

УДК 339.727.22(497.1:73)"1978/..."
339.944(497.1:73)"1978/..."
658.1:004(497.1)"1978"

DOI <https://doi.org/10.31212/tokovi.2024.3.cve.217-244>

Original scientific paper/Оригинални научни рад

Примљен/Received: 5. 4. 2024.

Прихваћен/Accepted: 26. 11. 2024.

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Computer Technology Transfer at the U.S.-Yugoslav Joint Venture Ei-Honeywell*

Abstract: This study explores the transfer of computer technology in the U.S.-Yugoslav joint venture. As an example of a unique form of economic cooperation between socialist enterprises and West corporations, Ei-Honeywell was founded in 1978. The joint venture included Honeywell and two Yugoslav entities, the Electronic Industry in Niš and Progres from Belgrade, with a focus on manufacturing computers and related peripherals. Through the analysis of factory publications, archival documents, and interviews, the research highlights that, while the venture spurred domestic innovation, the Yugoslav enterprise was not able to achieve full autonomous production without relying on Honeywell's licensing. Ultimately, this joint venture demonstrates another layer of U.S.-Yugoslav economic relations, illustrating efforts to enhance commercial cooperation between the two countries throughout the Cold War era.

Keywords: technology transfer, computers, joint ventures, socialist Yugoslavia, United States of America, Cold War

In the quest for technological supremacy, Cold War superpowers not only competed but engaged in “transfers of technology, knowledge and cooperation”, fostering transnational connections in the second half of the twenti-

* The research presented in this paper was funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia under contract number 451-03-47/2023-01/200005.

eth century.¹ Traditionally, technology transfer,² as a process of migration of technologies and knowledge from one place to another, was understood as a unidirectional flow, predominantly from developed Western nations to less industrialized regions. However, postcolonial scholarship has sought to challenge this perspective, highlighting the agency of technology “recipients” and their active contributions to the process. Consequently, technology transfer is not only perceived as a linear movement but as a more dynamic and reciprocal circulation of technology.³ In that sense, this case study of the U.S.-Yugoslav joint venture Ei-Honeywell emphasizes the proactive involvement of technology recipients, considering the broader economic, political, and social context.

The analysis of the complex concept of technology transfer remains challenging, as its stages are often fluid and not easily delineated. To address this complexity, this study adopts Edward Beatty’s model, which identifies four key phases of technology transfer: decision, acquisition, innovation, and diffusion.⁴ This model will be applied to examine the process of technology transfer within a joint venture in the domain of computer production, as a framework for this process. While tracing the trajectory of technological and knowledge flow and its assimilation within the Yugoslav framework, this research seeks to assess the influence of U.S. computer technology on the Yugoslav computer production environment. Moreover, this technology transfer will be evaluated within the broader perspective of U.S.-Yugoslav political and economic relations. To address this question, the study will rely on diverse historical sources, including factory newspapers, archival materials, and interviews.⁵

1 Wolfgang Mueller, Peter Svik, “Introduction”, *Technological Innovation, Globalization and the Cold War: A Transnational History*, eds. Wolfgang Mueller, Peter Svik, (London; New York: Routledge, 2023), 2.

2 According to the definition, technology encompasses three levels: the physical component, objects, or technological inventions; the production process itself; and the invisible segment, the required knowledge and skills. Ruth Schwartz Cowan, “Introduction”, *The Social Shaping of Technology: How the refrigerator got its hum*, eds. Donald Mackenzie, Judy Wajcman, (Milton Keynes: Open University Press, 1985), 3–4.

3 More on these theories in: Stefanie Gänger, “Circulation: Reflections on Circularity, Entity, and Liquidity in the Language of Global History”, *Journal of Global History* 3/2017, 303–318.; Daniel Hedinger, Nadin Heč, “Transimperial History-Connectivity, Cooperation and Competition”, *Journal of Modern European History* 4/2018, 429–452.

4 Edward Beatty, “Approaches to Technology Transfer in History and the Case of Nineteenth-Century Mexico”, *Comparative Technology Transfer and Society* 2/2003, 170, 180–183.

5 The Historical Archives of Niš did not include any record on Ei-Honeywell’s operations, as was the case with many socialist enterprises that became private ownership in the 1990s. More on the difficulties of exploiting archival collections, but also other sources that could be used in the study of labor and working-class history at the micro-level in: Rory Archer,

At the onset of the Cold War rivalry, the United States and the Soviet Union recognized the role of computers in national defense, which was a driving force for developing independent computer technologies.⁶ Notable U.S. manufacturers made significant strides in this technological race. From the 1950s, the Soviet Union's digital electronic computers stood out, but other socialist countries, such as Poland, Czechoslovakia, the German Democratic Republic, Romania, and from the 1960s, Bulgaria, also developed computing machines, mostly for military purposes.⁷ However, these computers often lagged behind their Western counterparts. This technological gap was not merely due to inherent flaws in design but stemmed from a lack of systematic and ideological support, which hindered their mass production and commercial usage. The main problem was that socialist countries required computers in different areas such as scientific development, banking, production, administration, and planning operations. To address this gap, they sought technology transfers from the West. In response to the escalating demand for advanced computer technologies, the United States implemented stringent controls on computer exports to preserve its strategic advantage over the Soviet Union in the 1950s. The Coordinating Committee for Multilateral Export Controls (CoCom) played an important role in this effort, restricting the export of computer technologies deemed to have potential military applications, particularly concerning the Soviet Union and other Eastern Bloc countries.⁸ Considering that official technology transfer between East and West was prohibited, socialist countries turned to illegal methods, such as cloning, industrial espionage, or using politically neutral countries as intermediaries.⁹ By the end of 1960, the political climate

Goran Musić, "Approaching the socialist factory and its workforce: considerations from fieldwork in (former) Yugoslavia", *Labor History* 1/2017, 44–66.

- 6 Slava Gerovitch, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics*, (Cambridge; Mass.: MIT, 2002), 133.
- 7 More on computerization in East bloc countries: Victor Petrov, *Balkan Cyberia: Cold War Computing, Bulgarian Modernization, and the Information Age behind the Iron Curtain*, (Cambridge, Massachusetts: MIT Press, 2023), 62–66; Marek Hołyński, "Early Computer Development in Poland", *Histories of Computing in Eastern Europe*, eds. Christopher Leslie, Martin Schmitt, (Berlin: Springer, 2019), 71–87; Vladimir A. Kitov, "On the History of Gosplan, the Main Computer Center of the State Planning Committee of the USSR", *Histories of Computing in Eastern Europe*, eds. Christopher Leslie, Martin Schmitt, (Berlin: Springer, 2019), 118–127.
- 8 Frank Cain, "Computers and the Cold War: United States Restrictions on the Export of Computers to the Soviet Union and Communist China", *Journal of Contemporary History* 1/2005, 133–134.
- 9 Mirosław Sikora, "Cooperating with Moscow, Stealing in California: Poland's Legal and Illicit Acquisition of Microelectronics Knowhow from 1960 to 1990", *Histories of Computing*

had become more favorable, leading to various forms of cooperation in computer technology production between the confronting sides of the Cold War.¹⁰

In the late 1950s and early 1960s, Yugoslavia reached an important milestone with the construction of the CER 10 electronic computer.¹¹ Initially intended for the Yugoslav nuclear program¹², its applications expanded to sectors like banking, state administration, industry, and science, where data management was crucial.¹³ In the 1960s, it was clear that Yugoslavia needed more computers and that capacities of domestic production were not enough to satisfy these needs. The solution was seen in the import from the West. Unlike other socialist countries, Yugoslavia had a different geopolitical position in the 1950s. After the Tito-Stalin split, Yugoslavia improved its relations with the West and strengthened ties with Third World countries. Along with enhanced relations with the U.S. in political, cultural, and economic spheres, Yugoslavia opened its market to U.S. products.¹⁴ While other socialist countries underwent CoCom restrictions, Yugoslavia was a market for U.S. manufacturers in the field of computer technology, such as IBM, Honeywell, Univac, the National Cash Register (NCR), and Control Data Corporation (CDC).¹⁵

Import, however, was not the only solution for Yugoslavia in order to improve domestic computer manufacturing capabilities. The country could also

in Eastern Europe, eds. Christopher Leslie, Martin Schmitt, (Berlin: Springer, 2019), 180–181.

- 10 Isabelle Gouarné, Olessia Kirtchik, “Computers for the Planned Economy: Franco–Soviet Scientific-Technical Cooperation during the Cold War”, *Europe-Asia Studies* 4/2022, 545–568.
- 11 Jelica Protić, Dejan Ristanović, “Building Computers in Serbia: The First Half of the Digital Century”, *ComSIS* 3/2011, 552.
- 12 Marko Miljković, “CER Computers as Weapons of Mass Disruption: the Yugoslav Computer Industry in the 1960s”, *Godišnjak za društvenu istoriju* 2/2017, 103.
- 13 The number of computers in Yugoslavia surged from 19 in 1965 to 1,050 in 1972. *Global Market Survey: Computers and Related Equipment*, U. S. Department of Commerce, October 1973, 134.
- 14 More on Yugoslav–American relations during the Cold War: Milan J. Igrutinović, „Jugoslovensko-američki ekonomski odnosi: (1954–1968)“, (doktorska disertacija, Univerzitet u Beogradu, Odeljenje za istoriju, 2018); Dragan Bogetić, *Jugoslovensko-američki odnosi u vreme bipolarnog detanta 1972–1975*, (Beograd: Institut za savremenu istoriju, 2015); Radina Vučetić, *Koka-kola socijalizam: amerikanizacija jugoslovenske popularne kulture šezdesetih godina XX veka*, (Beograd: Službeni glasnik, 2012); Dragan Bogetić, *Jugoslovensko-američki odnosi 1961–1971*, (Beograd: Institut za savremenu istoriju, 2012); Lorejn M. Lis, *Održavanje Tita na površini: Sjedinjene Države, Jugoslavija i Hladni rat*, (Beograd: BMG, 2003).
- 15 *Global Market Survey: Computers and Related Equipment*, U.S. Department of Commerce, October 1973, 132–138.

rely on Western licenses, cooperation agreements, and joint ventures, as strategic alliances between two or more business entities designed to share risks and rewards from newly established enterprises.¹⁶ Yugoslavia was the first among socialist countries that laid a legislative foundation for foreign investments in the form of joint ventures in 1967.¹⁷ This legislative transformation took place in the age of Yugoslav *market socialism* (1965–1975), a time when the focus was on the secondary and tertiary sectors and integration in the international division of labor.¹⁸ In Yugoslavia, the term *joint venture* was used for arrangements that resembled foreign investment in domestically owned entities, as defined by the law. In essence, joint ventures in Yugoslavia differed from the conventional Western understanding of the term that implied the creation of mixed enterprises.¹⁹ From the Yugoslav perspective, acquiring modern foreign technology was the main motive for participation in joint ventures.²⁰

This research shows that Ei-Honeywell partially achieved its goals. While computer production in Niš under a Honeywell license was successful, autonomous production, as an aim of Yugoslav enterprise, was not realized. Nevertheless, the knowledge transfer proved important for the expertise of Yugoslav managers and engineers not only for their performance within Ei-Honeywell but also for their future careers. On the other hand, the experience of this collaboration was important for the Yugoslav enterprise since it spurred domestic innovations. Although the joint venture failed to export computers to other countries, one of the goals of the U.S. partners, it successfully found a place in important Yugoslav institutions. Moreover, the political endorsement of this joint venture highlights its significance beyond mere business interests. Its operation reflects broader efforts to maintain a high level of U.S.-Yugoslav relations during the 1970s and 1980s, while simultaneously seeking to enhance economic cooperation between the two countries.

16 Geoffrey Jones, *Multinationals and Global Capitalism: From the Nineteenth to the Twenty-First Century*, (Oxford; New York: Oxford University Press, 2005), 214.

17 Emilija Cvetković, „Novi oblici ekonomske saradnje sa inostranstvom i (li) samoupravljanje: Institucionalni okviri zajedničkih ulaganja u Jugoslaviji tokom 1967. i 1968. godine”, *Značaj institucionalnih promena u ekonomiji Srbije kroz istoriju*, ur. Jelena Minović, Milica Kočović de Santo, Aleksandar Matković, (Beograd: Institut ekonomskih nauka, 2021), 216–217.

18 Zarko Lazarevic, “Foreign Investments and Socialist Enterprise in Slovenia (Yugoslavia): The Case of the Kolektor Company”, *Hungarian Historical Review* 3/2021, 558.

19 Đorđe Popov, *Zajednička ulaganja sa inostranim partnerima: dometi i realne mogućnosti*, (Zagreb: Informator, 1987), 35.

20 *Ibid.*, 95.

Where the Paths Meet: The Birth of a Joint Venture

There are multiple reasons why partners engage in joint ventures. After the 1960s, joint ventures became a common marketing strategy for multinational corporations seeking to expand into foreign markets. This form of economic cooperation was particularly effective in socialist countries, as it often succeeded in bypassing state-imposed barriers more effectively than foreign direct investments and facilitated technology transfer.²¹ Moreover, joint ventures often went beyond mere business transactions, evolving into long-term partnerships that played a political role, especially during the Cold War era, when such ties could serve as diplomatic tools between countries. Economic theory highlights that one of the key prerequisites for the establishment of a joint venture is mutual trust between the partners.²²

In the case of this joint venture, partners involved in the strategic alliance developed mutual trust based on their connections in the past. The U.S. company Honeywell²³ entered the Yugoslav market during the 1950s as an exporter of temperature and humidity control instruments through Merkantile, a Zagreb-based enterprise responsible for representing numerous foreign companies in Yugoslavia. At that time, the Yugoslav government expressed interest in establishing a joint venture with Honeywell Controlling System. However, this initiative has not materialized. According to the survey on the business operations with Yugoslav enterprises, Honeywell did not want to establish a joint venture in that field with Yugoslavia during the mid-1970s.²⁴ On the other hand, Honeywell demonstrated an interest in developing different forms of economic collaboration in the domain of computer manufacturing. Honey-

21 Qing Lu, “Bounded Reliability and the Termination of International Joint Ventures – Insights from the Mid-Med Bank, 1975–1979”, *Business History* 2/2019, 205.

22 Mark Casson, Marina Della Giusta, “Co-Operatives as Entrepreneurial Institutions”, *Entrepreneurship, Theory, Networks, History*, ed. Mark Casson, (Cheltenham: Edward Elgar, 2010), 182.

23 Honeywell was recognized for their heating systems in the first half of the twentieth century. This company played a significant role in the U.S. defense system during the Second World War. In the post-war period, the company’s production expanded to include equipment for space exploration, automatic control systems, and the manufacturing of electronic digital computers. Honeywell’s venture into the computer field officially began in 1955, when it entered a joint venture with the American company Raytheon. More on the Honeywell company history in: Jeffrey L. Rodengen, *The Legend of Honeywell*, (Ft. Lauderdale Fla: Write Stuff Syndicate, 1995).

24 Diplomatski arhiv Ministarstva spoljnih poslova Republike Srbije (DAMSP), 1974, Politička arhiva (PA), SAD, fascikla 120, dosije 3, pov. br. 452462, Američke kompanije o poslovanju sa Jugoslavijom, 23. 10. 1974.

well's partnership with the prominent Yugoslav enterprise, Electronic Industry (*Elektronska industrija*) in Niš began in 1971 when the Electronic Industry signed a technical cooperation agreement with the U.S. company and obtained a license to manufacture Honeywell computer components.²⁵

The export-oriented company Progres from Belgrade was the third partner in the joint venture. By the early 1970s, Progres had already established itself as the primary distributor of Honeywell's products in Yugoslavia.²⁶ However, the issue of mutual trust between the partners, as mentioned earlier, was put to the test due to Progres's reputation, since the company was well-known for re-exporting goods from developed economies to Eastern European and Non-Aligned countries. Despite the illegal nature of these activities, the Yugoslav government often tacitly supported them.²⁷ Legally, the Yugoslav Chamber of Commerce provided guarantees that U.S.-origin goods would not be re-exported,²⁸ but in certain gray areas, such activities still occurred. The U.S. government was informed that Progres had been re-exporting U.S. goods to the Soviet Union, with even some U.S. engineers reportedly involved in these operations.²⁹ This incident led to a cautious approach from the U.S. when considering export permits for Honeywell computers to Progres. Despite the controversy, the computers were eventually shipped to Yugoslavia via Progres and were even used by the Yugoslav Ministry of Interior Affairs.³⁰ Given the USSR's efforts to acquire Western technologies through non-CoCom countries such as Sweden, Austria, and Switzerland during the

25 „Saradnja sa ‚Hanivelom“, *Ekonomska politika*, 10. 3. 1971, 39.

26 Progres-Informatika was officially authorized to undertake the following activities in the name of the American company: “designing and implementing information systems within the operational structure, system analysis, development of programs for electronic data processing at the computing center, user training, expert consultations, provision of technical assistance, and servicing.” Arhiv Jugoslavije (AJ), fond 575, Savezni komitet za energetiku i industriju, fascikla 6, Dopis OOUR za informatiku Saveznom sekretarijatu za finansije, 4. 10. 1974.

27 Ognjen Tomić, “Examples of informal practices in Yugoslavia's trade relations with Italy in the 1960s and 1970s”, *Tokovi istorije* 3/2022, 177–188.

28 DASMP, PA, SAD, F–133, dosije 16, pov. br. 422094, Beleška sa sastanka između predstavništva PKJ i Američke ambasade, održanog 7. 4. 1976.

29 Ibid.

30 Department of State to Embassy Belgrade, Telegram 193354, August 4, 1976, 1976STATE193354, Central Foreign Policy Files, 1973–79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives and Records Administration (NARA) (accessed 22. 3. 2023).

CoCom restrictions,³¹ Progres's activities may represent a similar case of circumventing trade barriers.

Computers in Yugoslavia were used by domestic enterprises, educational institutions, commerce, state administration, and the finance sector.³² However, after the construction of CER computers, the aim to manufacture indigenous computers in Yugoslavia persisted. Contributions to the production of the CER family of computers in Serbia were made by the "Mihajlo Pupin" Institute, with additional computer developments in Croatia's "Ruđer Bošković" Institute and Slovenia's "Jožef Štefan" Institute.³³ Despite the promising technological features of these computers, the lack of state support for domestic computer development, combined with the decentralization of institutions that emphasized market orientation, disabled its possibilities for serial production of a larger scope. As Marko Miljković notes, that provided space for the foreign suppliers on the Yugoslav market.³⁴ In the 1970s, most imported computers in Yugoslavia were of U.S. origin. Although IBM was predominantly present in the Yugoslav market and even had its own general representative office,³⁵ Honeywell, as the second largest Yugoslav computer supplier³⁶ became the first manufacturer to engage in a joint venture with a Yugoslav enterprise in the field of computer production.

Dragan Miljković, the General Director of the Electronic Industry, and Dušan Petrović, Director of Progres, traveled to Honeywell's headquarters

31 Ángel Calvo, "Economy and politics in the embargo of high technology during the Cold War. The case of a semiperipheral country (Spain)", *International Journal of Humanities and Social Science (IJHSS)* 5/2018, 29.

32 According to the Statistical Office, in 1973, Yugoslavia had 500 general-purpose computers installed in 1973, which had increased to 1,000 by 1978. Based on the available data from 1973, this meant that there were only two computers per 10,000 inhabitants in Yugoslavia, whereas the developed countries had ten computers per the same number of inhabitants, highlighting Yugoslavia's large technological gap. Jovan Petrić, "The Utilization of Computer Based Information Systems in Yugoslavia – A Survey", *The Florida State University: Proceedings & Reports of Seminars and Research* 16/1984, 37.

33 Tara Maja Simonič, „Zgodovina osebnih računalnikov na Slovenskem: začetki zgodovine osebnih računalnikov v osemdesetih in danes“, (Diplomsko delo, Univerze v Ljubljani, Filozofska fakulteta, 2022), 24–25.

34 More in: Miljković, "CER Computers as Weapons of Mass Disruption: the Yugoslav Computer Industry in the 1960s", 99–123.

35 "Yugoslavia Discovers Computers", 23 April 1970. HU OSA 300–8–3–10476; Records of Radio Free Europe/Radio Liberty Research Institute: Publications Department: Background Reports; Open Society Archives at Central European University, Budapest. <http://hdl.handle.net/10891/osa:6a8be7d7-04d7-490c-8930-936092de79b1> (accessed 26. 6. 2023).

36 Computers and Related Equipment. United States: U.S. Government Printing Office, 1973, 132–137.

in Minneapolis in August 1978. They formalized the Yugoslav-American partnership in computer manufacturing by signing three key agreements: the Joint Venture Agreement, License Agreement, and Trademark and Name Agreement. Electronic Industry invested 63% within the Joint Venture Agreement, Honeywell 30%, and Progres-Informatika at 7% of capital.³⁷ Dušan Petrović's statements revealed that Honeywell permitted Ei-Honeywell to export computers and related equipment to new markets such as Eastern Europe, Asia, and Africa.³⁸ This intention provides clear insight into Honeywell's business strategy to increase collaborations with Third World markets, leveraging Yugoslavia's diplomatic and economic connections in these regions to introduce its computers and equipment, highlighting at the same time the U.S. political goals. Moreover, the fact that an enterprise with a problematic reputation such as Progres was still allowed to be part of the U.S.-Yugoslav joint venture is a significant indication of the prioritization of political motives for the expansion of economic collaboration over political ones. Additionally, this was another demonstration of the Yugoslav strategically important position within U.S. foreign policy.

At the time the joint venture contract was concluded, political relations between the U.S. and Yugoslavia presented a favorable precondition for the advancement of economic cooperation. According to Milorad Lazić's recent research, after a period of disruption in the early 1970s, the administration of Jimmy Carter began to appreciate Yugoslavia's global role. Lazić describes the "enormous self-confidence" of Yugoslav diplomacy during this time, as it successfully supported non-aligned countries, strengthened ties with China, and balanced relations between the Cold War superpowers.³⁹ This period of

37 Based on a review of the available correspondence between the U.S. Embassy in Belgrade and the State Department, it becomes evident that the leadership of the Socialist Republic of Serbia played an essential role in fostering the participation of Progres in this joint venture. According to the American perspective, this strategic move was driven by the need to reshape the negative narrative surrounding Yugoslav foreign trade organizations concerning their profit orientation and neglecting the state's interests. Embassy Belgrade to Department of State, Telegram 7860, September 7, 1978, 1978BELGRA06561, Central Foreign Policy Files, 1973-79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives and Records Administration (NARA) (accessed 18. 3. 2023).

38 Embassy Belgrade to Department of State, Telegram 7860, September 7, 1978, 1978BELGRA06561, Central Foreign Policy Files, 1973-79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives and Records Administration (NARA) (accessed 18. 3. 2023).

39 Milorad Lazić, *Unmaking Détente: Yugoslavia, the United States, and the Global Cold War, 1968-1980*, (Lanham; Boulder; New York; London: Lexington Books, 2022), 165-194.

U.S.-Yugoslav relations was marked by high-level visits, including Tito's visit to Washington in 1978. The joint statements made by Tito and Carter during this visit led to the creation of collaborative working groups at the governmental level, designed to enhance the level of economic cooperation in areas such as trade, industry, and technology transfer.⁴⁰ The level of political relations between the two countries was a crucial precondition for establishing a joint venture. That was also visible in the case of Romania's opening to the West, after Richard Nixon's visit coupled with the formation of the American-Romanian Economic Commission enabled the U.S. manufacturer CDC to successfully enter the Romanian market through a joint venture with a domestic enterprise in 1973.⁴¹

The U.S. support for the new Honeywell investment in Yugoslavia was also demonstrated in September 1978, when Lawrence Eagleburger, the U.S. Ambassador to Yugoslavia, visited the Electronic Industry, discussing "business cooperation between the Electronic Industry and related American firms".⁴² According to Yugoslav legislation regulating foreign investment in domestic labor organizations as of 1978, the U.S.-Yugoslav joint venture required approval of the republican, provincial, and federal institutions and the final confirmation from the central governing body, the Federal Energy and Industry Secretariat.⁴³ At the same time, Yugoslavia introduced a more restrictive and complex legal framework regarding investments in domestic enterprises, which resulted in a decreased interest among foreign companies.⁴⁴ In that sense, this particular joint venture presented a notable exception. On March 8, 1979, the agreement was officially registered in the Federal Energy and Industry Secretariat.⁴⁵ Additionally, the formation of this joint venture laid the foundation

40 DAMSP, 1979, PA, SAD, F-124, dosije 16, pov. br. 443404 Predlog o načinu rada Mešovutih jugoslovensko-američkih radnih grupa za razvijanje ekonomske saradnje, 6. 2. 1979.

41 Thad W. Simons Jr., "Trade-Most-Favored-Nation Status-The 1975 Agreement with Romania on Trade Relations", *Georgia Journal of International and Comparative Law* 6/1976, 585.

42 „Ambasador SAD u EI“, *Ei novine*, 30. 9. 1978, 1.

43 „Zakon o ulaganju sredstava stranih lica u domaće organizacije udruženog rada“, *Službeni list SFRJ*, br. 18/78

44 From 1968 to 1977, Yugoslavia registered 164 joint venture agreements, while from 1978 to 1984, only 89 such contracts were concluded. Mile Jović, "Joint venture business practice in former Yugoslavia – features and fact 1967–1990“, *Marketing: časopis Jugoslavenskog udruženja za marketing* 4/1992, 10; John R. Lampe, Russell O. Prickett, Ljubiša Adamović, *Yugoslav-American Economic Relations Since World War II*, (Durham; London: Duke University Press, 1990), 129–130.

45 AJ, 575–162, Saglasnost Saveznog komiteta za energetiku i industriju za uvoz opreme, 16. 11. 1979.

for another similar project of economic cooperation between the two countries. In 1980, Electronic Industry and U.S. company General Telephone & Electronics Corporation (GTE) initiated another joint venture.⁴⁶

*Building Bridges: The Path of Know-How Transfer
in Corporate Management*

According to the agreement, the management of the newly founded joint venture, Ei-Honeywell, was entrusted to a five-member board. For the understanding of the organization of the joint venture, as well as the interactions between the Yugoslav and U.S. sides, the interview with Slobodan Marinković, the first director of the Ei-Honeywell, who held that position for over 10 years, was crucial. This board consisted of two representatives from Electronic Industry and Honeywell, while Progres-Informatika held one position.⁴⁷ The carefully structured composition of the management board highlighted the significance of maintaining synergy and collaboration among all parties involved. The knowledge exchange between the managers from Niš and the managers from Honeywell also took place at the level of the board meetings. These meetings were held several times a year at various locations in the United States and Yugoslavia and served as a platform for planning future activities and evaluating the attainment of previous business goals.⁴⁸

Along with changes proclaimed in the Yugoslav Constitution of 1974 and the Law on Associated Labor of 1976, the self-management system and this joint venture entered a new phase. The aforementioned laws promoted the strengthening of self-management socialism through greater worker participation in the decision-making process and worker control over “social reproduction”.⁴⁹ In the specific context of Ei-Honeywell, these transformative changes manifested themselves in the establishment of the Basic Organization of Associated Labor (BOAL) in 1981, followed by the relocation of the new BOAL to a newly constructed building on the site of the Electronic Industry in

46 E. Milić, „Ugovor između GTE (SAD) i EI „Pupin: Digitalne telefonske centrale“, *Ei novine*, 23. 5. 1980, 1.

47 Embassy Belgrade to Department of State, Telegram 7860, September 7, 1978, 1978BELGRA06561, Central Foreign Policy Files, 1973–79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives and Records Administration (NARA) (accessed 18. 3. 2023).

48 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

49 Dejan Jović, *Jugoslavija – država koja je odumrla: uspon, kriza i pad Četvrtje Jugoslavije: (1974–1990.)*, (Beograd: Samizdat B92; Zagreb: Prometej, 2003), 208–209.

1982.⁵⁰ In addition to the development of the joint venture's autonomy within a framework of self-management, the education of Yugoslav managers represented a significant step in the transfer of Western-style management practices at this enterprise.

“Honeywell's desire, as well as ours, was to professionalize the management from the beginning,”⁵¹ explained Slobodan Marinković, describing the mutual need for knowledge transfer in the management sector that accompanied the arrival of the U.S. experts in Niš.⁵² The expertise of the American partner proved to be essential given the organizational changes that were taking place in the newly established organization. To manage these changes, interactive seminars were held for high-ranking executives of Ei-Honeywell in various cities in Yugoslavia. These seminars included lectures and case study discussions to enhance domestic managerial knowledge and skills. Additionally, the training of Yugoslav managers involved the participation of representatives from the American consulting company Arthur Andersen. Marinković highlighted the value of the knowledge he gained through training sessions conducted by this company, particularly in strategic planning and evaluations of the implemented plans, which proved beneficial for his career advancement in the late 1980s. Over time, these practices had the potential to influence broader changes in business operations and decision-making processes across the country, helping to modernize and professionalize management at various levels. Taking the initiative further to develop the essential qualities for his entrepreneurial journey, Marinković independently organized courses covering various aspects of management during his final years at Ei-Honeywell. These courses attracted more than 200 directors and managers from Niš, contributing to their professional growth.⁵³

Edson Spencer, the CEO of Honeywell, testified that the U.S. company opted for decentralized business operations by hiring local managers who understood their workforces' domestic corporate culture and dynamics. This

50 „Za brži razvoj računarske tehnike“, *Ei novine*, 17. 5. 1982, 1, 3.

51 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

52 They were instrumental in advancing the radio industry in Niš during this period, with 82.3% of the workforce in the factory's production and development departments being of German descent. Saša Ilić, *Stranci "gastarbajteri": strana stručna radna snaga u privredi Jugoslavije 1945–1950. godine*, (Beograd: Arhiv Jugoslavije, 2020), 381.

53 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

decentralized model was applied in Honeywell's subsidiaries in Italy, France,⁵⁴ and operations in Yugoslavia. Slobodan Marinković emphasized that each department within Ei-Honeywell was led by a manager from Yugoslavia, working closely with a foreign counterpart serving as their deputy.⁵⁵ Foreign experts were present in the joint venture's operation until the 1990s, enabling Ei-Honeywell managers to learn about organizational planning and strategy. During the late 1980s, the functions of Ei-Honeywell were structured around five distinct divisions: production, marketing, customer services, technical and developmental support, and economic affairs.⁵⁶ The organizational structure featured American experts as deputies in all the sectors except the quality control sector.⁵⁷ This practical arrangement reaffirmed Honeywell's commitment as a "technology exporter" to maintaining exceptional product quality. Furthermore, it showed how the American partner supported the control over the production process in the Yugoslav branch of the joint venture.

The transformation of the joint venture's structure reflected the need for continuous improvement in business practices. Initially, Progres-Informatika obtained the role of a passive observer in the joint venture. However, its role expanded, enabling it to contribute to marketing and offer valuable customer support services actively.⁵⁸ In 1986, the integration between Niš and Belgrade branches occurred, consolidating the production, sales, and services operations for Ei-Honeywell under the center in Niš.⁵⁹ According to Slobodan

54 Edson W. Spencer, Oral history interview with Edson W. Spencer, interview by James E. Fogerty, December 1, 2009, Minnesota Historical Society.

55 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

56 Jovica Cenić, „Razvoj proizvodnih linija od osnivanja OOUR-a „Ei-Honeywell“, *Praksa: jugoslovenska revija za informatiku i automatsku obradu podataka*, septembar-oktobar 1987, 3.

57 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

58 Embassy Belgrade to Department of State, Telegram 7860, September 7, 1978, 1978BELGRA06561, Central Foreign Policy Files, 1973–79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives and Records Administration (NARA) (accessed 18. 3. 2023).

59 S. R., „I za brži prodor u svet“, *Ei novine*, 26. 8. 1985, 2. According to Borivoje Špica, head of Progres-Informatika's information systems engineering department, the Belgrade firm collaborated with Honeywell's Italian division to assist customers who purchased Honeywell computer systems with hardware and software applications. Borivoje Špica's testimonies indicate the importance of political structures in positioning work organizations within the Yugoslavian system. Mirko Marjanović, the long-standing director of Progres, had a significant impact on the company's operations in the Yugoslav market: The authorized text of an interview with Borivoje Špica, owned by the author, November 2022.

Marinković, the U.S. partner in the joint venture, which was involved in numerous global integrations, wholeheartedly supported this integration in the Yugoslav context.⁶⁰ In addition to this internal integration, changes in the international computer industry market brought about changes in the operations of Ei-Honeywell, so the Yugoslav-American joint venture became Ei Bull HN.⁶¹

One of the indicators of Western influence in Yugoslavia was evident in marketing. Ei-Honeywell's economic propaganda, which was based on Western standards, showcased a solid commitment to advertising through computer magazines⁶² and presence in national and international exhibitions and fairs. Despite the economic stagnation in the 1980s, this emphasis on consumer culture and modernization conveyed a sense of affluence and progress in the country.⁶³ The joint venture functioned as a dynamic learning environment, in which formal and informal connections at the management level played a central role in knowledge transfer that went beyond individual contributions, becoming an integral part of the entire organization.⁶⁴ The impact of this knowledge transfer was visible through activities of unique educational centers in Belgrade and Izola, dedicated to training foreign and domestic users of Honeywell equipment.⁶⁵

Tracing the Path of U.S. Technology in the Yugoslav Factory

Rapid technological change in the computer industry required an active pursuit of knowledge and skills to remain competitive. The strengthening of the Yugoslav partner in the Ei-Honeywell joint venture was achieved through a learning process initiated by the U.S. company. In this transfer method, Yugoslav engineers were trained in the Honeywell U.S. facilities. Those trained engineers then transferred their skills and knowledge to local engineers and workers. Active participation in the learning process was essential for the "technology recipient". Based on the theoretical premises, the primary method of

60 The authorized text of an interview with Slobodan Marinković, owned by the author, December 2022.

61 In 1987, a joint venture was formed between the American *Honeywell*, the French computer giant *Bull*, and the Japanese electronics company *NEC*. After *Bull* took on a dominant role in that joint venture in 1989, the company was renamed *Honeywell Bull HN Information Systems*. „Decenija života i rada“, *Ei Bul HN Informator*, br. 1, 1. 5. 1989, 1.

62 *Računari*, jul 1984, 98; *Svet kompjutera*, jun 1985, 60; *Svet kompjutera*, januar 1987, 62.

63 Patric Hyder, *Bought and Sold: Living and Losing the Good Life in Socialist Yugoslavia*, (Ithaca; London: Cornell University Press, 2011), 102.

64 Andrew C. Inkpen, "Learning Through Joint Ventures: A Framework of Knowledge Acquisition," *Journal of Management Studies* 37/2000, 1024, 1031.

65 Stanko Stojiljković, „Evropski 'Ei-Honeywell'“, *Svet kompjutera*, april 1987, 21–22.

knowledge transfer is an imitation of successful models, often carried out by experts seeking new knowledge in a different environment.⁶⁶

The License Agreement outlined the precise procedures for technology transfer and knowledge exchange, laying the foundation for the production of Honeywell's Level 6 series computers, including successor models, serial printers, and video terminals in Yugoslavia.⁶⁷ This agreement was a milestone on the joint venture's path toward technological autonomy and reduced dependence on imports. The strategic plan for technological assimilation and computer system production unfolded through three phases, intending to achieve self-sufficiency. The initial phase began with producing essential components, encompassing meticulous mechanical assembly, thorough testing, and establishing reliable power sources. Building on this foundation, the second phase focused on the advanced development of printed circuit boards, their assembly, testing, and the production of assemblies from these components and modules. Finally, the third phase involved the manufacture of central processing units and video terminals, all of which were made from domestic parts.⁶⁸

The engineers of Ei-Honeywell had the opportunity to travel to the United States in smaller groups in search of necessary training and skill development. Available data indicate that by the mid-1980s, approximately 60 Yugoslav workers from Niš had the opportunity to spend time in the United States for training.⁶⁹ Miodrag Džunić, the former director of the Factory of Computing Machines, proudly stated in late 1979: "[...] you can find about twenty experts from the Factory of Computing Machines in the laboratories and production facilities of Honeywell. After completing their training and specialization, they will, alongside their colleagues who have already completed the training, transfer their knowledge to new colleagues and contribute to the realization of the first and subsequent phases of the production of the Ei-Honeywell 6 computers."⁷⁰

66 Timo Myllyntaus, "Technology Transfer and the Contextual Filter in the Finnish Setting. Transfer Channels and Mechanisms in a Historical Perspective", *Mastering Technology Diffusion – The Finnish Experienced*, eds. Synnöve Vuorija, Pekka Ylä-Anttila, (Helsinki: The Research Institute of the Finnish Economy, 1992), 207–223.

67 Jovica Cenić, „Razvoj proizvodnih linija od osnivanja OOUR-a Ei-Honeywell“, *Praksa: jugoslovenska revija za informatiku i automatsku obradu podataka*, septembar-oktobar 1987, 4.

68 Stanko Stojiljković, „Evropski 'Ei-Honeywell'“, *Svet kompjutera*, april 1987, 21–22.

69 „Ei Honeywell računari“, *Svet kompjutera*, maj 1985, 56–57.

70 „Kompjuteri EI-Honeywell“, *Ei novine*, br. 175, 26. 11. 1979, 1, 3.

In the late 1970s, Dušan Veljković,⁷¹ an engineer at Ei-Honeywell, underwent a six-month training program in Boston. He led a group of around 15 engineers from the Niš factory. The training included studying extensive technical documentation in English to understand Honeywell's hardware and software. Through hands-on work with a mentor from the U.S. Honeywell facility, they were to be equipped with the necessary skills upon their return to Niš.⁷² Veljković's team focused on troubleshooting and repairing complex printed circuit boards in computers. He emphasized the importance of concise presentation skills, a hallmark of "American business." However, Veljković was critical of the mentoring program's impact on Yugoslav engineers, believing it didn't significantly contribute to their technical knowledge given their existing expertise.⁷³

The first phase of domestication of production, which focused on the training of engineers and the repair of electronic printed circuit boards, was completed in the third quarter of 1980. The following step was aimed at reducing dependence on foreign partners, by involving using more computer components, some of which were less assembled, and by importing untested printed circuit boards from the U.S., now processed by trained Yugoslav engineers. In particular, the production of such complex printed circuit boards with four-layer printing was rare in Yugoslavia. In that sense, the license from Honeywell to manufacture these boards was a significant success for the joint venture due to their technological specificity. In addition, various computer components like metal and plastic parts, cables, and power sources were manufactured locally in Niš, which was another contribution to Yugoslav produc-

71 Dušan Veljković, a successful entrepreneur now based in Canada, began his career as an engineer in the electronics industry. After working at the Television Factory, he transitioned to the Factory of Computing Machines and later led the testing team for the newly formed Ei-Honeywell joint venture in Boston. Upon returning to Niš, he was appointed manager of the Test and Repair sector, which eventually evolved into the Development and Special Projects sector.

72 In knowledge management theories, "tacit" knowledge is acquired through direct communication, mentoring, and hands-on experience, focusing on practical skills and know-how. Mentors are essential in passing on their experience, habits, and nuanced insights that are difficult to articulate in writing, making this knowledge highly valuable and challenging to convey through other methods. Andrea Pozzali, Riccardo Viale, "Cognition, Types of "Tacit Knowledge" and Technology Transfer", *Cognitive Economics: New Trends (Contributions to Economic Analysis, Vol. 280)*, eds. Richard Topol, Bernard Walliser, (Bingley: Emerald Group Publishing Limited, 2006), 209.

73 The authorized text of an interview with Dušan Veljković, owned by the author, November 2022.

tion.⁷⁴ This exemplified how the transfer of U.S. technology within the joint venture increased the productivity of the entire Yugoslav enterprise.

Throughout its existence, Ei-Honeywell primarily focused on the licensed production of computers. Alongside the Level 6 model, the Ei-Honeywell production line included various models such as the 16-bit DPS 6 mini-computer and the 32-bit DPS 6 supermini-computers, as well as the DPS 7 and DPS 8 medium-sized computers as well as personal computers.⁷⁵ In the 1980s, U.S. reports highlighted the importance of the Electronic Industry, which operated under Honeywell's license, and Slovenian company Iskra Delta, which produced computers using a license from another U.S. firm, Digital Equipment Corporation (DEC). Nevertheless, according to this source, domestic producers were able to meet only 20% of Yugoslavia's computer needs.⁷⁶

The resulting difficulties in the Yugoslav economy were also visible in the functioning of the joint venture. Namely, its production outcomes fall significantly below expectations. By the start of 1981, it was projected that the organization, employing 136 workers, would produce 130 computer systems, with 100 destined for the domestic market and 30 for foreign markets.⁷⁷ However, this optimistic forecast proved unrealistic, and only 65 units were delivered to customers by the end of 1981.⁷⁸ The problem in purchasing computer parts and equipment due to currency shortages persisted, causing delays in delivering final computer systems to end-users. The repercussions of the crisis were evident for the foreign partner as well. In 1980, Harry Sweatt, Honeywell's highly positioned representative, expressed apprehensions about the venture's profitability to Yugoslavia's ambassador in Washington, Budimir Lončar.⁷⁹ Soon, this predicament was resolved when the Electronic Industry secured the necessary funds for purchasing the U.S. equipment through the intervention of the Federal Energy and Industry Secretariat. This situation highlights the importance of Ei-Honeywell in maintaining the reputation of Yugoslav en-

74 Jovica Cenić, „Razvoj proizvodnih linija od osnivanja OOUR-a „Ei-Honeywell“, *Praksa: jugoslovenska revija za informatiku i automatsku obradu podataka*, septembar-oktobar 1987, 5.

75 „Ei Honeywell-rešenje za vrhunski rezultat“, *Svet kompjutera*, maj 1986, 2; Slobodan Radić, „Ei-Honeywell PC“, *Praksa: jugoslovenska revija za informatiku i automatsku obradu podataka*, septembar-oktobar 1987, 15–16.

76 Country Market Survey: United States: Department of Commerce, Domestic and International Business Administration, Bureau of International Commerce, 1984, 8.

77 T. S., „Za kupce 65 sistema“, *Ei novine*, 2. 4. 1982, 5.

78 „130 sistema Ei-Hanivel“, *Ei novine*, 23. 1. 1981, 6.

79 DAMSP, PA, SAD, F-133, dosije 29, pov. br. 454727, Telegram ambasade SFRJ u Vašingtonu, broj 774, 9. 10. 1980.

terprises among potential U.S. investors interested in entering the Yugoslav market. This was particularly crucial as the U.S.-Yugoslav joint venture on Krk, the largest U.S. investment in Yugoslavia, was nearing its termination.⁸⁰

Ei-Honeywell was persistent in its efforts to become a recognizable company, mainly through the export-oriented approach of computer systems, which would enable the enterprise to access foreign currency funds. However, the Slovenian company Iskra Delta, the main competitor to Ei-Honeywell in the domestic market, was a far more successful Yugoslav computer manufacturer in an international context.⁸¹ Ei-Honeywell had some success in selling electronic boards manufactured in Italy.⁸² Moreover, Ei-Honeywell negotiated computer exports and even explored establishing joint ventures with Kuwait⁸³ and India.⁸⁴ Unfortunately, due to a lack of adequate corporate records, it is difficult to fully assess the scope of Ei-Honeywell's export activities. However, based on interviews with individuals involved in the joint venture's sales operations, it is evident that these export activities remained marginal.⁸⁵ This suggests that one of the primary goals set by Honeywell - expanding into foreign markets was ultimately unsuccessful.

Besides the licensed production, within the newly constructed building that opened in 1982, Ei-Honeywell aimed for increased domestic production. Imported equipment, such as dip soldering machines and systems for washing printed circuit boards, enabled the installation of "one of the most modern lines for the complete soldering process of high-quality, complex, double-layered, and multilayer electronic printed circuit boards".⁸⁶ In an effort to domesticate production, Yugoslav engineers attempted to produce multilayer printed circuit boards for computers independently of their U.S. partner. According to Dušan Veljković's account, these boards were eagerly sent to Honeywell experts for technical evaluation. However, it quickly became apparent that the domestic product was of inferior quality, making plans to sell Yugo-

80 Емилија Цветковић, „Између економије и политике: Дау кемакал у социјалистичкој Југославији“, *Наслеђе Андреја Митровића*, ур. Немања Радоњић, (Београд: Филозофски факултет, 2024), 256–258.

81 More on the history of *Iskra Delta* in: Janez Škrubej, *The Cold War for Information Technology: The Inside Story*, (Huston: Strategic Book Publishing, 2012).

82 „30 računara za Italiju“, *Ei novine*, 23. 1. 1981, 5.

83 Računari za Srednji Istok, *Ei novine*, 26. 8. 1983, 1.

84 S. R., „Ei Hanivel na tržištu Indije“, *Ei novine*, 22. 9. 1986, 3.

85 The authorized text of an interview with Slobodan Marinković, Niš, 21. 12. 2022; The authorized text of an interview with Dragan Milosavljević, Niš, 22. 12. 2022.

86 „U martu nova linija“, *Ei novine*, 28.1. 1983, 5; N. T., „Znatno veći dohodak“, *Ei novine*, 26. 8. 1983, 5.

slav-printed circuit boards on the U.S. market unfeasible.⁸⁷ This story reflects both the hopes and setbacks of the Electronic Industry's ambitions in domestic production of advanced electronic components. While the company succeeded in independently producing televisions and achieved success in manufacturing micro-computers for automated data processing under a German Kienzle license, it faced significant obstacles when it came to producing more complex computer components. A similar situation occurred in Bulgaria's computer industry. Although Bulgarian printed circuit boards were of better quality than those produced by the Soviets, they still fell short of the standards set by U.S. manufacturers like Control Data Corporation (CDC). As Victor Petrov highlights, the Bulgarian enterprise IZOT, a supplier for CDC, opted to focus on producing less complex components, such as disc parts, recognizing the limitations of their technology in meeting the high-quality demands for more complex elements like printed circuit boards.⁸⁸

*Empowering Workplaces: Joint Venture's Influence
on Domestic Environment*

The number of employees at Ei Honeywell demonstrated its impact on the Yugoslav economy. Initially, Ei-Honeywell had a workforce of approximately 60 employees. However, by 1989, Ei Bul HN had grown substantially, having nearly 800 employees working in Niš and Belgrade.⁸⁹ This flourishing organization took immense pride that 52% of its employees held a higher education degree, showcasing their commitment to excellence and technical expertise. Throughout its existence, Ei-Honeywell represented an attractive employment opportunity for workers, mainly due to the possibilities of direct collaboration with Honeywell. Engineer Dušan Veljković recalled how the cooperation with the U.S. partner and the chance to work with cutting-edge technologies were highly welcomed among Electronic Industry employees.⁹⁰

Ei-Honeywell's most significant contribution was visible in terms of the computerization of Yugoslav institutions. According to data from 1989, Ei-Honeywell delivered around 800 computers to various Yugoslav institu-

87 The authorized text of an interview with Dušan Veljković, owned by the author, November 2022.

88 Petrov, *Balkan Cyberia: Cold War Computing, Bulgarian Modernization, and the Information Age behind the Iron Curtain*, 86, 281–282.

89 „Decenija života i rada“, *Ei Bul HN Informator*, br. 1, 1. 5. 1989, 2.

90 The authorized text of an interview with Dušan Veljković, owned by the author, November 2022.

tions from other sectors.⁹¹ Analysis of Ei-Honeywell's advertisements shows that among users of these computer systems were important Yugoslav institutions, such as the Yugoslav People's Army, the "Mihajlo Pupin" Institute, Tanjug, the Federal Executive Council, Generalexport, the national banks of federal republics and provinces, as well as many others.⁹² Although Honeywell did not fully achieve its broader goal of penetrating international markets beyond Yugoslavia, its successful sales to these important Yugoslav institutions fostered closer ties between the company and the country.

The emergence of domestic innovations was the crucial point at which the influence of American technologies became apparent. Some of the innovations proved to be essential for domestic users of computers. Dušan Veljković highlighted the role of Ei-Honeywell engineers who independently developed software used by the Yugoslav People's Army within military repair centers. This group of engineers developed software for managing the procurement and production of aircraft engines. After receiving approval from Honeywell, this software, created on an U.S. computer system, was sold to other military repair facilities in the Yugoslav republics.⁹³ Ei-Honeywell also made a significant contribution by producing software solutions tailored to meet the needs of its customers. Within Ei-Honeywell's product range, one could find systems for office automation (*Automatizacija poslovnih sistema* – AOS), an interactive accounting system (*Interaktivni knjigovodstveni sistem* – IKS), and procedures used in library institutions (*Informacioni bibliotečki sistem* – INFOLIB). The convenience of using these computers was evident, as they could be purchased for dinars.⁹⁴

The management of the Niš-based company was focused on enhancing research and development activities during the second half of the 1980s.⁹⁵ Ei-Honeywell aimed to modernize its licensed products and meet customer demands with specialized items. This program included the development of video terminals, components for communication systems, and parts for computer networks. Starting in 1982, Ei-Honeywell entered into a partnership with a television manufacturing factory of the Electronic Industry, produc-

91 Т. Брзаковић, „Стално у функцији корисника“, *Еи новине*, 31. 3. 1989, 4.

92 Тихомир Станчевић, „Танјуг computer news“, *Свет компјутера*, октобар 1986, 19–20; Томислав Брзаковић, „Ослонац – домаћи рачунари: Делегација ЈНА у посети ЕИ“, *Еи новине*, септембар 1987, 3; *Свет компјутера*, новембар 1986, 66.

93 The authorized text of an interview with Dušan Veljković, owned by the author, November 2022.

94 Reklama, *Svet kompjutera*, avgust 1985, 60.

95 „Uz licencu i vlastiti razvoj“, *Ei Bul HN Informator*, br. 2, 3. 3. 1990, 10.

ing computer system monitors. Although some parts were imported, the use of local materials reduced the need for imports. These monitors also attracted interest from Poland,⁹⁶ but serial production remained limited despite this initiative. Ei-Honeywell expanded its activities by producing domestic video terminals. These terminals, which were widely used in computing during the 1970s,⁹⁷ were subjected to a comprehensive analysis by Ei-Honeywell's expert team. The analysis foresaw the creation of new job opportunities, a critical development given the increasing unemployment trend in Yugoslavia.⁹⁸ Moreover, from a strategic perspective, the move towards producing their video terminals aimed to reduce import dependency, resulting in savings in foreign currency for the Yugoslav enterprise. Following the commencement of video terminal production, Ei-Honeywell opened 50 new jobs, demonstrating the tangible benefits of this expansion.⁹⁹

At Ei-Honeywell, special attention was paid to outstanding domestic innovators, and the management felt that employees whose contributions were great should be appropriately incentivized. In the Special Projects Department of Ei-Honeywell, a program was developed to enable real-time tracking of sports results. Thanks to the development of this project, Ei-Honeywell computers were even used for statistical data processing during the games of the Yugoslav national basketball team at the 1987 European Championship.¹⁰⁰ Todor Stanković, a master of technical sciences, authored a system for selling tickets, which he further developed with colleagues from Ei-Honeywell. His project, initially called ORIENT, was recognized by Ei-Honeywell, and the company supported its production and distribution.¹⁰¹ The system for producing train tickets at railway stations found its way onto the international mar-

96 N. T., „Domaći monitori za računarsku tehniku“, *Ei novine*, 22. 11. 1985, 7.

97 The use of video terminals in computing coincided with the transition to computer systems based on “time-sharing,” which allowed multiple users to access the system simultaneously. Video terminals gradually replaced punched cards. Harry Henderson, *Encyclopedia of Computer Science and Technology*, (New York: Facts on File, 2009), 474, 475.

98 Unemployment in Yugoslavia was 5% in 1952, but increased significantly to 17% in 1988. Susan L. Woodward, *Socialist Unemployment: The Political Economy of Yugoslavia, 1945–1990*, (Princeton; New Jersey: Princeton University Press, 1995), 191.

99 Zoran Stojanović, „Razvoj i proizvodnja videoterminala“, *Praksa: jugoslovenska revija za informatiku i automatsku obradu podataka*, septembar-oktobar 1987, 11.

100 Vule Žurić, „Kako su kompjuterski majstori iz Niša preko Krešimira Čosića zauvek promenili način na koji se igra i gleda košarka“, <https://oko.rts.rs/sport/4936931/kako-su-kompjuterski-majstori-iz-nisa-preko-kresimira-cosica-zauvek-promenili-nacin-na-koji-se-igra-i-gleda-kosarka.html> (Accessed 10. 9. 2022).

101 N. T., „Domaći patent (i autor) između podrške i saplitanja“, *Ei novine*, 3. 2. 1984, 6.

ket and aroused the interest of Polish and Czechoslovakian users.¹⁰² Another interesting project by Ei-Honeywell was presented in 1986 when electrical engineer Andro Mošić combined his passion for chess with his technical skills and created a model of an electronic chessboard DEMOS.¹⁰³ Despite these enthusiastic projects proving the creativity and skills of Yugoslav engineers, their impact on the non-Yugoslav markets remains marginal.

Summary

According to the suggested stages of technology transfer, the *decision* to form the Ei-Honeywell joint venture in 1978 initiated a collaborative learning process at both managerial and technical levels. This led to the successful *acquisition* and application of licensed technology, evident in the production of computers and peripheral devices for Yugoslav institutions. However, the domestic production of complex computer components—a key goal for the Yugoslav partner—was never fully achieved. While there were notable *innovations* initiated by individuals, particularly in software development, these achievements were primarily limited to local users. The broader *diffusion* of these innovations remained limited, reflecting the importance of the contextual dimension of technology transfer, as Beaty has emphasized. Despite Yugoslavia's early successes in computing, such as the production of the CER digital electronic computer, the country remained unable to overcome institutional challenges and economic limitations, particularly in the 1980s, at the time of the economic crisis when issues with imported materials occurred. Besides the perspective that highlights the Ei-Honeywell as a framework for the technology transfer process, this joint venture was significant in terms of broader U.S.-Yugoslav relations. From this perspective, the Ei-Honeywell was important in reinforcing bilateral economic ties, particularly following the cessation of the Dow Chemical investment in Yugoslavia. Moreover, this case study offers insights into the dynamics and complexities of broader transnational economic collaborations during the Cold War.

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Резиме

Емилија Цветковић

ТРАНСФЕР РАЧУНАРСКИХ ТЕХНОЛОГИЈА У ОКВИРУ
АМЕРИЧКО-ЈУГОСЛОВЕНСКОГ ЗАЈЕДНИЧКОГ
УЛАГАЊА "ЕИ-ХАНИВЕЛ"

Апстракт: Овај рад испитује трансфер рачунарске технологије у оквиру америчко-југословенског заједничког улагања. Као пример јединственог облика економске сарадње између социјалистичких предузећа и западних корпорација, *Еи-Ханивел* је основан 1978. године. Заједничко улагање је укључивало *Ханивел* и југословенска предузећа, *Електронску индустрију* из Ниша и *Прогрес* из Београда, фокусирајући се на производњу рачунара и њихових периферних делова. На темељу анализе фабричких публикација, архивских докумената и интервјуа, истраживање је показало да југословенско предузеће, упркос инвентивности подстакнуте овом сарадњом, није успело да достигне потпуно аутономну производњу без коришћења *Ханивелове* лиценце. Такође, ово заједничко улагање представља још један ниво југословенско-америчких односа, илуструјући напоре за унапређење комерцијалне сарадње између две земље у време Хладног рата.

Кључне речи: трансфер технологије, рачунари, заједничка улагања, социјалистичка Југославија, Сједињене Америчке Државе, Хладни рат

Према предложеним фазама преноса технологије, одлука о формирању заједничког улагања *Еи-Ханивел* 1978. године покренула је процес заједничког учења, како на нивоу менаџмента, тако и на техничком нивоу. Ово је довело до успешног усвајања и примене лиценциране технологије, што се огледало у производњи рачунара и периферних уређаја за југословенске институције. Ипак, домаћа производња сложених рачунарских компоненти као један од кључних циљева југословенског партнера никада није у потпуности постигнута. Упркос значајним иновацијама појединаца, посебно у развоју софтвера, ова достигнућа била су углавном ограничена на локалне кориснике. За разумевање ограниченог домета фазе дифузије иновација важно је, како наглашава Бити, осврнути се на контекстуалну димензију трансфера технологија. Упркос раним успесима Југославије у области рачунарства, као што је производња ди-

гиталног електронског рачунара ЦЕР, она није успела да превазиђе институционалне изазове и економска ограничења, посебно осамдесетих година, у време економске кризе и проблема са увозом материјала. Поред перспективе која истиче *Еи-Ханивел* за трансфер технологије, ово заједничко улагање је било значајно у контексту ширих односа између САД и Југославије. У том смислу, *Еи-Ханивел* је био важан за јачање билатералних економских веза, нарочито по окончању инвестиције *Дау кемикала* у Југославији. Поред наведеног, ова студија случаја пружа увид у динамику и сложеност шире, транснационалне економске сарадње током Хладног рата.