvisen od poslovnega okolja, saj ga v začetnih fazah življenjskega kroga zelo izrazito usmerja.

Raziskava v poslovnih okoljih je pokazala, da ima sposobnost različno vrednost v različnih fazah življenjskega cikla. Še več, v začetni fazi in v fazi učenja je vrednost sposobnosti, specifične za podjetje, manjša od sposobnosti, ki jo zahteva trg. Poenostavljeno je razmerje med gibanjem vrednosti sposobnosti, specifične za podjetje, in gibanjem vrednosti, ki jo zahteva trg, prikazano na sliki 2.

Če je mogoče predstaviti gibanje vrednosti za specifično sposobnost, je mogoče definirati proces akumulacije sposobnosti kot:

$$CAP = \int_0^{t_{lc}} VC_f \cdot dt \quad (8),$$

pri čemer pomeni VC_f predstavlja gibanje vrednosti za podjetje specifične sposobnosti in t_{lc} čas konjunktornega življenjskega cikla. Podobno je mogoče zapisati zahtevano sposobnost trga:

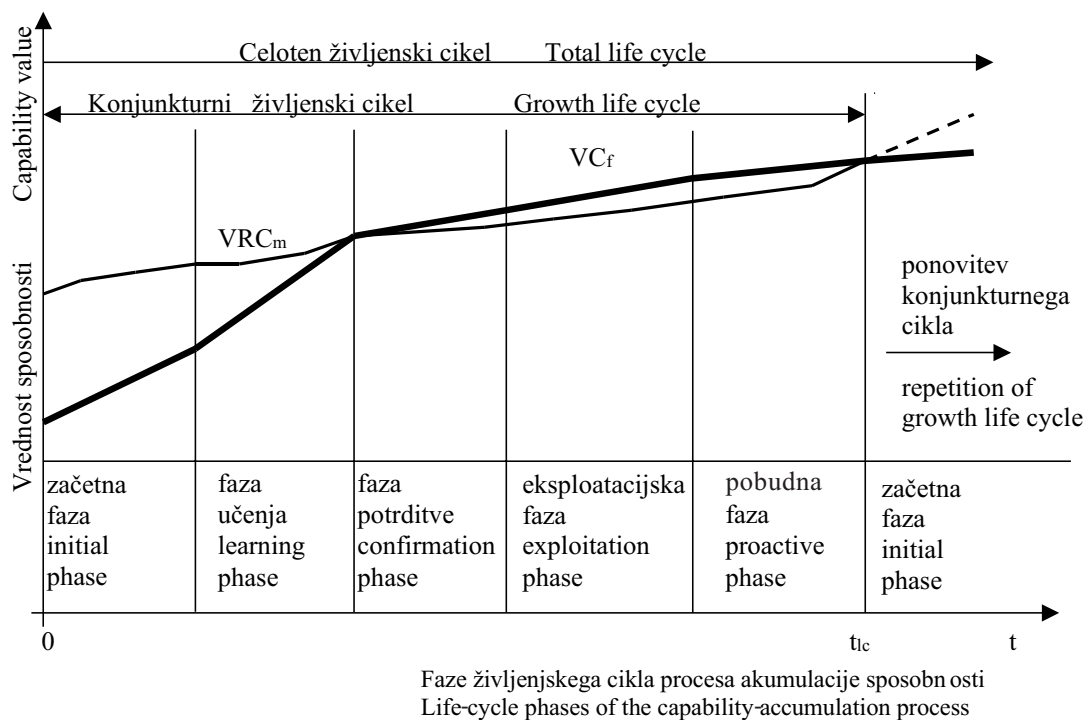
sively influences the process. Or, in other words, the synergistic effect between the organisation-oriented impact factors directs the capability-accumulation process.

These findings challenge previous theoretical issues. Scholars in the field of resource-based theory suggest that the business environment and the capability-accumulation process are independent. What they do acknowledge, however, is that capabilities must suit the market. Their perspective is explicitly static and transversal. It studies manufacturing organisations in a short time interval. Studying the process through a longitudinal perspective has shown that the capability-accumulation process is not independent of the business environment; what is more, it clearly directs it in the initial phases of a life cycle.

Research in business environments has shown that capability has a different value in the different phases of a life cycle. What is more, in the initial and learning phases, the organisation-specific capability value is lower than the market-oriented capability value. The relationship between the organisation-specific capability value and the market-oriented capability value is shown in a simplified way in Figure 2.

If variations of value can be represented as a specific capability, the capability-accumulation process can be defined as:

where VC_f is the organisation-specific value movement and t_{lc} is the time of the growth life cycle. Similarly, the market-oriented value can be written as:



Sl. 2. Življenjski cikel procesa akumulacije sposobnosti
Fig. 2. Capability-accumulation process life cycle

$$RCAP = \int_0^{t_c} VRC_m \cdot dt \quad (9)$$

pri čemer je VRC_m gibanje vrednosti zahtevanih sposobnosti. Vsakokratno strmino krivulje lahko označimo kot koeficient dinamike poslovnega okolja. Mogoče je predpostaviti, da poslovno okolje stalno zahteva boljše sposobnosti. Večji koeficient dinamike poslovnega okolja pomeni, da v hitreje rastočih industrijskih panogah zahteve po sposobnostih hitreje naraščajo. Pomeni, da je vrednost sposobnosti odvisna od poslovnega okvira.

Razkorak med sposobnostmi podjetja in sposobnostjo, ki jo zahteva poslovno okolje, definiramo kot:

$$\Delta C = VC_f(t) - VRC_m(t) \quad (10)$$

Odvisnosti med razkorakom in značilnostmi posameznih faz je mogoče pojasniti takole:

where VRC_m is a market-oriented capability value. Every inclination of a curve can be determined as a coefficient of business-environment dynamics. It can be anticipated that the business environment continually requires better capabilities. A higher coefficient of business-environment dynamics means that in faster-developing industrial branches the requirements for capabilities increase more quickly. The capability value is thus dependent on the business context.

A gap between organisation-specific capabilities and the capabilities required by the business environment is determined as:

The relationships between the gap and the characteristics of individual phases can be explained as follows:

$$\begin{cases} VC_f(t) - VRC_m(t) \leq 0 \Rightarrow \text{prevladujoč vpliv koeficientov iz } S_m \text{ ali } \sigma_f < \sigma_m \\ VC_f(t) - VRC_m(t) > 0 \Rightarrow \text{prevladujoč vpliv koeficientov iz } S_f \text{ ali } \sigma_f > \sigma_m \\ VC_f(t) - VRC_m(t) \leq 0 \Rightarrow \text{prevailing impact of } S_m \text{ coefficients or } \sigma_f < \sigma_m \\ VC_f(t) - VRC_m(t) > 0 \Rightarrow \text{prevailing impact of } S_f \text{ coefficients or } \sigma_f > \sigma_m \end{cases} \quad (11)$$

V začetni fazi in v fazi učenja, pri kateri obstaja razkorak med zahtevanimi sposobnostmi in sedanjo sposobnostjo, vpliva na postopek akumulacije sposobnosti poslovno okolje. Podjetje v teh fazah še ni akumuliralo sposobnosti, ki bi dosegale raven zahtevanih sposobnosti, zato se v

In the initial and learning phases, when there is still a gap between the required and the existing capability, the business environment affects the capability-accumulation process. In these phases the organisation has not yet accumulated the capabilities that would equal the level of the required capabilities, therefore the

podjetjih odzivajo na zahteve poslovnega okolja. Od faze potrditve dalje, raven že akumuliranih sposobnosti odločilno vpliva na razvoj procesa. Podjetja se zavedajo pomena na trgu potrjenih sposobnosti.

Pojavi se logično vprašanje, kdaj se proces akumulacije sposobnosti konča in kaj se zgodi po pobudni fazi. Razlaga empiričnih podatkov je omogočila definiranje življenjskega cikla, katerega značilnosti zajamemo v predstavljenih fazah. Proučevan življenjski cikel je mogoče imenovati konjunkturni življenjski cikel, saj vrednost sposobnosti podjetja narašča in presega zahtevano vrednost. Konjunkturni življenjski cikel se lahko prekine, če se vrednost zahtevane sposobnosti hitro dvigne. Do takšnega pojava lahko pride ob prodoru konkurenta, ki je razvil sposobnosti obvladovanja nove tehnologije ali z organizacijskimi ukrepi izrazilo dvignil svojo sposobnost. Sklepamo lahko, da je celotni življenjski cikel procesa akumulacije sposobnosti sestavljen iz zaporedja konjunkturnih življenjskih ciklov. Celoten življenjski cikel akumulacije sposobnosti se zaustavi samo v primeru propada podjetja ali s kakšno drugo dramatično spremembo.

Proučevanje zaporedja konjunkturnih ciklov procesa akumulacije sposobnosti je lahko smer nadaljnjih raziskav. Seveda pa bi bilo treba pri takšnih raziskavah obravnavati zelo dolga časovna obdobja.

5 SKLEPI

Namene pričujočega prispevka je mogoče predstaviti v dveh vsebinskih sklopih. V prvem, teoretičnem delu želimo predstaviti teorijo proizvodnih virov in njen pomen za raziskovalno področje proizvodnih strategij. Sporočilo prispevka je, da lahko teorija proizvodnih virov s svojo introvertiranostjo predstavlja teoretična zamisel, ki bo usmerjala raziskave na področju proizvodnih strategij. V drugem delu je predstavljena raziskava, ki je potekala v štirih slovenskih proizvodnih podjetjih. Spoznanja, pridobljena v induktivnem raziskovalnem procesu, prispevajo k novim spoznanjem na področju teorije proizvodnih virov. Vzdolžna perspektiva raziskave je omogočila opis akumulacije sposobnosti kot življenjskega cikla. V posameznih fazah procesa različni vplivni dejavniki različno vplivajo na postopek akumulacije sposobnosti. V začetni fazi in v fazi učenja na postopek izrazito vpliva poslovno okolje. V naslednjih fazah pa raven že akumulirane sposobnosti izrazito usmerja postopek. Izsledki raziskave dokazujejo, da sposobnost ni nekaj, kar je že po definiciji vredno in pomembno v poslovnem okolju, ampak to šele postane, ko njeno vrednost potrdi trg.

Raziskovanje akumulacije sposobnosti skozi vzdolžno in razvojno perspektivo lahko predstavlja pomembno smer raziskovanja na področju

organisation responds to the demands of the business environment. From the confirmation phase onwards, the level of accumulated capabilities decisively affects the process development. The organisation is aware of the importance confirmed by the market.

A logical question arises as to when the capability-accumulation process stops and what happens after the proactive phase. The interpretation of empirical data has enabled us to define a life cycle whose characteristics have been included in the presented phases. The studied life cycle can be designated as a growth life cycle, because of the value of the organisation's capability increases and surpasses the required value. The growth life cycle can be stopped if the value of the required capability rises quickly. Such a phenomenon can occur when a competitor penetrates the market because he has developed capabilities to master a new technology or has clearly increased his capability with organisational measures. We can conclude that the total life cycle of the capability-accumulation process consists of a sequence of growth life cycles. The capability-accumulation life cycle, in its totality, can fail only due to a total collapse of an organisation or some other dramatic change.

The study of the growth life-cycle sequence of the capability-accumulation process can be a topic for further research. However, long time periods should be considered in such investigations.

5 CONCLUSIONS

The purpose of this paper is twofold. In the first, conceptual part we want to present the resource-based theory and its importance for the research of operations strategy. The article is designed to communicate the idea that resource-based theory, while being highly introverted, can represent a theoretical concept for directing research in the field of operations strategy. The research presented in the second part was performed in four Slovenian manufacturing organisations. The knowledge obtained in the research process makes a contribution to resource-based theory. The longitudinal perspective of the research has enabled us to describe capability-accumulation as a life cycle. In individual phases of the process, different factors differently affect the capability accumulation process. In the initial and learning phases, the process is clearly affected by the business environment. In subsequent phases, however, it is the level of accumulated capability that directs the process. The research findings prove that capability is not something that is valuable and important in the business environment only by definition, but that it becomes valuable when its value has been confirmed by the market.

The research into capability accumulation via the longitudinal and evolutionary perspective can significantly direct research in the field of operations

proizvodnih strategij. Poznavanje dinamičnega procesa akumulacije sposobnosti lahko pomaga vodjem proizvodnih podjetij obvladovati proces, ki je zaradi zapletenosti, posebnosti in dinamične historične odvisnosti težko obvladljiv.

¹ Omeniti velja, da se v angleški terminologiji ime proizvodni menedžment vse bolj umika izrazu *operations management*. V okviru slednjega so dejavnosti, potrebne za fizično proizvodnjo izdelka, integrirane z dejavnostmi upravljanja nabavne in distribucijske mreže, uvajanja novih izdelkov, menedžmenta kakovosti, menedžmenta tehnologij in merjenja izvedbe. V slovenskem prostoru še ni poenotenja okoli izraza, ki bi opisoval vsebino, ki jo v angleški terminologiji opisuje beseda *operations*. Pojavljajo se termini npr.: procesni menedžment in izvedbeni menedžment. Zato je v slovenskem delu prispevka uporabljen izraz proizvodni menedžment, v angleškem prevodu pa *operations management*. Neenotnost v terminologiji dokazuje, da proizvodni menedžment kot znanstvena panoga še ni uveljavljena v Sloveniji. Slednje je seveda, glede na pomen proizvodnega menedžmenta, anahronizem, vendar je to že tema, ki izstopa iz okvira tega prispevka.

strategy. A knowledge of the dynamic-accumulation process can help managers of manufacturing organisations to master the process that is otherwise difficult to manage due to its complexity, idiosyncrasy and path-dependence.

¹ It should be noted here that in English terminology the term *manufacturing management* is being increasingly replaced by *operations management*. The latter encompasses the activities needed for the physical manufacture of the product and the management of purchase and distribution networks, new product introduction, quality management, technology management and performance measurement. In Slovene terminology no term has yet been found to describe the contents of the English term *operations*. There are terms such as *procesni menedžment* and *izvedbeni menedžment*. Therefore, the term *proizvodni menedžment* is being used in the Slovene part of the article, while *operations management* is being used in the English translation. This terminology gap shows that in Slovenia *operations management* has not yet become a scientific discipline. With respect to its importance, this is an anachronism, yet this topic is not within the scope of this article.

6 LITERATURA 6 REFERENCES

- [1] Hayes, R. H., G. P. Pisano (1996) Manufacturing strategy: at the intersection of two paradigm shifts. *Production and Operations Management*, Vol.5, No.1, 25-41.
- [2] Skinner, W. (1969) Manufacturing-missing link in corporate strategy, *Harvard Business Review*, May-June, 136-145.
- [3] Clark, K.B. (1996) Competing through manufacturing and the new manufacturing paradigm: is manufacturing strategy passe? *Production and Operations Management*, Vol. 5, No. 1, 42-58.
- [4] Womack, J., D. Jones, D. Roos (1991) The machine that changed the world. *Harper-Perennial*, New York.
- [5] Hayes, R.H., G.P. Pisano, D.M. Upton (1996) Strategic operations: competing through capabilities. *New York: Free Press*.
- [6] Gunasekaran, A. (1999) Agile manufacturing: a framework for research and development. *International Journal of Production Economics* 62, 84-105.
- [7] Kidd, P.T. (1994) Agile manufacturing, forging new frontiers. *Addison – Wesley Publishing Company*.
- [8] Warnecke, H.J (1993) The fractal company, a revolution in corporate culture. *Springer-Verlag*.
- [9] Kotha, S. (1995) Mass customization: implementing the emerging paradigm for competitive advantage. *Strategic Management Journal* 16, 21-42.
- [10] Kuhn, T. (1972) The Structure of scientific revolution. *University of Chicago Press*.
- [11] Rumelt, E.P. (1991) How much does industry matter? *Strategic Management Journal* 12 (3), 167-185.
- [12] Dierickx, I., K. Cool (1989) Asset stock accumulation and sustainability of competitive advantage. *Management Science*, Vol.17. No.1, 121-154.
- [13] Barney, J. (1991) Firm resources and sustained competitive advantage. *Journal of Management*, Vol.17, No.1, 99-120.
- [14] Grant, R. M. (1991) The resource based theory of competitive advantage: implications for strategy formulation. *California Management Review*, 33(3), 114-135.
- [15] Teece, D.J., G.P. Pisano, A. Shuen (1997) Dynamic capabilities and strategic management. *Strategic Management Journal*, 18, 509-533.
- [16] Collis, D.J. (1994) Research note: how valuable are organizational capabilities. *Strategic Management Journal*, Vol.15, 143-152.
- [17] Slack, N., M. Lewis (2001) Operations strategy. *Financial Times Prentice Hall*.
- [18] Gagnon, S. (1999) Resource-based competition and the new operations strategy. *International Journal of Operations & Productions Management*, Vol.19, No.2, 125-138.
- [19] Hayes, R. H., G. P. Pisano (1994) Beyond world class: the new manufacturing strategy. *Harvard Business Review*, January-February, 77-86.

- [20] Roth, A.V. (1996) Neo-operations strategies linking capabilities-based competition to technology. In G.H. Gaynor (Ed.), *The Handbook of Technology Management*. McGraw-Hill Publishing, New York.
- [21] Tranfield, D., S. Smith (1998) The strategic regeneration of operations by changing routines. *International Journal of Operations & Production Management* Vol.18, No.2, 114-129.
- [22] Mills, J., K. Platts, M. Gregory (1995) A framework for the design of operations strategy process, a contingency approach. *International Journal of Operations & Productions Management* Vol. 15, No.4, 17-49.
- [23] Glaser, B., A. Strauss (1967) The discovery of grounded theory: strategies of qualitative research. *London: Wiedenfeld and Nicholson*.
- [24] Godfrey, P.C., C.W.L. Hill (1995) The problem of unobservables in strategic management research, *Strategic Management Journal*, Vol.16, 519-533.
- [25] Van de Ven, A.H. (1992) Suggestions for studying strategy process: a research note. *Strategic Management Journal*, Vol. 13, 169-188.
- [26] Winter, S.G. (2000) The satisfying principle in capability learning. *Strategic Management Journal*, Vol. 21, 981-996.
- [27] Pandža, K., A. Polajnar (2000) Capabilities accumulation process: a longitudinal case study in manufacturing organisation. In R. Van Dierdonck, A. Vereecke (Ed.), *Crossing Borders and Boundaries: The Changing Role of Operations*. *EurOMA Conference, Gent*, 503-210.

Naslov avtorjev: dr. Krsto Pandža
doc.dr. Borut Buchmeister
prof.dr. Andrej Polajnar
Iztok Palčič
Fakulteta za strojništvo
Univerza v Mariboru
Smetanova 17
2000 Maribor
krsto.pandza@uni-mb.si
borut.buchmeister@uni-mb.si
andrej.polajnar@uni-mb.si
iztok.palcic@uni-mb.si

Authors' Address: Dr. Krsto Pandža
Doc.Dr. Borut Buchmeister
Prof.Dr. Andrej Polajnar
Iztok Palčič
Faculty of Mechanical Eng.
University of Maribor
Smetanova 17
2000 Maribor, Slovenia
krsto.pandza@uni-mb.si
borut.buchmeister@uni-mb.si
andrej.polajnar@uni-mb.si
iztok.palcic@uni-mb.si

Prejeto: 12.2.2002
Received:

Sprejeto: 20.9.2002
Accepted: