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Vloge orodjarn v dobavni verigi

The Role of Toolmakers in the Supply Chain

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Predstavljeni prispevek obravnava pomen vključevanja dobaviteljev v razvoj novih izdelkov, pri čemer smo se osredotočili na orodjarne, ki so zaradi svoje vključitve v dobavno verigo ustrezen predmet raziskovanja. Tako smo na podlagi metodologije študija primera podrobno raziskali stanje v orodjarskem sektorju z namenom, da bi ugotovili, kakšne vloge zavzemajo orodjarne v dobavni verigi in pri razvoju novih izdelkov glede na razvite sposobnosti. Izsledki raziskave so zaokroženi z modelom vlog orodjarn v dobavni verigi, pri čemer so vloge odsev različne stopnje razvitosti določenih sposobnosti.

(Ključne besede: orodjarstvo, razvoj izdelkov, dobavitelji, verige dobaviteljev)

This paper deals with the importance of involving suppliers in new-product development and focuses on the toolmaking industry because of its integration into the supply chain. Using a case-study methodology an in-depth analysis of the situation in the Slovenian toolmaking sector was carried out in order to identify the roles of toolmakers in the supply chain and in new-product development in relation to their capabilities. The results of the research are summarized in a model of the roles of toolmakers in the supply chain, in which the roles reflect the different stages of development of individual capabilities.

(Keywords: toolmaking, product development, suppliers, supply chains)

0 UVOD

Veliko proizvodnih podjetij po svetu in doma išče poti, ki bi omogočile hitrejši in učinkovitejši razvoj novih izdelkov oziroma poti, ki bi izboljšale sedanje izdelke. Kupci so namreč dandanes neizprosni, saj zahtevajo hitre dobavne čase, dobro kakovost izdelkov ter ugodne cene. Zaradi vseh teh zahtev pa razvoj novih izdelkov postaja iz dneva v dan bolj zapleten in zahtevnejši. Proizvodna podjetja se srečujejo z velikimi pritiski tako glede časa kakor tudi stroškov, hkrati pa je tudi globalizacija prinesla nove zahteve v razvoj izdelkov [1].

Zaradi tega se vse več podjetij poskuša zgledovati po japonskih proizvajalcih, pri čemer izstopa predvsem avtomobilski gigant Toyota, ki svet že od 80. let vedno znova preseneča z novimi dognanji s področja proizvodnega menedžmenta. Eno izmed teh dognanj predstavlja tudi vitka proizvodnja, v kateri se skupine zaposlenih nenehno trudijo, da bi izboljšali proizvodne postopke. Ta termin namreč pomeni, da podjetje porabi za dejavnosti v postopkih manj dela, manj proizvodnega prostora, manj investicij, manj orodij, manj časa itn., skratka pomeni, biti zmožen izdelovati standardne izdelke velike kakovosti z majhnimi stroški.

0 INTRODUCTION

In order to satisfy their clients many production companies all over the world are searching for ways that will result in the faster and more efficient development of new products or improvements to existing products. Today, buyers are inexorable in their demands for products with shorter delivery times, higher quality and lower prices. As a consequence, the development of new products becomes more and more complex and demanding. But these production companies are not only under constant pressure in terms of time and cost, at the same time globalisation has brought new challenges for the development of new products [1].

For this reason more and more companies try to follow the example of Japanese producers, in particular the car-industry giant Toyota, a company that has been surprising the world over and over again with new findings in the sphere of production management since the eighties. One example of their achievements is the so-called "lean manufacturing" process; the term means that less work, less production room, less investment, fewer tools, less time etc. are used in the process operations. In other words, employees working in teams are required to try and improve production processes all the time in order to produce standard products of high quality with low costs.

Nadalje proizvajalci vlagajo veliko naporov v iskanje rešitev za racionalizacijo postopka razvoja novega izdelka, saj je več raziskav pokazalo, da izhaja 40 odstotkov vseh problemov glede kakovosti iz faze snovanja in konstrukcije izdelka, 60 do 80 odstotkov stroškov izdelka pa se ustvari pri načrtovanju proizvodnih postopkov [2]. Zato je zaporedno izvajanje dejavnosti v postopku razvoja novega izdelka in proizvodnje nadomestilo vzporedno izvajanje le-teh, saj so se na tak način poleg skrajšanja pretočnega časa zmanjšali tudi stroški razvoja novega izdelka, hkrati pa je takšna organizacija dejavnosti omogočila učinkovitejši pretok informacij. Ta postopek, ki je v osemdesetih letih prinesel nov pogled na dogajanja, poznamo kot sočasno inženirstvo. Vse bolj zapleteni izdelki pa zahtevajo tudi razvoj najrazličnejše strojne in računalniške programske opreme. Tako uporaba učinkovitih računalniško podprtih (RP) orodij in komunikacijskih sistemov pomeni temelje, na katerih je postopek razvoja novega izdelka pripravljen za 21. stoletje. Fizične prototipe so začeli nadomeščati digitalni, uporaba navidezne tehnike za vizualizacijo, simuliranje in interaktivno preskušanje rezultatov razvoja ter načrtovanje proizvodnje postaja standardno orodje pri razvoju izdelkov, informacijski in komunikacijski sistemi pa oblikujejo nove temelje za partnersko sodelovanje podjetij pri razvoju novih izdelkov.

Poleg hitrega razvoja najrazličnejših tehničnih pripomočkov pa podjetja vse bolj prisegajo tudi na svoje dobavitelje. Tudi na tem področju so japonski proizvajalci prekosili preostali svet. Že dolgo uveljavljena japonska praksa vključuje dobavitelje v razvoj novih izdelkov. Vendar v današnjem času ni to samo japonska praksa, ampak se tudi druga podjetja vedno bolj zavedajo dejstva, da postajajo njihovi dobavitelji vedno močnejše orožje pri doseganju konkurenčne prednosti. V mnogih podjetjih so spoznali, da pomeni nabavna veriga vir novih znanj in sposobnosti, ki lahko veliko pripomore k dvigu konkurenčnosti. Sedaj gledajo kupci na svoje dobavitelje kot na kompetenten vir inovacij po meri uporabnika [3]. Tako učinkovita zgodnja integracija dobaviteljev v razvoj izdelka postaja za določene proizvajalce ključni dejavnik pri doseganju različnih izboljšav, potrebnih, da ostanejo konkurenčni [4].

1 TEORETIČNO OZADJE

Veliko raziskovalcev se ukvarja s problematiko integracije dobaviteljev v razvoj novega izdelka predvsem z vidika preučevanja, kdaj se naj dobavitelji vključijo v razvoj, katere so prednosti, pomanjkljivosti ter koristi in tveganja vključevanja.

Ustrezen predmet raziskovanja pomena vključevanja dobaviteljev ter mogoče koristi takšnega

The producers are also engaged in finding solutions for the rationalisation of the new-product development process itself, as many studies show that 40 % of all problems relating to quality originate from the product planning and design phases and 60 to 80 % of the product costs are incurred in the planning of the production processes [2]. This is why the consecutive performance of operations in the process of product development and production has been replaced by the simultaneous performance of these operations, which has resulted not only in an improved throughput, but also in a reduction of new-product development costs. At the same time, such an organisation of operations has resulted in a more efficient flow of information. This approach, which introduced a whole new way of thinking in the eighties, is known as concurrent engineering. Together with the development of increasingly complex products, the development of hardware and software has become more important. Thus, new-product development in the 21st century relies on the use of efficient computer-aided (CA) tools and communication systems. Material prototypes are being replaced by digital ones, virtual technology is used for visualisation, simulations and the interactive testing of development results and production planning have become standard tools in product development, and information and communication systems form a new foundation for the partnership of companies in the development of new products.

In addition to the rapid development of various technical instruments, the producers are increasingly relying on the support of their suppliers. This is yet another field where Japanese producers are way ahead of the rest of the world. In Japan it has been common practice to involve suppliers in new-product development for many years. Today, this well-established Japanese practice is also being adopted by companies in other countries, which are becoming increasingly aware of the fact that their suppliers are a powerful weapon in achieving a competitive advantage. Many companies have realised that the supply chain is a valuable source of new knowledge and capabilities that can be used to increase their competitiveness. Today, buyers regard their suppliers as a competent source of innovations, providing solutions to meet the needs of customers [3]. For some producers the efficient and early integration of suppliers into the process is becoming a key factor for the implementation of the necessary improvements in order to maintain their competitiveness [4].

1 THEORETICAL BACKGROUND

There are many studies dealing with the issue of integrating suppliers into the development of a new product. In particular, the questions of when suppliers should be involved in such development, what are the advantages, the weaknesses as well as the benefits and risks of their integration?

In the nineties, studies investigating the importance of supplier involvement and the possible

postopanja so bili v devetdesetih letih predvsem japonski proizvajalci končnih izdelkov, za katere je bil značilen hiter ter kakovosten razvoj novih izdelkov, pri čemer je raziskovalce zanimala japonska avtomobilska industrija ([5] in [6]), ki je že zgodaj začela v postopek razvoja novega avtomobila vključevati tudi zunanje vire. Vendar so tudi druga podjetja v svoje poslovne strategije vključila integracijo dobaviteljev v razvoj predvsem z vidika skrajšanja razvojnega časa ([7] in [8]). Zelo zanimivi za preučevanje so bili tudi ameriški in evropski proizvajalci končnih izdelkov, pri čemer so se ameriški proizvajalci izkazali kot dejavnejši pri vključevanju dobaviteljev v razvoj [2].

Poleg interesov proizvajalcev končnih izdelkov za vključevanje dobaviteljev v postopek razvoja, pa so pomembni tudi dejavniki, ki vplivajo na interes dobaviteljev, da se zgodaj vključijo v razvoj [9]. Tako je enakopravnost obeh strani ključna značilnost uspešne zveze [10]. Zaupanje, delitev dobička, delitev lokacije, skupen delež v novih tehnologijah, obojestransko zmanjševanje stroškov, nenehna komunikacija in izmenjava informacij kakor tudi zaupanje, so prav tako kritični dejavniki ([4], [11] in [12]), ki pripomorejo k uspešnemu sodelovanju. Poleg naštetih dejavnikov ima vpliv na uspeh integracije tudi trajanje sodelovanja kupec/dobavitelj [13].

Predstavljeni prispevek obravnava razvoj sposobnosti dobaviteljev, potrebnih za uspešno vključevanje le-teh v razvoj novih izdelkov, saj raziskovanje razvoja sposobnosti in vključevanje teorije proizvodnih virov v okvir proizvodnih strategij pomeni eno od pomembnejših usmeritev s področja proizvodnega menedžmenta.

2 METODOLOGIJA IN PREDMET RAZISKAVE

Pri raziskovanju smo se osredotočili na orodjarstvo, ki je zaradi svoje navzočnosti v dobavni verigi ustrezen predmet raziskovanja. Orodja, kot rezultat njihovega razvoja, so običajno unikatni in kakovostni izdelki, ki so plod bogatega tehničnega in tehnološkega znanja ter izkušenj, kljub naštetemu pa ti izdelki niso zanimivi za široke množice porabnikov. Zato se orodjarne največkrat znajdejo v vlogi dobaviteljev orodij za velike serijske proizvajalce.

Pri tem nas je predvsem zanimalo razmerje orodjarna kot dobavitelj in avtomobilski proizvajalec kot izdelovalec končnega izdelka, saj so poleg tega, da orodjarne pri svojem delu v večini sodelujejo z avtomobilsko industrijo, v tej industrijski panogi najrazličnejše zahteve trga in tudi proizvajalcev samih še izrazitejše.

Tako smo na podlagi metodologije študija primera podrobneje raziskali stanje v dveh slovenskih orodjarnah: EMO Orodjarni d.o.o. iz Celja in orodjarni VAR d.o.o. iz Gornje Radgone, pri čemer

benefits of such integration focused at first on Japanese producers of final products, who were known for their fast and high-quality new-product development. The chosen subject of the research was the Japanese car industry ([5] and [6]), one of the first to begin integrating external sources into the process of developing a new car. Other companies also introduced supplier integration into the development in their own business strategies, initially to shorten the development time ([7] and [8]). Another interesting subject of research were US and European producers of final products, with the US producers proving to be more active in integrating suppliers into their development [2].

When looking at integrating the supplier into the development process one should not only consider the interest of the final-product manufacturers in such an integration but also the factors influencing the supplier's interest in early involvement in the development [9]. Thus, the equal involvement of both sides is the key to a successful alliance [10]. Other important factors contributing to a successful collaboration include mutual trust, sharing of profit, sharing of location, equal share in new technologies, mutual reduction of costs, continuous communication and exchange of information ([4], [11] and [12]). Another important factor in the success is the duration of the buyer-supplier collaboration [13].

Taking into account present production-management research trends that focus on capability-development studies and the integration of the resource-based view theory into production strategies, this paper deals with the development of the supplier capabilities necessary for their successful integration into the development of new products.

2 METHODOLOGY AND SUBJECT OF THE RESEARCH

Our study focused on the toolmaking industry, which represents an appropriate subject for research because of its position in the supply chain. In spite of the fact that tools resulting from toolmaking product development tend to represent unique and high-quality products, the production of which requires a lot of technical and technological expertise and experience, these products are not interesting for a broader consumer society. This is why toolmakers usually act as suppliers to big serial manufacturers.

We were particularly interested in the relationship between the toolmaker, as the supplier, and the car producer, as the manufacturer of the final product. Not only because toolmakers mostly collaborate with car manufacturers, but also because the growing demands of the market, as well as of the producers themselves, concern the car industry even more than other branches of industry.

Using a case-study methodology we analysed the situation of two Slovenian toolmakers, EMO Orodjarna Ltd. Celje and VAR Ltd. Gornja

smo za metodo zbiranja podatkov uporabili intervjuje. Izsledki raziskave, izvedene v teh dveh orodjarnah, so rabili za postavitev modela, v katerem so prikazane razvite sposobnosti, ki opišejo določene vloge orodjarn v dobavni verigi. Model vlog orodjarn v dobavni verigi je splošen model, saj orodjarne za dobavitelja lahko vzamejo tudi druga dobavna podjetja. Poleg tega lahko te vloge zavzamejo orodjarne oziroma drugi dobavitelji v razmerju z drugimi proizvajalci končnih izdelkov, vendar z omejitvijo. Zahtevnost izdelkov le-teh mora biti podobna zahtevnosti avtomobila.

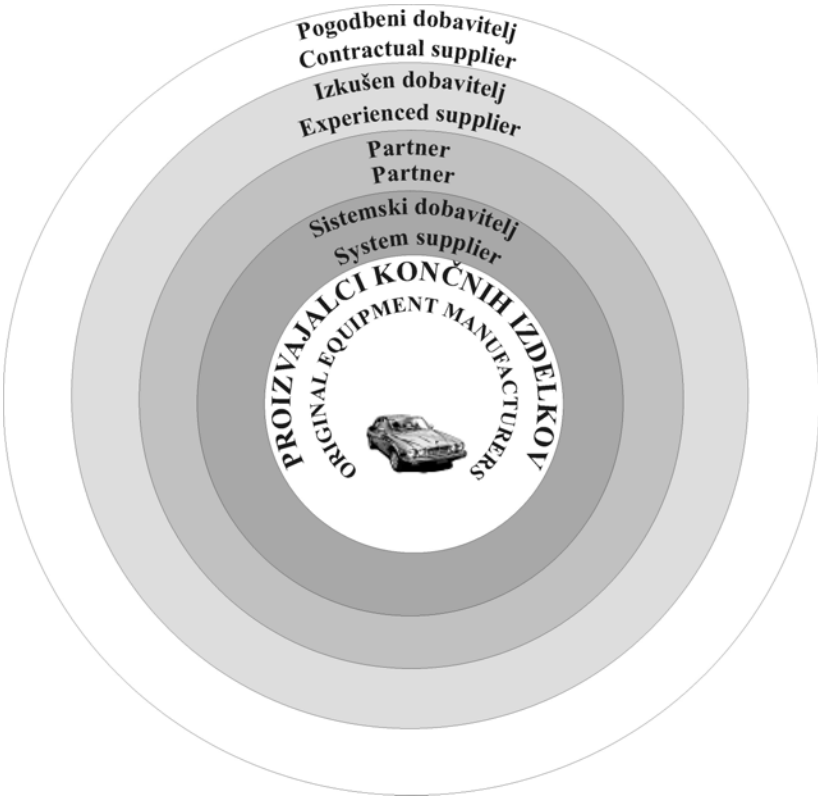
3 MODEL VLOG ORODJARN V DOBAVNI VERIGI

Izsledki raziskave, ki so bili pridobljeni z analiziranjem slovenskih orodjarn, so združeni v modelu vlog orodjarn v dobavni verigi (sl.1) [14]. Vloge so odsev razvitih sposobnosti, ki jih orodjarna v določenem trenutku ima, oziroma jih še mora razviti.

Radgona, using interviews as the data-collection tool. The findings of our investigation were used in setting up a model describing the relationship between developed capabilities and the roles of toolmakers in the supply chain. The model of toolmaker roles in the supply chain is a general model, as it can be applied to car-industry suppliers other than toolmakers. In addition, it can also be applied to toolmakers or other suppliers in relation to the producers of final products other than car manufacturers, but with one restriction; the complexity of the products involved must correspond to the complexity of a car.

3 MODEL OF TOOLMAKER ROLES IN THE SUPPLY CHAIN

The findings obtained in our analysis of two Slovenian toolmakers are summarized in the model of toolmaker roles in the supply chain (Fig.1) [14]. The roles reflect different capabilities already developed, or yet to be developed, by toolmakers involved in the study.



Sl. 1. *Orodjarne in njihove vloge v dobavnih verigah*
Fig.1. *Toolmakers and their roles in the supply chain*

Orodjarnam smo dodeli štiri vloge in tako se lahko orodjarna pojavlja v vlogi:
- sistemskega dobavitelja,
- partnerja,
- izkušenega dobavitelja in
- pogodbenega dobavitelja.

Preden predstavimo ključne sposobnosti, ki so vplivale na razdelitev vlog, je treba najprej

Toolmakers have been assigned four different roles, they can play the role of:
- system supplier,
- partner,
- experienced supplier and
- contractual supplier.

Before we present the most important capabilities, on the basis of which the roles have been

opredeliti pojem sposobnost. Ena izmed definicij pravi, da sposobnosti podjetjem omogočijo, da učinkoviteje oziroma uspešneje izvedejo dejavnosti, ki vodijo k izdelavi in dobavi izdelkov oziroma storitev kupcu [15]. Viri so sredstva, oprijemljiva ali neoprijemljiva, ki jih ima podjetje in sami po sebi niso produktivni.

Vsak proizvajalec končnih izdelkov ima svoja merila, po katerih ocenjuje pomen in vpliv določenih sposobnosti. Za orodjarstvo je značilno, da je zelo intenzivna dejavnost, ki sicer ne zahteva velikega materialnega vložka, ampak veliko inovativnosti in strokovnega dela. Pri analiziranju slovenskega orodjarskega sektorja smo ugotovili, da so vloge posledica različne stopnje razvitosti naslednjih ključnih sposobnosti:

– obvladovanja tehnologij,
– obvladovanja informacijskih sistemov in računalniške programske opreme,
– obvladovanja razvoja,
– obvladovanja kakovosti in ekologija

ter virov:

– proizvodnih zmogljivosti,
– človeških virov in
– finančnih virov (sl. 2).

Sposobnost obvladovanja tehnologij je pomembna predvsem z vidika obvladovanja tehnologije izdelave izdelka. Tako določeno tehnološko ekspertno znanje (npr. obvladovanje

determined, let us define the term capability. According to one of the definitions, capabilities allow firms to more efficiently or effectively choose and implement the activities to produce and deliver a service to customers [15]. Resources, on the other hand, are assets, either tangible or intangible, which the company has at its disposal, but which are not productive themselves.

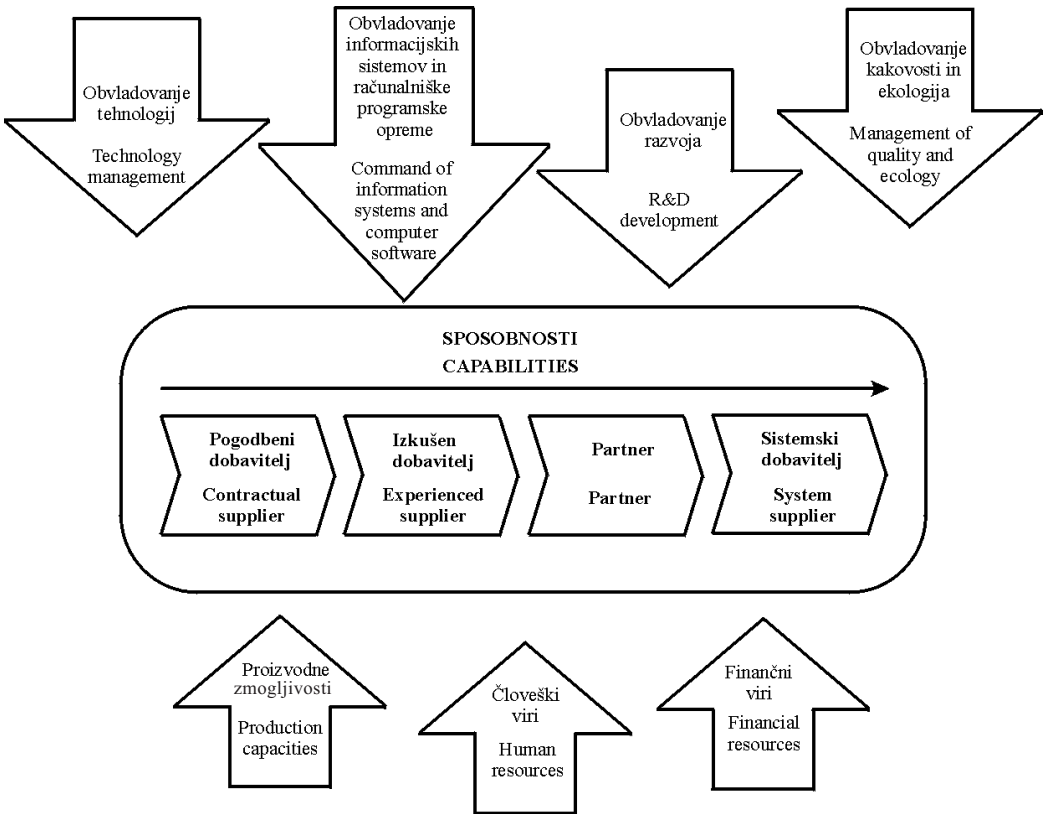
Every manufacturer of final products will have its own standards for the assessment of capabilities in terms of importance and impact. According to the results of our study and taking into account that toolmaking is a highly work-intensive activity that does not require a big material input, but a lot of innovation and expertise, the roles of toolmakers are determined by the stage of the development of the following capabilities:

– technology management,
– command of information systems and computer software,
– R&D,
– management of quality and ecology

and resources:

– production capacities,
– human resources and
– financial resources (Fig.2).

The capability referred to as technology management relates to the command of product-specific production technologies. In this context, specific technological expertise (for instance the



Sl.2. *Vpliv sposobnosti in virov na razdelitev vlog*
Fig. 2. *The influence of capabilities and resources on role determination*

tehnologije globokega vleka) pomeni temelj konkurenčne prednosti. Obvladovanje določene tehnologije pomeni ključno znanje, ki ga orodjarna prodaja na trgu, in je eno izmed bistvenih sposobnosti, ki jo ločuje od drugih orodjarn.

Nadalje pomeni obvladovanje informacijskih sistemov in računalniške programske opreme naslednjo sposobnost, brez katere si več ne moremo zamišljati kakovostnega razvoja. Velik problem pa je velika ponudba le-te na trgu, zato velikokrat prihaja do problemov ujemanja opreme, ki jo ima naročnik, in opreme, ki jo ima dobavitelj. Poseben pomen ima tudi ustrezno zgrajen informacijski sistem, saj dandanes potujejo informacije prek elektronskih sredstev.

Naslednja sposobnost, ki jo proizvajalci končnih izdelkov zahtevajo, je obvladovanje razvoja v pomenu obvladovanja razvoja končnega izdelka oziroma določenih komponent izdelka. Proizvajalci iščejo dobavitelje, ki so inovativni, polni zamisli in izboljšav, dobavitelje, ki so sposobni sami narekovati razvoj. Da je orodjarna sposobna obvladovati razvoj, ne samo orodja, temveč tudi izdelka, mora imeti predvsem veliko znanja in izkušenj na določenem področju izdelave izdelka, imeti mora ustrezno programsko opremo, strokovni kader, velika finančna sredstva, zato lahko povzamemo, da so sposobnosti med seboj zelo povezane in se tudi prelivajo druga v drugo.

Obvladovanje kakovosti in posluh za ekologijo je naslednja pomembna zahteva proizvajalcev končnih izdelkov. Tako so najrazličnejši certifikati o zagotavljanju kakovosti osebna izkaznica podjetja, s katero se ta izkazuje pri pridobivanju naročil. Certifikatom proizvajalci končnih izdelkov zaupajo, saj jih dobavitelji pridobijo na temelju preverjanja neodvisne certifikacijske organizacije. Vrh obvladovanja kakovosti je poslovna odličnost, pri kateri je podjetje dovolj zrelo, da se samo preverja, da postanejo vsi zaposleni resnični borci za napredek, skratka, podjetje mora graditi lastno kulturo in kulturo v odnosih s svojimi kupci ter dobavitelji.

Poleg sposobnosti so pomembni tudi viri podjetja.

Kot prve omenimo proizvodne zmogljivosti, ki so bistvene, da določen izdelek sploh nastane. Zaradi vse večje zapletenosti končnih izdelkov postajajo tudi orodja oziroma izdelava orodij vse bolj zahtevna. Zato je pomembno, da orodjarna v skladu z začrtanim razvojem nenehno posodablja proizvodne zmogljivosti in sledi usmeritvam, ki vladajo na tem področju.

Pomemben vir konkurenčnosti so zaposleni. Ljudje so namreč tisti, ki z znanjem upravljajo. Še tako popolna oprema nima pomena, če ni ljudi, ki bi jo obvladovali. Zato je vlaganje v znanje, izpopolnjevanje in motiviranje vseh

command of deep-draw technology) is a basic precondition for obtaining a competitive advantage. The command of a specific technology is actually the knowledge that the toolmaker is selling on the market and as such represents one of the most distinguishing capabilities.

The next one is the command of information systems and computer software, a capability without which quality development would become unimaginable. At the same time the variety of products on the market often causes equipment-compatibility problems. Another important factor is the choice of appropriate information systems, as the electronic transmission of data has become the state of the art.

Another capability that is required by final-product manufacturers is the necessary R&D to develop a final product or a product component. Producers are looking for suppliers that are innovative, full of ideas and improvements, suppliers that are capable of dictating the course of development. Taking into account that in order to have R&D capability, not only in terms of tools development but also in terms of product development as a whole, the toolmaker needs to have a lot of knowledge and experience, adequate software, qualified staff and the necessary financial means, we can conclude that all these capabilities are closely linked and complement one another.

At a later stage the final-product manufacturers require from their suppliers competence in the fields of quality management and environmental issues. Thus, companies are producing different quality-assurance certificates as a kind of identity card in order to receive orders. Producers of final products trust these certificates as the suppliers only obtain them after verification by an independent certification agency. Supreme management of quality leads to business excellence. A company reaching this stage is mature enough to control itself, all of its employees are committed to progress. In other words, the companies are required to develop a business culture that is also manifested in their relationships with customers and suppliers.

In addition to capabilities an important factor is the resources of a company.

First, we should look at production capacities, which are essential in order for a certain product to be created in the first place. As final products become increasingly complex, the tools used in their production, as well as the toolmaking itself, become increasingly demanding. That is why companies are required to follow the trends in their field of operation and continuously improve and modernize their production capacities based on development plans.

Another important factor are human resources. A company needs to have employees who have the knowledge and know how to use it. Even the most sophisticated equipment will be useless without people to operate it. For this reason, investment in knowledge,

zaposlenih ena izmed bistvenih dolgoročnih nalog.

Poleg naštetega proizvajalci končnih izdelkov prenašajo vedno več finančnega bremena v razvoju na svoje dobavitelje. Tako se morajo orodjarne pripraviti tudi na zahteve po velikih kapitalskih vložkih.

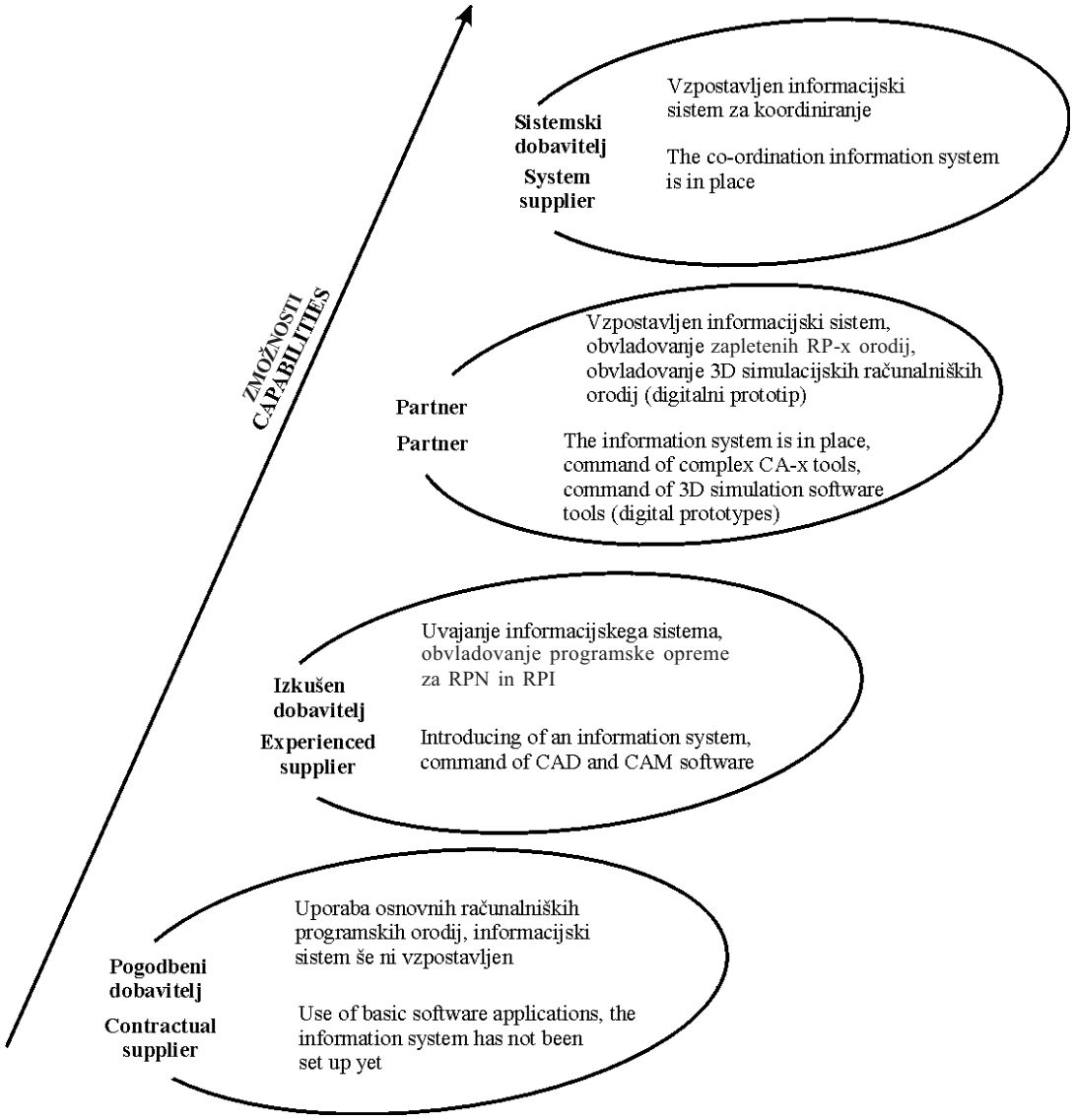
Sposobnosti so za vse vloge enake, različna je stopnja razvitosti posamezne sposobnosti. Poglejmo si primer. Naslednja slika prikazuje razvoj sposobnosti obvladovanja informacijskih sistemov in računalniške programske opreme glede na posamezno vlogo (sl. 3).

Razvitost sposobnosti narašča od vloge pogodbenega dobavitelja do vloge sistemskega dobavitelja. Orodjarna kot pogodbeni dobavitelj praviloma še ni specializirana orodjarna. Znanje, training and the motivation of employees, in the long run represents one of the most important tasks of a company.

In addition, the producers of final products are putting more and more of the financial burden for development onto their suppliers, so toolmakers also have to be prepared for major investments of capital.

Every role is determined by the same set of capabilities, with the difference created by the stage of development of a particular capability. Let us take an example. The following figure shows the development of capabilities in terms of the degree of command of information systems and computer software in relation to individual roles (Fig. 3).

As for the ranking of roles in relation to the stage of the development of capabilities, the lowest stage of development pertains to the role of a contractual supplier, the highest to the role of a system supplier.



Sl. 3. *Razvitost sposobnosti glede na vlogo*
Fig. 3. *The stage of capability development pertaining to the role*

ki ga ima, je splošno, vendar na zadovoljivi ravni, ni pa sposobna izdelovati zapletenejših orodij ter tudi informacijska razvitost ter uporaba računalniške programske opreme je še v razvoju. Uspešnejše orodjarne pri njih iščejo nadomestne proizvodne zmogljivosti oziroma storitve v izdelovalnem pomenu, zato pa morajo zadostiti kakovostnim zahtevam. Običajno takšne orodjarne nimajo lastnega razvoja.

Vlogo izkušenega dobavitelja smo pripisali orodjarni, ki svojo prihodnost gradi na specializaciji za določeno tehnologijo obdelave in hkrati s tem uvaja vse potrebne tehnične pripomočke. Poleg tega ima orodjarna vzpostavljen ustrezen informacijski sistem.

Orodjarna kot partner je že ozko specializirana za določeno področje obdelave in s tem razvoja. Da ostane v tej vlogi, je prisiljena nenehno slediti razvojnim usmeritvam tako na tehnološkem področju kakor na področju programske in komunikacijske opreme. Poleg obvladovanja najrazličnejših RP-x orodij, mora obvladovati tudi navidezno inženirstvo oziroma 3D simulirno tehniko.

Orodjarna v vlogi sistemskega dobavitelja ima, poleg že naštetega, vzpostavljen informacijski sistem za koordiniranje. Orodjarna v tej vlogi dobavlja sisteme orodij, pri čemer za izdelavo določenega števila orodij išče kompetentne partnerje. Za lažje komuniciranje med vsemi sodelujočimi mora imeti vzpostavljen ustrezen informacijski sistem, ki poleg ustrezne infrastrukture terja tudi veliko znanja.

4 SKLEP

Predstavljeni prispevek obravnava pomen vključevanja dobaviteljev v razvoj novih izdelkov, saj zgodnje vključevanje dobaviteljev v razvoj novih izdelkov pomeni eno izmed možnosti za optimiranje procesa razvoja novega izdelka. Pri tem smo posebej izpostavili razvoj sposobnosti, ki so ključnega pomena, saj dobavitelji s svojimi sposobnostmi dokazujejo svojo kakovost in zanesljivost. Dobavitelji ne zadostijo potrebam in zahtevam svojih naročnikov na enak način, saj nimajo enako razvitih sposobnosti. Zaradi tega jim lahko glede na razvitost sposobnosti pripišemo vloge v dobavni verigi oziroma predstavljene vloge so odsev razvitih sposobnosti. Opisane sposobnosti niso nujno načrtovane, velikokrat se izoblikujejo zelo spontano. Vendar moramo poudariti, da razvoj ključnih sposobnosti traja določeno časovno obdobje in se praviloma nikoli ne konča.

Pri raziskovanju razvoja sposobnosti smo obravnavali podjetje kot samostojno enoto. V nadaljevanju raziskave se bomo osredotočili na razvoj sposobnosti v mrežnih organizacijah oziroma

Toolmakers who have not specialized yet will usually appear in the role of a contractual supplier. Their knowledge is satisfactory, yet general and still insufficient to produce more complex tools. They have not set up an information system yet and the use of software is still in the development stage. But as they are providing production capacities and production services for more successful toolmakers, they have to meet their requirements regarding quality. Such toolmakers usually do not have any development of their own.

The role of an experienced supplier belongs to toolmakers who are in the process of specializing in a specific processing technology and are, in parallel to this, acquiring the necessary technical competence. Such toolmakers have already set up an appropriate information system.

Toolmakers in the roles of partners already specialize in a specific area of processing and development. In order to keep this role they are forced to follow development trends in terms of technology as well as software and communication equipment. In addition to having command of the use of different CA-x tools they must also be competent in virtual engineering and 3D simulation techniques.

Toolmakers in the position of system suppliers have all the previously mentioned competencies as well as a coordination information system in place. Such toolmakers are supplying tool systems in collaboration with competent partners. In order to facilitate communication between the partners, system suppliers have to set up information systems, a task requiring not only infrastructure but also a lot of knowledge.

4 CONCLUSION

This paper deals with the involvement of suppliers in new-product development, in particular the importance of their early involvement as a possible way of optimizing the new-product development process. Our study focused on the development of capabilities that play a crucial role in providing proof of quality and the reliability of suppliers. Of course, different suppliers cannot satisfy the needs and requirements of their clients in the same way as their capabilities differ in terms of the stage of their development. For this reason suppliers can be assigned different roles in the supply chain, with the role determined by the stage of the development of individual capabilities. In other words, the roles presented in this paper are a reflection of the different stages of capability development. The described capabilities need not always be the result of a planned development, quite often they are developed spontaneously. Nevertheless, we should point out that the key capabilities presented in this paper cannot be developed overnight and that the development of capabilities is a continuous process.

This study deals with the development of capabilities in companies as independent units. In the continuation of this research project we shall focus on

strateških zvezah med podjetji. Tako več ne govorimo toliko o dobavnih verigah, ki tekmujejo med seboj, ampak govorimo o mrežnih organizacijah, ki imajo določene dopolnilne sposobnosti in znanja. Na tak način se temelj konkurenčnosti seli z enega podjetja in pripadajočih dobavnih verig na nivo mrežne organizacije podjetij.

the development of capabilities in company networks or strategic company alliances. The subject will no longer be competing supply chains, but company networks characterized by particular complementary capabilities and knowledge. Thus the platform of competition will no longer be at the level of a single company with its supply chains, but will shift to the level of company networks.

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