

Časopis THERMAL SCIENCE

Osnivanje, istorijat razvoja i naučni doprinos

THERMAL SCIENCE Journal

Foundation, History of Development and Scientific Contribution

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U drugoj polovini 20-tog veka, i naročito početkom 21-og veka, postalo je jasno i neosporno, da tehnološki i opšti ekonomski razvoj neposredno zavise od ulaganja u obrazovanje, istraživanje i razvoj. Primer velikih država, ako što su Nemačka, Kina i Japan (o Sjedinjenim Američkim Državama da i ne govorimo) to očigledno pokazuje. Međutim, mnogo su izrazitiji primeri malih država Dalekog Istoka (Južna Koreja, Singapur, Tajland i druge), ali i nama, po mnogim parametrima, bliskih Evropskih država Danske, Finske, Švedske i Norveške. Kao kuriozitet se može navesti da je finansiranje istraživanja i razvoja u Finskoj, dodeljeno kao zadatak Ministarstvu spoljne trgovine. Samo radi opšteg uvida treba pogledati podatke o udelu sredstava za istraživanje i razvoj (R&D) u Bruto Nacionalnom Dohotku (GDP) pojedinih zemalja u 2018-toj godini: OECD 2.4%, Kina 2.186% (u 2000. 0.983%), Koreja 4.528%, Izrael 4.961%, Finska 2.746%, Danska 3.033%, Slovenija 1.950%, Holandija 2.164%, Japan 3.264%, Srbija 0.4%. [1]



In the second half of the 20th century and especially at the beginning of the 21st century, it has become clear and undeniable that technological and general economic development directly depends on investments in education, research, and development. The example of large countries, such as Germany, China, and Japan (not to mention the United States of America), shows that clearly. However, the examples of small countries in the Far East (South Korea, Singapore, Thailand and other countries) and some

European countries such as Denmark, Finland, Sweden and Norway (more similar to Serbia by many parameters), are much more representative. As a curiosity, it can be stated that the financing of research and development in Finland has been assigned as the task to the Ministry of Foreign Trade. Just for the purpose of general insight, we should look at the data on the percentage of funds for research and development (R&D) in the Gross National Product (GDP) of individual countries in 2018: OECD 2.4%, China 2.186% (0.983% in 2000), Korea 4.528%, Israel 4.961%, Finland 2.746%, Denmark 3.033%, Slovenia 1.950%, the Netherlands 2.164%, Japan 3.264% and Serbia 0.4%. [1]

Istraživanje i uloga naučnih časopisa

Za ovo razmatranje mogu korisno da posluže podaci koje, prema studiji **Knowledge, Networks and Nations: Global scientific collaboration in the 21st century** [2], navodi Prof. Jinyue Jan, Glavni i odgovorni urednik časopisa *Applied Energy* [3]. U 2011 godini baza podataka SCOPUS navela je sledeće podatke: objavljeno je preko 18,000 časopisa, ponuđeno je preko 3 miliona radova, angažovano preko 300.000 recenzenata, broj čitalaca

Research and the Role of Scientific Journals

For these considerations, data which, according to the study **Knowledge, Networks and Nations: Global Scientific Collaboration in the 21st Century** [2] specify prof. Jinyue Jan, Editor-in-Chief of the journal *Applied Energy* [3] can be very useful. In 2011, the SCOPUS database provided the following data: over 18,000 journals were published, over 3

prelazi 30 miliona, objavljeno je preko 1.5 miliona radova, čitaoci su preuzeli preko 3 milijarde radova, a citirano je preko 30 miliona radova. Navedeni podaci nameću bar dva zaključka: (1) rezultati istraživanja objavljeni u naučnim časopisima su veoma interesantni i sigurno neophodni i korisni za čitaoce – od aktivnih naučnika do stručnjaka u industriji, poljoprivredi i drugim ljudskim delatnostima bitnim za život običnog čoveka i za razvoj obrazovanja, nauke i tehnologija, i ekonomije u celini, svih država u svetu, (2) izdavanje časopisa je takođe i veliko tržište naučnim informacijama koje omogućava velike profite svetski renomiranim izdavačkim kućama.

Veliki interes za objavljivanje naučnih rezultata omogućio je i osnivanje mnogih malih časopisa, čiji su osnivači zainteresovani samo za profit, ali ne i za kvalitet radova koje objavljuju, najčešće bez ikakvih kriterijuma i recenzije.

U takvom okruženju postavlja se i pitanje: ima li tu mesta, i gde je mesto novim, malim kvalitetnim naučnim časopisima, i koju ulogu oni mogu, i treba, da imaju u svetskoj naučnoj zajednici.

Objavljivanje radova je karika u istraživačkom lancu, veoma važna, i neizbežna. To nije želja pojedinaca za afirmacijom ili sakupljanje poena za napredovanje u struci, već važan deo istraživačkog lanca - na početku zbog utvrđivanja problema koje treba istraživati, a u toku istraživanja zbog provere i kritike dobijenih rezultata. Objektivna i oštra recenzija najvažniji je deo procesa objavljivanja radova i najkorisnija za autore.

Ulogu časopisa, recenzije, kritike i značaj objavljivanja rezultata radi mogućnosti njihove provere, veoma lepo je opisala Prof. Jinyue Jan u svom izlaganju [3]: „pisanje ili objavljivanje naučnih radova nije važno radi lične promocije, već radi širenja i razmene informacija i ostvarivanje međusobnih veza istraživača sa ciljem ostvarivanja saradnje.“

Sa ciljem da rezultate svojih istraživanja što pre i što bolje prikažu svetskoj naučnoj zajednici, u manjim zemljama van Engleskog govornog područja, već odavno se doktorske i magistarske teze pišu i objavljuju na Engleskom jeziku (Holandija, Danska, Norveška, Švedska, Finska i mnoge druge). Na žalost u Srbiji takvi predlozi ne mogu da budu prihvaćeni zbog pogrešnog shvatanja o nacionalnom ponosu i očuvanju Srpskog jezika.

Suočeni sa stalnim izazovom da se istraživanja usklade sa prioritarnim svetskim pravcima i prioritetima u nauci i modernim tehnologijama, ali i da se domaća nauka osposobi da rešava tekuće probleme domaće industrije i privrede, u Institutu u Vinči, i posebno u Laboratoriji za termotehniku i energetiku, istraživanja su organizovana u lancu: osnovna istraživanja, usmerena osnovna istraživanja, razvojna istraživanja, eksperimentalna istraživanja na laboratorijskim i pilot postrojenjima, završno sa testiranjem demonstracionih postrojenja realnih dimenzija u realnim radnim uslovima. Svako istraživanje počinjalo je pregledom literature (utvrđivanje „up-to date“ naučnih znanja), ali je tokom istraživanja bilo potrebno i upoznati

million papers were offered, over 300,000 reviewers were hired, the number of readers exceeded 30 million, over 1.5 billion papers were published, readers downloaded over 3 billion papers and over 30 million papers were cited. These data impose at least two conclusions: (1) Results of researches published in scientific journals are very interesting and certainly necessary and useful to readers - from active scientists to experts in industry, agriculture and other human activities important for the life of ordinary people and for the development of education, science and technology the economy as a whole; (2) Publication of journals is also a large market for scientific information that provides large profits to renowned publishing houses in the world.

The great interest in the publication of scientific results has also enabled the establishment of many small journals whose founders are interested only in profits and not in the quality of papers which they publish often without any criteria and reviews. Consequently, a decline in the quality of papers and journals can be noticed.

In such a situation, some questions can also be asked: (1) Whether there is some place for new, small, quality scientific journals; (2) where their place is and what role they can and should have in the worlds' scientific community?

The publication of papers is a particularly important and inevitable link in the research chain. Desire of individuals for affirmation or collecting points for the advancement in their profession is not the main motivation for publish scientific papers. Presenting of the research results is important part of the research chain: at the beginning, for identifying problems that have to be investigated, and at the end for verifying and analysing obtained results. The objective and strict review is the most important part of the process of the publication of papers and the most useful for authors.

The role of a journal and the importance of the publication of results in order to check them out, are very nicely described by prof. Jinyue Jan in her presentation [3]: “Writing or publishing scientific papers is not important for personal promotion but for spreading and exchanging information and for establishing mutual connections among researchers in order to achieve cooperation”.

With the aim to present the results of their scientific achievements to the worlds' scientific community, in small countries outside the English-speaking area, doctoral and master theses have long been written and published in English (the Netherlands, Denmark, Norway, Sweden, Finland and many other countries). Unfortunately, such proposals cannot be accepted in Serbia due to the misconception of the national pride and preservation of the Serbian language.

Faced with the constant challenge to coordinate researches with worlds' priorities in the science and modern technology development, as well as to make domestic science capable for solving current problems of domestic industry and economy, in the VINČA Institute and especially in the Laboratory for Thermal Engineering and Energy investigations are organized in a chain: basic research, oriented basic research, applied research, followed by experimental inve-

svetsku naučnu zajednicu sa dobijenim rezultatima i dobiti povratnu, preko potrebnu kritiku.

Na osnovu iskustava iz dugogodišnje međunarodne saradnje, i primera dobro organizovanih zemalja i njihovog strateškog opredeljenja o važnosti nauke za napredak industrije i ekonomije, u Institutu u Vinči, i u Laboratoriji za termotehniku i energetiku, dugo se raspravljalo o najboljem načinu kako prikazati ostvarene naučne rezultate. Još 1974. godine pokrenut je časopis TERMOTEHNIKA na srpskom jeziku, koji je uređivan i štampan u institutskoj štampariji, kao glasilo Društva termičara Jugoslavije, a izdavač je bio Institut za nuklearne nauke VINČA. Časopis je bio namenjen inženjerima u industriji, elektroprivredi, i objavljivao je radove sa Simpozijuma Društva termičara Jugoslavije.

Osnivanje

Neposredan povod za osnivanje domaćeg časopisa na Engleskom jeziku, bila je situacija u kojoj se Jugoslavija u celini, i Srbija posebno, našla tokom poslednje decenije XX veka. U tom periodu, međunarodna institucionalna naučno tehnička saradnja istraživača je prekinuta (sa nekoliko časnih izuzetaka, koji su se zasnivali na ličnim odnosima pojedinaca). Radovi autora iz Srbije bili su odbijani u renomiranim svetskim časopisima, automatski ili sa nejasnim objašnjenjima, a učešće na Međunarodnim Simpozijumima bilo je onemogućeno, često iz političkih razloga, ali i zbog nedostatka sredstava. Pošte mnogih Evropskih država nisu primale pošiljke naučnih časopisa i knjiga poslate u Srbiju.

Na IX simpozijumu Jugoslovenskog društva termičara 1993. u Beogradu, na predlog istraživača Laboratorije za termotehniku i energetiku, Instituta u Vinči, doneta je odluka da se pokrene međunarodni časopis na engleskom jeziku “THERMAL SCIENCE”. Prva dva broja objavljena su 1995. i 1996. kao četvrti godišnji broj (No. 4) časopisa TERMOTEHNIKA, a 1997. godine THERMAL SCIENCE se izdvojio kao samostalan časopis.

Tako je 1997. počeo svoj život časopis THERMAL SCIENCE, osnovan od Društva termičara Jugoslavije (kasnije Srbije), a izdavač je bio Institut za nuklearne nauke VINČA koji je imao iskusan naučni i tehnički kadar i štampariju. Nacionalni uređivački Odbor formiran je od vodećih istraživača Laboratorije za termotehniku i energetiku i profesora Mašinskog fakulteta u Beogradu.

Nastao sa skromnim ciljem da omogući upoznavanje svetske naučne javnosti sa rezultatima domaćih istraživanja, pri formulisanoj politike časopisa Nacionalni uređivački odbor postavio je mnogo ambicioznije ciljeve i pri definisanju naučne oblasti časopisa formulisao je dugoročnu naučnu politiku. Dugoročni i ambiciozni ciljevi vide se i u izabranom nazivu časopisa, koji je na predlog

stigations using laboratory size and pilot plants, and finally, completed with testing of real size demonstration plants, under real operating conditions. Each research begins with a literature review (acknowledgement with “up-to-date” scientific knowledge). During the research, it is necessary to inform the scientific community in the world about obtained results and to get feedback and necessary criticism.

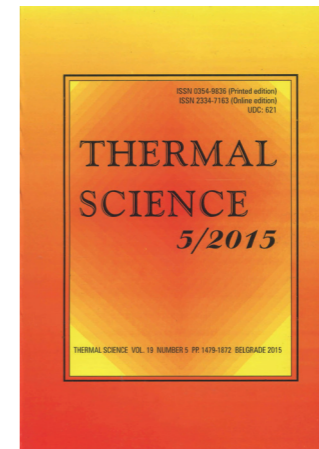
On the basis of experience from long lasting international cooperation and examples of well-organized countries and their strategic commitment to the importance of science for the progress of industry and economy, in the VINČA Institute and in the Laboratory for Thermal Engineering and Energy, it has been long discussed about the best way to present achieved scientific results. As early as in 1974, the journal TERMOTEHNIKA in the Serbian language was launched with Society of Thermal Engineers of Yugoslavia as founder and VINČA Institute of Nuclear Sciences as publisher. The journal was intended for engineers in industry and in electric power industry and mostly, papers presented at the Symposiums of the Society of Thermal Engineers of Yugoslavia were published.

Foundation

The main reason for the foundation of a domestic journal in English was the situation in which Yugoslavia as a whole, and particularly Serbia, was found during the last decade of the 20th century. In that period, international institutional, scientific, and technical cooperation of researchers stopped (with a few honourable exceptions, which were based on personal relationship of individuals). The papers of authors from Serbia were rejected in renowned journals in the world, either automatically or with unclear explanations, and the participation at international symposia was prevented, often for political reasons, but also due to the lack of funds. Post offices of many European countries did not receive shipments of scientific journals and books sent to Serbia.

At the IX Symposium of the Yugoslav Society of Thermal Engineers in Belgrade in 1993 and at the suggestion of researchers from the Laboratory for Thermal Engineering and Energy of the VINČA Institute, the decision was made to launch an international journal in English - THERMAL SCIENCE. The first two issues were published in 1995 and 1996 as the fourth annual issue (No. 4) of the journal TERMOTEHNIKA and, in 1997, THERMAL SCIENCE became an independent journal.

That is how the journal THERMAL SCIENCE, founded by the Society of Thermal Engineers of Yugoslavia (later Society of Thermal Engineers of Serbia), began its life in 1997. Publisher was the VINČA Institute of Nuclear Sciences, which had experienced scientific and technical staff and the printing house. The National Editorial Board was formed by leading researchers from the Laboratory for Thermal



Glavnog urednika i uz podršku direktora Laboratorije za termotehniku i energetiku Dr. Ljubomira Jovanovića, nazvan THERMAL SCIENCE. Izbor imena THERMAL SCIENCE rezultat je želje da se ne ograniči oblast koju časopis „neguje“ jer su termički procesi prisutni i najčešće presudni u skoro svim prirodnim procesima, i tehnološkim uređajima i sistemima (prvobitno je bila ideja da se naziv više poveže sa energetikom, kojom se Laboratorija pretežno bavila). Razvoj nauke i novih tehnologija postavljaće nove i do sada nepoznate naučne probleme koje treba rešavati istraživanjem termičkih procesa. U toku već 20 - godišnjeg postojanja časopisa THERMAL SCIENCE, ovi stavovi su više puta potvrđeni.

Da bi časopis postigao osnovni cilj – upoznavanje svetske naučne javnosti sa rezultatima naše nauke i upoznavanje naših istraživača sa savremenim istraživanjima i najnovijim naučnim rezultatima - časopis je morao imati tri osnovne karakteristike: opštu dostupnost svim zainteresovanim čitaocima (OPEN ACCESS), opštu dostupnost svim autorima niskim troškovima „proizvodnje“ (osnivač i izdavač su neprofitne organizacije), najviši međunarodni nivo recenzija (peer reviews), angažovanjem isključivo recenzentata iz drugih, visoko razvijenih zemalja (zaključeno je da naša naučna zajednica nema dovoljnu „kritičnu masu“ za objektivne i visoko kvalitetne recenzije).

Naučna i uređivačka politika

Polazeći od stava da je za razvoj novih tehnologija neophodno negovati osnovna i usmerena osnovna istraživanja kao temelj za razvojna istraživanja, definisani su prioriteta uređivačke politike i prednost je data osnovnim i usmerenim osnovnim istraživanjima, teorijskim i eksperimentalnim u oblastima: (a) mehanika fluida (pre svega turbulentni tokovi), prenos toplote i materije, sagorevanje i hemijski procesi, (b) višefazna i višekomponentna strujanja, (c) visoko temperaturni tokovi sa hemijskim reakcijama, (d) procesi u fluidizovanim sistemima, i (e) razvojna istraživanja u oblastima koje su prioritetne u Srbiji.

Uskoro se pokazalo da se svetski prioriteta ne pokla-



Engineering and Energy and professors form the Faculty of Mechanical Engineering in Belgrade and Novi Sad.

Although THERMAL SCIENCE has been founded with a modest goal “to enable worlds’ scientific community to be informed about the results of domestic researches”, the National Editorial Board has set much more ambitious goals when drafting the policy of the journal and when defining scientific fields covered by the journal - it has been created long term scientific policy. Long term and ambitious goals can be seen even in the chosen name of the journal. The name THERMAL SCIENCE has been accepted at the suggestion of the Editor-in-Chief and with the support of the Director of the Laboratory for Thermal Engineering and Energy, Ljubomir Jovanović. The choice of the name THERMAL SCIENCE is the result of the desire not to limit the area that the journal will “cherish”, because thermal processes are present, and most often crucial, in almost all natural processes and in many technological devices and systems (originally, the idea was to connect the name more with energy with which the Laboratory has been predominantly concerned). The development of science and new technologies will impose new and so far, unknown scientific problems that will have to be resolved by investigating thermal processes. In 20 years of the existence of the journal THERMAL SCIENCE, these views have been confirmed several times.

Along with the one of the main goals of the journal scientific policy – acquainting the worlds’ scientific community with the results of our science and familiarizing our researchers with modern scientific achievements - the journal has to have three basic characteristics: general accessibility to all interested readers (OPEN ACCESS), general accessibility to all authors by low costs of “production” (the founder and the publisher are non-profit organizations) and the highest international level of reviews (peer reviews) by engaging only reviewers from highly developed countries (it has been concluded that our scientific community does not have sufficient “critical mass” for objective and high quality reviews).

Scientific and Editorial Policy

Starting from the perception that the development of new technologies requires cherishing basic and oriented basic investigations as the basis for applied research, the priorities of editorial policy have been defined and the priority has been given to basic and oriented basic investigation, theoretical and experimental, in areas: (a) fluid mechanics (primarily, turbulent flows), heat and mass transfer, combustion and chemical processes, (b) multiphase and multi-component flows, (c) high temperature flows with chemical reactions, (d) processes in fluidized systems, and (e) applied researches in areas that have priority in Serbia.

Very soon, it has become clear that the priorities in the world are not always the same as the priorities in the domestic economy and new areas are opened - renewable energy sources, energy efficiency and sustainable development, thermal processes in previously unknown systems - coo-

paju uvek sa prioritetima domaće privrede, i otvorene su nove oblasti - obnovljivi izvori energije, energetska efikasnost i održivi razvoj, termički procesi u ranije nepoznatim sistema – hlađenje elektronskih uređaja, strujanje i prenos toplote u mikro kanalima, strujanje i prenos toplote nanofluida, proizvodnja mikro i nano vlakana, procesi u atmosferi povezani sa klimatskim promenama. Sada su oblasti interesa časopisa mnogo šire nego pri njegovom osnivanju.

Matematičko, pre svega numeričko, modeliranje procesa u realnim uslovima imalo je prioritet i u prvom periodu je prevladalo u ponuđenim radovima, ali proširenje oblasti od interesa za savremeni razvoj, pokazalo je da, često zanemarevani, analitički postupci rešavanja jednačina koje opisuju termičke procese u postrojenjima i u prirodi nisu izgubili raniji značaj.

Pored osnovnog cilja – razmena informacija, rezultata istraživanja i znanja o konvencionalnim i novim tehnologijama, trebalo je pružiti priliku da se ponovno uspostave veze među istraživačima i naučnim ustanovama, koje su prekinute podelom Jugoslavije na šest nezavisnih država. Na osnovu ranijih naučnih veza Laboratorije za termotehniku i energetiku i učešća u međunarodnim projektima, 2003. godine je posle skupa više zemalja Jugoistočne Evrope u Solunu prihvaćen naš predlog da se THERMAL SCIENCE prihvati kao regionalni časopis i formiran je Regionalni Uređivački Odbor sa članovima iz Bugarske, Makedonije, Grčke, Rumunije, Bosne i Hercegovine i Srbije, u koji su kasnije pozvani i članovi iz Hrvatske, Slovenije, Crne Gore i Turske. 2008. godine, počelo je redovno objavljivanje izabranih radova sada već poznate međunarodne konferencije Sustainable Development of Energy, Water and Environmental Systems (SDEWES) koja se od 2001. godine, svake druge godine održava u Dubrovniku, a od 2015. godine održava se svake druge godine i Regionalna Konferencija SDEWES, naizmenično u zemljama bivše Jugoslavije.

Poznajući stanje u mnogim zemljama, i na osnovu radova dobijenih u prvih nekoliko godina bilo je jasno da će časopis THERMAL SCIENCE, pored istraživača iz zemalja bivše Jugoslavije i susednih zemalja Jugoistočne Evrope i Istočne Evrope biti orijentisan najviše na autore i čitaoce iz malih zemalja, zemalja u razvoju Azije i Afrike, ali i Kine, Rusije i Indije, koje se poslednjih decenija brzo razvijaju i ulažu velika sredstva u istraživanje i razvoj. Prema predviđanjima datim u Studiji [1], u svetu broj publikovanih naučnih radova iz Kine, dostići će, pa i preći do 2020. godine, broj publikacija autora iz SAD, a broj publikovanih radova Japana, Brazila i Indije će stalno da raste. Statistički podaci o broju naučnih radova iz raznih zemalja objavljenih u THERMAL SCIENCE, potvrđuju ova predviđanja. Radovi iz zemalja u razvoju poslednjih godina čine preko 50% ukupno objavljenih radova.

Izbor oblasti istraživanja težak je, i uvek prisutan problem, počevši od lične odluke naučnog radnika i naučne institucije u kojoj radi, do državne strategije osnovnih

ling of electronic devices, flows and heat transfer in micro canals, flows and heat transfer of nanofluids, the production of micro and nanofibers, and processes in the atmosphere related to the climate change.

Mathematical, primarily numerical, modelling of processes in real conditions has had priority and in the first period, it has prevailed in offered papers. But, along with the expansion of interest for modern technology development, has shown that often neglected analytical procedures for solving equations describing thermal processes, again obtained former significance.

Now, the areas of interest of the journal THERMAL SCIENCE are much wider than they used to be when it was founded.

In addition to the main goal - the exchange of information, research results and knowledge about conventional and new technologies, it has also been necessary to give an opportunity to re-establish connections between researchers and scientific institutions, which were broken by the division of Yugoslavia into six independent states. On the basis of previous scientific connections of the Laboratory for Thermal Engineering and Energy and the participation in international projects, after the meeting of several countries of the Southeast Europe in Thessaloniki in 2003, our proposal to accept THERMAL SCIENCE as a regional journal was accepted and the Regional Editorial Board was formed with members from Bulgaria, Macedonia, Greece, Romania, Bosnia and Herzegovina and Serbia, in which members from Croatia, Slovenia, Montenegro and Turkey were later invited. In 2005, the regular publication of selected papers of presently well-known international Conference on Sustainable Development of Energy, Water and Environmental Systems (SDEWES) began. This Conference has been organized in Dubrovnik every second year since 2001 and the Regional SDEWES Conference has been organized every second year alternately in the countries of the former Yugoslavia since 2015.

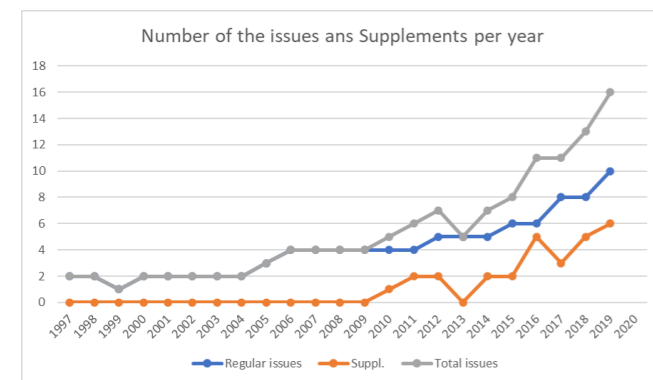
Knowing the situation in many countries and on the basis of papers received in the first few years, it has become clear that the journal THERMAL SCIENCE cannot be oriented only to researchers from former Yugoslavia and neighbouring countries of Southeast Europe and East Europe, but also to authors and readers from small developing countries of Asia and Africa, as well as from China, Russia and India, which have been developing rapidly in recent decades and which are investing huge amounts of money in research and development. According to the predictions given in the OECD Study [1], the number of published scientific papers from China by 2020 will reach, and even surpass the number of publications by authors from the USA, and the number of published papers from Japan, Brazil and India also will be constantly growing. Statistic data about the number of scientific papers from various countries published in THERMAL SCIENCE confirm these predictions. In recent years, papers from developing countries account for over 50% of totally published papers.

i usmerenih osnovnih istraživanja i strategije razvoja i uvođenja novih tehnologija. U toku svog radnog veka, naučnici neprekidno preispituju svoje odluke kojom će se užom (ili širom) naučnom oblasti baviti. Kada državna strategija naučnog razvoja i privrednih i tehnoloških prioriteta postoji, i dovoljno je jasna i konkretna, odluke na ličnom nivou su olakšane. Dobra strategija naučnog i tehnološkog razvoja počiva na stalnom praćenju svetskih pravaca i dostignuća naučnog i tehnološkog razvoja i prioriteta, i pouzdanim statističkim podacima o energetskim potencijalima, rezervama sirovina i rudnom bogatstvu i podacima o kvalitetu naučnog i stručnog kadra, i mogućnostima naučnih ustanova i univerziteta.

Da bi olakšali naučnim radnicima, našim čitaocima, izbor prioriteta, donošenje strateških odluka o njihovom daljem radu, ali i procenu opravdanosti društvenih i državnih prioriteta u strategijama naučnog i tehnološkog razvoja, i ponudili podloge donosiocima strateških odluka, posle nekoliko godina od osnivanja časopisa, kao oblasti od interesa uključili smo radove koji razmatraju: (a) energetske potencijale, posebno obnovljivih izvora energije; (b) energetske efikasnost kao poseban vid energetskog potencijala, (c) studije opravdanosti primene obnovljivih izvora energije i (d) studije povećanja efikasnosti proizvodnje i potrošnje energije.

Razvoj i problemi u razvoju časopisa THERMAL SCIENCE

Časopis THERMAL SCIENCE postoji i razvija se već skoro 25 godina. U tom dugom periodu dogodile su se mnoge revolucionarne promene u nauci, razvijene su mnoge nove tehnologije, i promenjeni naučni prioritati. Ali drastično se promenila i tehnika „proizvodnje“ časopisa. Sve ove promene uticale su na naučnu orijentaciju i razvoj časopisa. Digitalne tehnologije uticale su, kako na naučni profil časopisa, tako i na način komunikacije sa autorima i recenzentima, metode „reklamiranja“ i distribucije časopisa, pripremu tekstova i štampanje tiraža.



Slika 1. Broj redovnih brojeva i Suplemenata godišnje

Figure 1 – The number of regular issues and supplements per year

For each researcher and research institution in which he/she is engaged, the choice of research areas is a difficult and always present problem starting from the personal decision to definition of the priorities in the state's strategy of basic and oriented basic research and in the strategies of economy development and the introduction of new technologies. During their work life, scientists are constantly reconsidering their decisions regarding a narrow (or a wider) scientific field they will deal with. When the state's strategies of scientific and economic development and technological priorities exists and when it is sufficiently clear and concrete, decisions at the personal level are easier. The good strategy of scientific and technological development is based on constant monitoring of global directions and achievements of scientific and technological development and priorities and on reliable statistical data on energy potentials, reserves of raw materials and mineral resources, as well as on data on the quality of scientific and professional human resources and possibilities of scientific institutions and universities.

In order to make it easier for scientists and our readers to choose priorities, to make strategic decisions about their further work, as well as to evaluate the justification of social and state priorities in the strategies of scientific and technological development and to offer bases for strategic decision makers, recently we have included as areas of interest papers that consider: (a) energy potentials, especially renewable energy sources; (b) energy efficiency as a special type of energy potentials, (c) feasibility studies for the use of renewable energy sources and (d) studies to increase the efficiency of energy production and consumption.

Development and Problems in the Development of the Journal THERMAL SCIENCE

The Journal THERMAL SCIENCE has existed and has been developing for almost 25 years. In that long period of time, many revolutionary changes in science have taken place, many new technologies have been developed and scientific priorities have changed. In the same period the technique of the "production" of journals has also been changed drastically. Digital technologies have influenced not only the scientific profile of the journals, but also the way of communication with authors and reviewers, methods of "advertising" and distribution of journals, the preparation of texts and printing of issues. All these changes have influenced the scientific orientation and development of our journal.

The financial support of the Ministry of Science and Technological Development, with always present financial support of the Society of Thermal Engineers of Serbia and VINČA Institute of Nuclear Sciences and especially, the support of the Laboratory for Thermal Engineering and Energy were sufficient for the first few years when only 2 issues per year with the maximum of 20 papers in total were published. The members of the National Editorial Board did not receive compensation for their work, and they

Godina/Year	2009.	2010.	2011.	2012.	2013.	2014.	2015.	2016.	2017.	2018.	2019.
Impakt Faktor /Impact Factor	0.407	0.706	0.779	0.838	0.962	1.222	0.939	1.093	1.431	1.541	1.574

Tabela 1. Impact factor časopisa THERMAL SCIENCE

Table 1 - Impact Factor of the journal THERMAL SCIENCE

Finansijska podrška Ministarstva nauke i tehnološkog razvoja, uz uvek prisutnu finansijsku podršku Instituta za nuklearne nauke VINČA i Društva termičara Srbije, i posebno Laboratorije za termotehniku i energetiku, bili su dovoljni prvih nekoliko godina kada je časopis objavljivao samo 2 broja godišnje sa najviše 20 radova ukupno. Članovi Nacionalnog uređivačkog odbora nisu dobijali nadoknadu za svoj rad, radili su kod kuće. Finansijski problemi počeli su kada je 2012. godine broj prijavljenih radova (oko 600) prevazišao naše tehničke, fizičke i finansijske mogućnosti. O ovom problemu biće reči kasnije.

Prvo je formiran Nacionalni uređivački odbor od saradnika Laboratorije za termotehniku i energetiku i Mašinskog fakulteta u Beogradu, koji je formulisao naučnu i izdavačku politiku i formirao Međunarodni naučni odbor (International Advisory Board) sa zadatkom da pomogne u formiranju naučnog profila i politike časopisa i da vodi računa kvalitetu objavljenih radova, tj. da kontroliše proces recenzije radova. Odmah je odlučeno da časopis bude OPEN ACCESS, i na taj način dostupan svakom istraživaču u svetu bez naplate za čitanje i kopiranje objavljenih radova.

Oslanjajući se na dotadašnju veoma intenzivnu naučnu saradnju saradnika Laboratorije sa Univerzitetima i institutima mnogih zemalja (Univerziteti u Aachen-u, Erlangenu, Londonu, Birminghamu, Geteborgu, Tokiju, Rusiji, Belorusiji, Estoniji i Letoniji, Finskoj, Danskoj, Austriji i Institutu u Novosibirsku i Minsku, Moskvi, Talinu, Holandiji, i druge) formiran je International Advisory Board od istaknutih istraživača, profesora i akademika, koji su zamoljeni da pošalju svoje radove ili radove svojih saradnika u novi časopis THERMAL SCIENCE. Prvi Međunarodni naučni odbora imao je 26 članova – 2 iz Švedske, 1 iz Danske, 5 iz Rusije, 2 iz Belorusije, 2 iz Estonije, 4 iz Nemačke, 1 iz Engleske, 1 iz Kanade, 1 iz Holandije, 1 iz Makedonije, 4 iz USA, 1 iz Japana i 1 iz Italije.

Kao što se vidi sa Sl. 1, od 1997. do 2004. godine objavljivano je samo 2 broja godišnje, sa ukupno 15-20 radova. Ovaj period se može nazvati **Prva etapa** razvoja časopisa, u kojoj smo se upoznavali sa problemima izdavanja časopisa, sprovođenja procesa recenziranja, odnosa i komunikacije sa autorima i recenzentima, i pre svega sa problemima opstanka i prepoznatljivosti u mnoštvu časopisa koji se objavljuju u svetu.

I pored napora da se o osnivanju časopisa obavesti što veći broj Univerziteta i naučnih instituta u svetu, „vidljivost“ časopisa bila je mala. Poslato je preko 500 pisama (90-tih godina još nije bilo Interneta i elektronske pošte, i komunikacija sa autorima i institucijama bila je moguća samo poštom i Telefaks-om), naučnim institucijama i poje-

worked at home. Financial problems began when in 2012 the number of submitted papers per year (around 600) exceeded our technical, physical, and financial capabilities.

First, the National Editorial Board has been formed from associates of the Laboratory for Thermal Engineering and Energy and the Faculties of Mechanical Engineering in Belgrade and Novi Sad, prepared scientific and publishing policy. After that, International Advisory Board has been formed with the task to help in the final formulation of the scientific profile and policy of the journal and to take care about the quality of published papers and/or to control the peer reviewing process. It has been instantly decided that the journal should be OPEN ACCESS and thus available to every researcher in the world free of charge for reading and copying published papers.

Relying on up to that time very intensive scientific cooperation of the associates of the Laboratory with universities and institutes of many countries (universities in Aachen, Erlangen, London, Birmingham, Gothenburg, Tokyo, Russia, Belarus, Estonia and Latvia, Finland, Denmark, Austria and the Institutes in Novosibirsk and Minsk, Moscow, Tallinn, the Netherlands, etc.), the International Advisory Board has been formed of prominent researchers, professors and academics. Members of the International Advisory Board were invited to submit their papers, or the papers of their associates, to the new journal THERMAL SCIENCE. The First International Scientific Committee had 26 members - 2 from Sweden, 1 from Denmark, 5 from Russia, 2 from Belarus, 2 from Estonia, 4 from Germany, 1 from England, 1 from Canada, 1 from the Netherlands, 1 from Macedonia, 4 from the USA, 1 from Japan and 1 from Italy.

As it can be seen in the Fig. 1, from 1997 to 2004, only 2 issues were published per year with totally 15-20 papers. This period can be called the **First Stage** of the development of the journal in which we have become familiarized with problems of publishing, conducting the process of paper reviewing, relationships and communications with authors and reviewers and primarily with all problems related to the survival and recognition in the majority of journals published all over the world.

Despite efforts to inform many universities and scientific institutes in the world about the foundation of the new journal, the "visibility" of the journal was low. Over 500 letters were sent (in the 1990s there was neither Internet nor e-mail and the communication with authors and institutions was possible only by mail and telefax) to scientific institutions and individuals in Europe, Asia, Africa and America but, the response of authors was small.

A significant change in the "visibility" and "popularity" of THERMAL SCIENCE has been achieved because of

dincima u Evropi, Aziji, Africi i Americi, ali je odziv autora je bio mali.

Značajan preokret u „vidljivosti“ i „popularnosti“ časopisa THERMAL SCIENCE ostvaren je kao rezultat sledeće tri aktivnosti koje je preduzeo Nacionalni uređivački odbor. Thermal Science je 2003. godine dobio karakter regionalnog časopisa, i osnovan je Regionalni uređivački odbor, krajem 2004. godine formiran je Website časopisa (<http://thermalscience.vinca.rs>) koji je preko Internet mreže omogućio da se cela svetska naučna zajednica obavesti o novom časopisu, 2006 časopis je uključen u svetsku informacionu bazu podataka DOAJ, i objavljen je prvi Specijalni broj [4], čiji je urednik bio Prof. Jordan Hristov iz Bugarske, koji je pozvao niz svetski poznatih naučnika da objave radove posvećene Constructal Theory (Teoriji konstruisanja) koju je formulisao Prof. Adrian Bejan.

Kao rezultat ovih akcija Nacionalnog uređivačkog odbora u sledećih 5 godina (2006 - 2010), broj redovnih brojeva porastao je od 2 na 4 godišnje (Sl. 1), a broj radova objavljenih godišnje porastao je od 25 na 100. U periodu od 2006 do 2010 broj zemalja iz kojih su stigli radovi povećao se od 5 na 16. Značajno je zapaziti da radovi počinju da stižu iz Evrope, Azije i Afrike (posebno Kine, Indije, Irana i Rusije). Ovaj period razvoja časopisa može se nazvati **Druga etapa**.

Treća etapa razvoja časopisa počinje 2009 godine kada je THERMAL SCIENCE (posle dva pokušaja), dobio od Thompson Scientific (sada Clarivate) svoj prvi Impact factor i uključen u svetsku bazu podataka naučnih časopisa – Web of Science. Iako je prvi Impact factor (odnos citiranih radova u toku 2 godine, prema broju objavljenih radova) bio skroman - 0.407 (Tabela 1), drastično je uticao na ugled časopisa i broj prijavljenih radova. Iako osporavan, sa razlogom, ali i možda suviše oštro, Impact faktor je prihvaćen kao pokazatelj kvaliteta objavljenih radova, odnosno kvaliteta časopisa. Počevši od 2009. godine, kada je THERMAL SCIENCE dobio prvi Impact factor i uvršten na Web of Science, naglo raste interes autora za objavljivanje radova u časopisu.

Od 2009. godine počinje nagli porast broja prijavljenih radova i radova prihvaćenih za objavljivanje. Raste broj objavljenih brojeva i broj objavljenih radova godišnje. Od 2012. godine, kada je došlo i do finansijskih problema, broj objavljenih redovnih brojeva godišnje raste na 5 (Sl. 1) a zatim i na 6, da bi 2019. dostigao 10 brojeva. Takođe ukupan broj objavljenih radova u redovnim brojevima je u stalnom porastu – 2012. već 165, da bi 2019. bio 389 (sa objavljenim Supplementima ukupan broj objavljenih radova u 2019 godini je 608). Srednji broj radova u jednom broju časopisa, porastao je od 6 u 1997. godini na 38 u 2019. godini.

Od 2009. godine, broj prijavljenih radova konstantno raste, tako da je 2012. prijavljeno oko 600 radova, što je pored finansijskih teškoća dovelo i do organizacionih i tehničkih problema. Takođe, mnoge naučne institucije i Univerziteti pokazali su interes da objave specijalne brojeve časopisa sa radovima posvećenih raznim, užitim naučnim

the following three activities undertaken by the National Editorial Board. In 2003, THERMAL SCIENCE turns out to be a regional journal and the Regional Editorial Board was established. At the end of 2004, the Website of the journal (<http://thermalscience.vinca.rs>) was established, which enabled the entire worlds' scientific community to be informed about the new journal through the Internet network. In 2006, the journal was included in the world information database DOAJ. Also, the first special issue [4] was published, whose editor was prof. Jordan Hristov from Bulgaria, who invited many reputed scientists in the world to publish papers dedicated to the Constructal Theory (The Theory of Constructing) formulated by prof. Adrian Bejan.

As the result of these actions of the National Editorial Board, in the next 5 years (2006 - 2010) the number of regular issues increased from 2 to 4 per year and the number of papers published per year increased from 25 to 100 (Fig. 1). In this period the number of countries from which papers arrived increased from 5 to 16. It is important to notice that papers started to come from Europe, Asia, and Africa (especially China, India, Iran, and Russia). This period of the development of the journal can be called the **Second Stage**.

The **Third Stage** in the development of the journal began in 2009 when THERMAL SCIENCE (after two attempts) received from Thompson Scientific (now Clarivate) its first Impact Factor and was included in the world's database of scientific journals - Web of Science. Although the first Impact Factor (the ratio of number of cited papers during 2 years to the number of published papers) was modest - 0.407, it drastically affected the reputation of the journal and the number of submitted papers (Impact Factor is generally accepted as an indicator of the quality of published papers and/or the quality of the journal, in spite of many opposite opinions). Starting from 2009, when THERMAL SCIENCE received its first Impact Factor and was included on the Web of Science, the authors' interest in publishing papers in the journal has been growing rapidly (Table 1).

Since 2009, the number of submitted papers and papers accepted for publishing has been constantly growing, so that in 2012 about 600 papers were submitted, which caused not only financial difficulties but also organizational and technical ones.

In 2012, the number of published regular issues grew to 5 per year (Fig. 1), to reach 10 issues in 2019. Also, the total number of published papers has been constantly increasing. In 2012, there were already 165 and in 2019, there were 389 published papers in regular issues (with papers published in Supplements the total number of published papers in 2019 was 608). The average number of papers in one issue of the journal has been increased from 6 in 1997 to 38 in 2019.

Also, many scientific institutions and universities have shown interest in publishing special issues of the journal with papers dedicated to various, narrower scientific areas. The increased interest of many authors and institutions to publish the results of their researches in our journal has

oblastima. Povećan interes mnogih autora i institucija da objavljuju rezultate svojih istraživanja u našem časopisu, pored rešavanja finansijskih problema, zahtevao je i promenu uređivačke politike i organizacije rada. Promene koje su uvedene početkom 2013 godine mogle bi da se nazovu **Četvrta etapa** razvoja časopisa. Rezultati ovih promena omogućili su dalji brz razvoj časopisa, koji se može pratiti na Sl. 1 i u Tabeli 1. Broj redovnih brojeva je od 4 u 2012. povećan na 6 brojeva godišnje u 2017, ali je zbog uvođenja izdanja A i B, broj redovnih brojeva u 2019. dostigao 10 izdanja (Sl. 1). Broj objavljenih Supplementa od 2 u 2012. povećan je na 6 u 2019. godini.

Osim fizičkog povećanja „produkcije“, koji je očigledan pokazatelj porasta interesa svetske naučne zajednice za objavljivanje radova u časopisu THERMAL SCIENCE, i posredan pokazatelj porasta kvaliteta radova i naučnog kvaliteta časopisa, mnogo značajnija činjenica je porast citiranja radova koji su objavljeni, što se vidi u Tabeli 1, koja pokazuje porast Impact factora od 0.838 u 2012. na 1.574 u 2019. godini.

Očekivanja uredništva i neki od osnovnih ciljeva naučne i izdavačke politike časopisa, koji su postavljeni još prilikom osnivanja časopisa, su ostvareni u toku ove **Četvrte etape** razvoja časopisa:

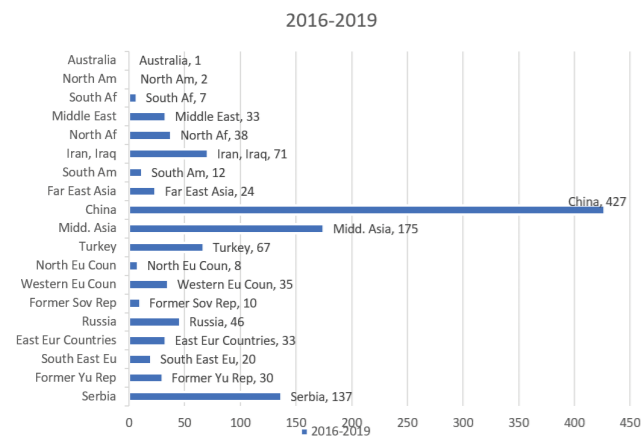
- Značajan porast broja radova autora iz Srbije,
- Značajno povećanje ugleda časopisa u regionu Jugoistočne, i istočne Evrope. Opšte je prihvaćeno, i često iskazano na mnogim mestima i u mnogim prilikama, mišljenje da je THERMAL SCIENCE najugledniji časopis koji se izdaje u našem regionu u oblastima kojima je posvećen – energetika, termodinamika i termotehnika, prenos toplote i materije, obnovljivi izvori energije i energetska efikasnost, tj. jednom rečju u oblasti termičkih procesa u svim oblastima inženjerstva.
- Značajno je porastao broj radova autora iz Rusije, Poljske, Mađarske i Turske.
- Porast ugleda časopisa THERMAL SCIENCE i u svetskim razmerama. Značajno je porastao u ovom periodu broj zemalja iz kojih nam autori šalju radove za objavljivanje. Povećan je i interes autora iz nekih razvijenih zapadnih zemalja (Italija, Francuska).
- Izraženo je veliko interesovanje autora iz Azijskih zemalja (Kine, Indije, Irana) i zemalja Severne Afrike (Egipta, Tunisa, Maroka i Alžira), čime je potvrđena predviđena orijentacija časopisa prema zemljama u razvoju, koja je bila postavljena kao jedan od važnijih ciljeva pri osnivanju časopisa THERMAL SCIENCE. Potrebno je napomenuti visoka ulaganja u razvoj nauke i obrazovanja u Kini, Koreji i Jugoistočnoj Aziji (a verovatno i u Iranu). Generalno, zemlje krajnjeg istoka Azije i Jugoistočne Azije, poslednjih decenija ulažu natprosečno visoka sredstva u nauku i obrazovanje, što se vidi i po njihovom tehnološkom i ekonomskom razvoju, ali i po broju radova u naučnim časopisima, pa i u THERMAL SCIENCE.
- I na kraju, možda i najvažnije, u poslednjim godinama razvoj THERMAL SCIENCE i porast njegovog naučnog

required solving financial problems and the changes in the editorial policy and in the organization of work. The changes that were introduced at the beginning of 2013, and this period can be called the **Fourth Stage** of the journal development. The results of these changes have enabled further rapid development of the journal, which can be followed in the Fig. 1 and in the Table 1. The number of regular issues increased from 4 in 2012 to 6 issues per year in 2017 but, due to the introduction of issues A and B, the number of regular issues in 2019 reached 10 volumes (Fig. 1). The number of published supplements from 2 in 2012 increased to 6 in 2019.

Increase of the “production” is an obvious indicator of the growing interest of the scientific community in the world for publishing papers in the journal THERMAL SCIENCE, and indirectly shows the scientific quality of papers and of the journal. More important fact is the increase in citing of papers that have been published, which can be seen in the Table 1, as the increase of the Impact Factor from 0.838 in 2012 to 1.574 in 2019.

Expectations of the Editorial Board, and some of the basic goals of the scientific and publishing policy of the journal, which were set as early as on the occasion when the journal was founded, have been achieved during this **Fourth Stage** of development of the journal:

- Significant increase of the number of papers by authors from Serbia,
- Significant increase of the reputation of the journal in the region of Southeast and East Europe.
- It is generally accepted, and often expressed in many places and on many occasions, that: “THERMAL SCIENCE is the most distinguished journal published in our region in the fields to which it is devoted - energy, thermodynamics and thermal science, heat and mass transfer, renewable energy sources and energy efficiency”. That is, in one word, in the fields of thermal processes present in all areas of engineering.
- The growth of the reputation of THERMAL SCIENCE journal on a global scale. The number of countries from which authors send papers for publication to us has been significantly increased in this period. The interest of authors from some developed western countries (Italy, France) has also been increased.
- Great interest of authors from Asian countries (China, India, Iran) and countries from North Africa (Egypt, Tunisia, Morocco and Algeria) has also been intensified, which has confirmed anticipated orientation of the journal towards developing countries pre-set as one of the most important objectives when founding the journal THERMAL SCIENCE. It is important to mention high investments in science and education in China, South Korea, and Southeast Asia (and probably also in Iran). Generally, countries of the Far East of Asia and of Southeast Asia have been investing above average amounts of money in science and education in recent decades, which can be seen not only in their technological and economic development but also in the number of pa-



Sl. 2. Broj objavljenih radova svetskih regiona i većih zemalja u periodu 2016 - 2019

Fig. 2 - Number of published papers of some World Regions and large Countries in the period 2016 - 2019

kvaliteta i uticaja, ogleđa se u novim naučnim oblastima u kojima broj radova stalno raste, a koje su otvorene u Supplementima i Specijalnim brojevima:

- Nanofluidi, procesi u njima i njihovo korišćenje u novim tehnologijama,
- Procesi pri formiranju i proizvodnji nanovlakana,
- Fizički modeli termičkih procesa i procesa strujanja korišćenjem fraktalne matematike,
- Fraktalna matematika i primena fraktalnih metoda pri rešavanju jednačina koje opisuju procese pri strujanju fluida, i termičkim procesima,
- Proseci u atmosferi i uzroci klimatskih promena

Da bi mogli pratiti promene vidljivosti i interesa autora za objavljivanje radova u časopisu THERMAL SCIENCE, 70 zemalja iz kojih su štampani radovi podeljene su u 14 svetskih regija i 5 zemalja koje su za nas od posebnog interesa:

- Države nastale posle raspada bivše Jugoslavije - Former Yu Rep (Hrvatska, Slovenija, Crna Gora, Severna Makedonija, Bosna i Hercegovina),
- Zemlje Jugoistočne Evrope – South East Eu (Grčka, Bugarska, Rumunija),
- bivše republike Sovjetskog Saveza – Former Sov Rep (Litvanija, Ukrajina, Kazahstan),
- zemlje Istočne Evrope – Eastern Eur Countries (Mađarska, Poljska, Češka, Slovačka),
- zemlje Zapadne Evrope – Western Eu Coun (Italija, Francuska, Španija, Portugalija, Austrija, Nemačka, Nizozemska, Belgija),
- zemlje Severne Evrope – North Eu Coun - (Švedska, Finska, Velika Britanija, Irska, Danska),
- Srednja Azija - Midd. Asia (Indija, Bangladeš, Pakistan),
- Daleki Istok- Far East Asia (Japan, Malezija, Koreja, Singapur, Tajland, Brunei),
- Južna Amerika – South Am (Brazil, Argentina, Meksiko, Kolumbija),

pers in scientific journals, as well as in THERMAL SCIENCE.

- The number of papers by authors from Russia, Poland, Hungary, and Turkey has been increased significantly.

• Finally, perhaps the most important, is that the development of THERMAL SCIENCE in recent years and the increase of its scientific quality and influence, has been reflected also in new scientific areas in which the number of papers is constantly growing and which have been opened in Supplements and Special Issues:

- Nanofluids, processes in them and their use in new technologies,
- Processes in the formation and production of nanofibers,
- Physical models of flow and thermal processes by using fractal mathematics,
- Fractal mathematics and application of fractal methods in solving equations that describe processes in fluid flows and in thermal processes,
- Processes in the atmosphere and origins of the climate change.

In order to be able to follow changes in visibility and in interests of authors for the publication of papers in the journal THERMAL SCIENCE, 70 countries from which papers have been published are divided into 14 world regions and 5 countries which are of special interest to us:

- Former Yugoslav Republics – Former Yu Rep (Croatia, Slovenia, Montenegro, North Macedonia, Bosnia and Herzegovina),
- Countries of the Southeast Europe – Southeast EU (Greece, Bulgaria, Romania),
- Former Soviet Union Republics - Former USSR Rep (Lithuania, Ukraine, Kazakhstan),
- Countries of the East Europe - East EU (Hungary, Poland, Czech Republic, Slovakia),
- Countries of the West Europe - West EU (Italy, France, Spain, Portugal, Austria, Germany, Netherlands, Belgium),
- Countries of the North Europe - North EU - (Sweden, Finland, Great Britain, Ireland, Denmark),
- Central Asia - Middle Asia (India, Bangladesh, Pakistan),
- Countries of the Far East- Far East Asia (Japan, Malaysia, Korea, Singapore, Thailand, Brunei),
- Countries of the South America - South Am (Brazil, Argentina, Mexico, Colombia),
- Countries of the North Africa - North Af. (Algeria, Tunisia and Morocco),
- Countries of the Middle East - Middle East (Oman, UAE, Egypt, Israel, Saudi Arabia, Jordan, Kuwait, Abu Dhabi),
- Countries of Africa and South Africa – Af. and South Af. (Madagascar, Nigeria, Ethiopia, Kenya, Cameroon, Sudan, South African Republic),
- North America - North Am (USA and Canada),
- Australia (and New Zealand),
- and individual countries - Serbia, Russia, Turkey, China (and Taiwan and Hong Kong), Iran (and Iraq).

If we have in mind the fact that in this period 1181 papers were published in 4 years, it can be seen that these countri-

- Severna Afrika – North Af (Alžir, Tunis i Maroko),
- Srednji istok - Middle East (Oman, UAE, Egipat, Izrael, Saudijska Arabija, Jordan, Kuvajt, Abu Dhabi),
- Afrika i Južna Afrika- Af and Sout Af (Madagaskar, Nijerija, Etiopija, Kenija, Kamrun, Sudan, Južno Afrička Republika),

- Severna Amerika – North Am (SAD i Kanada),
- Australija (i Novi Zeland) i
- pojedinačno zemlje - Srbija, Rusija, Turska, Kina (i Tajvan i Hong Kong), Iran (i Irak).

Ako se ima u vidu da je u ovom periodu objavljeno za 4 godine 1181 rada, vidi se da ove zemlje ipak objavljuju u THERMAL SCIENCE značajan broj radova, iako je njihov procentualni udeo mali (Sl. 2)

Može se izvesti zaključak, da je početna pretpostavka pri osnivanju časopisa potvrđena – časopis stekao međunarodni ugled objavljujući rezultate istraživanja autora iz zemalja u razvoju, Srbije, Jugoistočne Evrope i zemalja u regionu bivše Jugoslavije. Časopis je postao poznat po svom kvalitetu u celom svetu. Autori iz velikog broja zemalja (osim iz zapadne Evrope i Severne Amerike), potvrđuju svojim radovima i brojem citiranih radova, da je THERMAL SCIENCE dostigao visok međunarodni nivo, uporediv sa časopisima poznatih svetskih izdavačkih kuća.

Uloga malih naučnih časopisa u nauci i razvoju

Navedeni podaci o razvoju i trenutnom stanju časopisa THERMAL SCIENCE, kao i mišljenja mnogih renomiranih naučnika i naučnih institucija i interes istraživača iz 70 zemalja Sveta da U OVOM ČASOPISU objave rezultate svojih istraživanja, jasno govore da je časopis dostigao stabilan, respektabilni naučni nivo, među mnogobrojnim časopisima koji se štampaju u Svetu, uprkos stalnom povećanju broja časopisa.

Ovaj zaključak se može potvrditi i sa nekoliko sažimajućih konstatacija i činjenica: (a) ime časopisa THERMAL SCIENCE je prepoznatljivo i poznato u velikom broju zemalja; (b) u regionu Jugoistočne Evrope THERMAL SCIENCE je, po mišljenju mnogih autora i naučnih institucija, najbolji časopis iz svoje oblasti (nedavno je Ministarstvo nauke Poljske, pored mnogih drugih, uvrstilo THERMAL SCIENCE u listu časopisa koji se priznaju za izbor u naučna zvanja); (c) Impact factor časopisa stalno raste i veći je od 1.5; (d) prema vrednosti Impact factora THERMAL SCIENCE se nalazi u gornjih 50% časopisa iz svoje oblasti; (e) najpoznatije svetske baze podataka objavljuju podatke o radovima objavljenim u THERMAL SCIENCE; (f) organizatori mnogih Konferencija i Simpozijuma pokazuju interes da izabrane radove objave u našem časopisu (da istaknem posebno da International Center for Sustainable Development of Energy, Water and Environment Systems (SDEWES), na svojim svetskim Konferencijama u Dubrovniku i na regionalnim Konferencijama navodi THERMAL SCIENCE kao „journal partner“. Thermal Science objavljuje izabrane radove sa konferencija u Dubrovniku,

es still published significant number of papers in THERMAL SCIENCE although their percentage is small (Fig. 2).

It can be concluded that the initial assumption when founding the journal has been confirmed - the journal has gained international reputation by publishing results of researches by authors from developing countries, Serbia, Southeast Europe and countries in the region of the former Yugoslavia. The journal has become known for its quality all over the world. Authors from a large number of countries (except from Western Europe and North America) confirm, with their papers and with the number of cited papers, that THERMAL SCIENCE has reached high international level that can be compared with the journals of famous publishing houses in the world.

The Role of Small Scientific Journals in the Science and in the Technology Development

The above specified data about the development and about the current situation with the journal THERMAL SCIENCE, as well as the opinion of many renowned scientists and scientific institutions and researchers from 70 countries in the world to publish the results of their investigations IN THIS JOURNAL clearly show that the journal has reached a stable, respectable scientific level among numerous journals printed worldwide.

This conclusion can also be confirmed by a few summarized statements and facts: (a) The name of the journal THERMAL SCIENCE is recognizable and well-known in a large number of countries; (b) In the region of the Southeast Europe, THERMAL SCIENCE is, in the opinion of many authors and scientific institutions, the best journal in its field (recently, the Ministry of Science of Poland, among many others, has included THERMAL SCIENCE in the list of journals recognized for the promotion into scientific titles); (c) The Impact Factor of the Journal is constantly growing and it is greater than 1.5; (d) According to the values of the Impact Factor, THERMAL SCIENCE is in the top 50% journals in its field; (e) The most famous databases in the world announce data on papers published in THERMAL SCIENCE; (f) The organizers of many conferences and symposia show interest in publishing selected papers in our journal (it is especially necessary to emphasize that the International Center for Sustainable Development of Energy, Water and Environment Systems (SDEWES), at its world conferences in Dubrovnik and at regional conferences specifies THERMAL SCIENCE as a “journal partner.” Thermal Science has published selected papers from the Conference in Dubrovnik every second year since 2005); (g) Many publishing houses in the world (for example, Springer) offer cooperation or purchase of the journal THERMAL SCIENCE); (h) Universities and scientific institutions are very much interested in the preparation and publication of special issues of the journal THERMAL SCIENCE with selected papers from modern scientific topics; (i) Many renowned researches from various countries are interested in becoming members of the

svake druge godine od 2005); (g) mnoge svetske izdavačke kuće (n.pr. Springer) nude saradnju ili otkup časopisa THERMAL SCIENCE); (h) veliki je interes Univerziteta i naučnih institucija da pripreme i objave Specijalne brojeve časopisa THERMAL SCIENCE sa izabranim radovima iz savremenih naučnih oblasti; (i) mnogi renomirani istraživači iz raznih zemalja imaju želju da postanu članovi International Advisory Board-a, tako da sada ovaj odbor ima preko 70 članova.

THERMAL SCIENCE je takođe potvrdio svoj kvalitet strogom i objektivnom recenzijom, kako radova stranih autora tako i radova iz Srbije, bez uticaja kolegijalnih veza ili domaćih naučnih institucija. Imajući u vidu da je kritična masa istraživača u užim, posebno modernim, naučnim oblastima (ne samo u Srbiji, već i u svim zemljama Jugoistočne Evrope u celini), mala i nedovoljna za objektivnu ocenu naučnih radova, čvrsta politika Nacionalnog Uređivačkog Odbora je da se za ocenu domaćih radova biraju recenzenti iz razvijenih zemalja. Od ukupno prijavljenih radova preko 30% se odbija odmah ocenom Glavnog i odgovornog urednika pre upućivanja radova recenzentima, a posle obavljanja recenzija broj prihvaćenih radova je manji od 50%, što je slično kao i u velikim poznatim časopisima.

Smatrajući da je objavljivanje radova važna karika u lancu istraživanja, svojom strogom i objektivnom izdavačkom politikom Uredništvo časopisa THERMAL SCIENCE smatra da je dalo važan doprinos obrazovanju mladih istraživača i podizanju nivoa naučnih istraživanja u Srbiji. Kritički odnos prema sopstvenim rezultatima važna je osobina istraživača, a postiže se pored ostalog i ozbiljnim odnosom istraživača i recenzenata i mogućnost da se ostvari diskusija između autora i recenzenata.

Prednost malih časopisa u odnosu na velike svetske renomirane časopise, je mogućnost da se autori i recenzenti, pa i urednici časopisa, osećaju kao deo procesa saznavanja naučne istine. Kolegijalni, lični odnos (bez kršenja anonimnosti recenzenata), moguć je samo u malim časopisima. Veliki časopisi, poznatih izdavačkih kuća, kojima je pretežni cilj ostvarivanje profita distribucijom naučnih informacija, suviše su industrijalizovani i depersonalizovani, i veza autora i recenzenata je prekinuta.

Urednici, autori i recenzenti malih časopisa, osećaju da učestvuju i zajedničkom poduhvatu traganja za naučnom istinom.

Ako se pogleda ukupna „proizvodnja“ velikih svetskih časopisa, i pored anonimne i objektivne recenzije, pristup autora iz zemalja u razvoju je vidno otežan, što se jednostavno vidi iz statističke analize regionalnog rasporeda autora radova. I bez uzimanja u obzir mogućnosti pristupa časopisima istraživača iz velikih zemalja i velikih naučnih centara, autori zemalja u razvoju imaju bar dve značajne prepreke da se „probiju“ u velikim časopisima Engleskog govornog područja: nacionalni prioriteta u zemljama u razvoju često nisu uvek identične oblastima koje su trenutno u svetu moderne i prioritet-

International Advisory Board so that this board has over 70 members now.

THERMAL SCIENCE has also confirmed its quality with strict and objective reviews, both of papers by foreign authors and of papers from Serbia without the influence of collegial connections or domestic scientific institutions. Taking into account the fact that the critical mass of researchers in narrower, especially modern, scientific fields is small (not only in Serbia but also in all countries of Southeast Europe as a whole), and insufficient for the objective assessment of scientific papers, the firm policy of the National Editorial Board is to select reviewers from developed countries for the evaluation of domestic papers. Out of the total number of submitted papers, over 30% is rejected immediately by the Editor-in-Chief before sending papers to reviewers. Number of accepted papers after peer review is less than 50%, which is similar as in large well-known journals.

Bearing in mind that publishing papers is an important link in the research chain, the Editorial Board of THERMAL SCIENCE with its strict and objective publishing policy believes that it has made an important contribution to the education of young researchers and to raising the level of scientific research in Serbia. A critical attitude towards someone's own results is an important characteristic of a researcher and it is achieved, among other things, by a serious relationship between a researcher and a reviewer and by the possibility to enable discussions between an author and a reviewer.

The advantage of small journals in relation to large and renowned journals in the world is the possibility that authors and reviewers, and even editors of journals, feel as the part of the process of getting to know a scientific truth. Collegial and personal relationship (without violating the anonymity of reviewers) is possible only in small journals. Large journals of well-known publishing houses, whose main objective is to make profits by the distribution of scientific information, are overly industrialized and depersonalized and the connection between authors and reviewers is discontinued.

The editors, authors and reviewers of small journals feel that they also participate in the joint venture of searching for the scientific truth.

If you look at the total "production" of large journals in the world, despite anonymous and objective reviews, the approach of authors from developing countries is obviously difficult. This can simply be seen from the statistical analysis of the regional distribution of authors. If we even do not take into account much greater possibility of researchers from large countries and large scientific institutes to access journals, authors from developing countries have at least three significant obstacles to break through to major journals of the English-speaking region: (a) national priorities in developing countries are often not at all identical with present scientific priorities in the world; (b) technical conditions and measuring instrumentation for experimental investigati-

ne, tehnički uslovi obavljanja eksperimentalnih istraživanja i numeričkog modeliranja nisu na svetskom nivou i veština predstavljanja rezultata na engleskom jeziku je često nedovoljna za prihvatanje u velikim časopisima. Zbog toga, toliko važna kritika rezultata od strane vrhunskih recenzenata nije dostupna mnogim istraživačima u zemljama u razvoju. Istraživači u mnogim zemljama uskraćeni su za ozbiljnu ocenu svojih rezultata, bez koje nema značajnog uticaja na obrazovanje naučnog kadra i povećanje kvaliteta istraživačkog rada koji bi doprineo tehnološkom i ekonomskom razvoju zemalja u razvoju.

Na kraju, mali časopisi su po pravilu OPEN ACCESS, i omogućavaju svim istraživačima u svetu da besplatno dobiju poslednje naučne informacije, a autorima da objave svoje radove samo uz nadoknadu troškova „proizvodnje“ časopisa. Izdavači malih časopisa su po pravilu neprofitne naučne organizacije ili naučne institucije, čiji cilj je ostvarivanje što lakšeg protoka naučnih informacija i omogućavanje naučne saradnje istraživača iz mnogih zemalja.

THERMAL SCIENCE ostvario sve ciljeve koje je postavio Nacionalni uređivački odbor prilikom osnivanja časopisa:

- Postigao je visok, svetski, naučni nivo
- Znatno doprinosi obrazovanju domaćih mladih istraživača, i omogućio je informisanje svetske naučne zajednice sa rezultatima istraživanja ostvarenih u Srbiji, zemljama Jugoistočne Evrope, i mnogih zemalja u razvoju – od Dalekog istoka do Evrope,
- Upoznaje istraživače u Srbiji, u zemljama jugoistočne Evrope i mnogim nerazvijenim zemljama sa poslednjim naučnim dostignućima u svetu,
- Omogućio je upoznavanje i uspostavljanje veza istraživača iz mnogih zemalja,
- Daje značajan doprinos podizanju nivoa istraživanja u Srbiji i zemljama Jugoistočne Evrope.

Časopisa THERMAL SCIENCE je postao značajna karika u istraživačkom lancu naučnih, tehnoloških i inženjerskih oblasti u Srbiji.

Spisak referenci

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ons often are not at high level as well as for numerical modelling; and (c) the skill of presenting results in the English language is often insufficient for the acceptance in large journals. For that reason, crucially important criticism of results by top reviewers is not available to many researchers in developing countries. Researchers in many countries do not get serious assessment of their results and without that, there is no significant influence on the education of scientific staff and on the increase of the quality of research work that will contribute to technological and economic development of developing countries.

Finally, small journals are as a rule OPEN ACCESS and enable researchers in the world to receive latest scientific information free of charge and authors to publish their papers only by compensating the cost of the "production" of the journal. The publishers of small journals are as a rule non-profit scientific organizations or scientific institutions and their objective is to achieve the easiest possible flow of scientific information and to enable scientific cooperation of researchers from many countries.

THERMAL SCIENCE has achieved all goals set from the beginning by the National Editorial Board:

- It has achieved a high scientific level in the world
- It significantly contributes to the education of domestic young researchers and it has enabled informing the scientific community in the world about the results of researches carried out in Serbia, countries in the Southeast Europe and in many developing countries from the Far East to Europe,
- It informs researchers in Serbia, in the countries of the Southeast Europe and in many underdeveloped countries about the latest scientific achievements in the world,
- It has enabled getting to know researchers from many countries and the establishment of connections among them,
- It makes a significant contribution to raising the level of research in Serbia and in countries of the Southeast Europe.

The journal THERMAL SCIENCE has become a significant link in the research chain of scientific, technological, and engineering fields in Serbia.

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