

Vanguard of National Development: Key punch Operators and the Gendered Dimensions of Early Computing in South Korea*

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Introduction

On November 15, 1972, the *Dong-A Ilbo* launched a serialized feature titled “Unusual Exports,” which began with an article highlighting the advancements in “computer utilization.” Opening with the striking headline, “Dollars Pouring from Every Key punch Hole,” the piece described a small office, barely 33 square meters, located in Pil-dong, Seoul, where “delicate hands tap briskly on key punch machines like swallows in flight.” The journalist observed that “even the noise transforms into a melody, and with that melody, dollars cascade in.” The story focused on the Korea Computer Center (KCC), established in 1967, which had begun offering key punch services to clients in the United States and Japan. The business model was lucrative yet straightforward: blank tapes purchased for \$15 were encoded with client data and sent overseas, earning between \$2,000 and \$3,000 per tape. It was, quite literally, a business where foreign currency “poured in” in proportion to the number of holes punched. While the article noted specific challenges, such as underpricing by some domestic firms and the manipulation of foreign intermediaries, it concluded with an optimistic message, framing these services as a promising way of “showcasing the intelligence of the Korean people” to the world.¹

Key punching was a method used to input data into early computers. Optical readers would scan the holes into cards or tapes to process the data, making key punching one of the most basic steps in data processing. A standard punch card measured 187.32mm in width and 92mm in height, arranged in 80 columns and 12

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¹ “Unusual Exports: (1) Computer Utilization Technology 이색수출: (1) 컴퓨터 이용 기술,” *Donga Ilbo*, 1972. 11. 15.

rows. The work of keypunch operators consisted of two stages: punching, which involved translating handwritten lists or tables into holes on punch cards or tapes, and verifying, ensuring that the data were punched correctly in the designated locations. In the early 1970s, keypunch services for overseas clients in the United States and Japan emerged as a thriving export sector in South Korea, sustaining momentum for roughly five years. As a critical component of early computing systems, keypunch services were once grouped with programming under the broader category of the “software industry” that was anticipated to generate foreign currency. The category outlived both the machines and their operators, becoming the cornerstone of the nation’s technological ambitions for decades to come.

This essay’s focus on keypunch services in South Korea reflects the broader shift in computing historiography beyond its traditional Anglo-American emphasis.² Recent scholarship portrays computers and related technologies as products of a technocratic vision aimed at making the state more legible, connected, profitable, and defensible, a vision often advanced through the contributions of key actors from the West or the Global North. Across various geographies, computers have assumed distinct sociocultural meanings and purposes, shaped by diverse histories and national interests. More specifically, studies that focus on the transnational information technology economy—whether analyzing offshore manufacturing in Taiwan or outsourced software services in India—have scrutinized the global circulation of technology, challenging essentialist claims about computing practices that are purportedly unique to specific nations.³ Historian Honghong Tinn, in particular, argues that the Taiwanese practice of “tinkering” became central to its computing industry not because of any innate national trait, but as a contingent outcome of the island’s specific geopolitical context. Her work details the active roles of the Taiwanese government, academia, and industry, including the factory workers who have largely been left invisible in official documents, showing how these historical actors secured Taiwan’s place in the globalized technological landscape.⁴ In a similar vein, this essay connects South Korea’s keypunch industry with the global phenomenon of outsourcing data-processing labor, arguing that its computing practices were shaped by the alignment and tensions between local conditions and global demand.

² Eden Medina, *Cybernetic Revolutionaries: Technology and Politics in Allende’s Chile* (Cambridge, MA: MIT Press, 2011); Benjamin Peters, *How Not to Network a Nation: The Uneasy History of the Soviet Internet* (Cambridge, MA: MIT Press, 2016); Corinna Schlombs, *Productivity Machines: German Appropriations of American Technology from Mass Production to Computer Automation* (Cambridge, MA: MIT Press, 2019).

³ Honghong Tinn, *Island Tinkerers: Innovation and Transformation in the Making of Taiwan’s Computing Industry* (Cambridge, MA: MIT Press, 2025); Dinesh C. Sharma, *The Outsourcer: The Story of India’s IT Revolution* (Cambridge, MA: MIT Press, 2015).

⁴ Tinn, *op. cit.*

Histories of computing in South Korea, especially during its early stages, have primarily been written by, or focused on, the pioneering individuals who introduced these technologies to what was often referred to as the “Computer Barren.”⁵ Existing narratives emphasize the contributions of bureaucrats, businessmen, scientists, and engineers—the so-called “prophets of computing”—who played key roles in importing and developing these systems since the 1960s.⁶ Sangwoon Yoo and Dongwon Jo’s study of Ki Dong Kang, founder of Hanguk Semiconductor in the 1970s, follows a similar path but is notable for situating Kang’s career within a broader informal technological culture. By tracing his participation in an amateur radio hobbyist circle in the 1940s and 1950s, they link the formal history of the semiconductor industry to the less institutionalized practices in postwar Korea. Their work thus illuminates the historical contexts since the Korean War that underpinned the rise of South Korea’s high-tech semiconductor industry.⁷ Focusing on the emergence of keypunch service exports, this essay aims to expand on what remains implicit in these studies by demonstrating how computing technologies acquired unique sociocultural meanings within South Korea’s specific historical and developmental context.

This essay argues that the export of keypunch services provides a compelling case for exploring how computing technologies were integrated into the state’s modernization and economic development initiatives through their practical functions and symbolic significance. As in Chihyung Jeon’s analysis of the Gyeongbu Highway, where artifacts and discourses articulated one another to produce the “road to modernization,” we are able to observe similar dynamics in the rhetoric and practices surrounding the keypunch machines, along with other

⁵ The phrase “Computer Barren 컴퓨터 불모지” was frequently used by South Korean computer pioneers in their interviews and autobiographies to underscore their roles in laying the groundwork for the introduction of computers and related infrastructure into the country. Hyunjin Seo, *The First Written History of Computing in Korea* 처음 쓰는 한국 컴퓨터사 (The Electronic Times, 1997); Ki Soo Sung, *Anthology of Uigu Dr. Sung Ki Soo’s 60th Birthday Celebration* 의구정기수박사 회갑기념집 (High Tech Information, 1993); The Editorial Committee for the 50-Year History of the Electronics Industry, *50 Years of Miraculous Times: 1959-2009, The 50-Year History of South Korea’s Electronics Industry* 기적의 시간 50: 1959-2009, 대한민국 전자산업 50년사 (The Electronic Times, 2009); Ju-yong Lee, *My Life with Computers for Half a Century* 반세기 컴퓨터와 함께한 나의 인생 (The Electronic Times, 2007).

⁶ I borrow the term “prophets of computing” from the book edited by Dick van Lente. The book traces how computing technologies were spread across thirteen different countries, including South Korea, with the guide of each prophet, who “created public awareness of computers and shaped the way they were understood in society.” See Dick van Lente “Introduction: Prophets and Narratives,” in Dick van Lente eds. *Prophets of Computing: Visions of Society Transformed by Computing* (New York: Association for Computing Machinery, 2022), 3.

⁷ Sangwoon Yoo and Dongwon Jo, “From Walkie-talkie to Radio Receiver: An Entangled History of Electronic Technological Culture and the Beginning of Semiconductor Industry 무전기에서 라디오로: 전자 기술 문화와 반도체 산업 발단의 착종사,” *The Korean Journal for the History of Science* 한국과학사학회지 47:3 (2021), 557-600.

components of the computer system, which were envisioned to “build a nation and organize a society” by processing data and generating foreign income.⁸ The computer indeed provided no such magnificent spectacle as the one that was given to and by the highway. Instead, the rows of young women seated in front of keypunch machines, as featured in newspapers and promotional materials, and the very idea of large, heavy, and intelligent mainframes installed in isolated computer rooms of various organizations conveyed a collective sense of progress by bringing efficiency and rationalization to the nation. Both the people and the machine rendered data processing legible and photogenic, transforming keypunch work into a visible and symbolic site where labor and technology intersected in the service of modernization.

This essay’s focus on the depiction of female keypunch operators as the vanguard of national development adds another dimension to the gendered history of computing. Historians have shown how the British government “programmed” the computing industry to exclude trained women and how Taiwanese female factory workers were never granted the opportunity to begin their own electronic manufacturing businesses.⁹ While sympathetic to these studies, this essay highlights that computerization gained legitimacy by mobilizing women within local discourses, such as the “modernization of the fatherland” and “economic self-reliance.” As sociologist Seungsook Moon argues, these discourses depended on mass mobilization of the populace through a hegemonic understanding of the “proper places” of women and men.¹⁰ The problem was not only that computing labor was gendered, but that the state’s modernization project itself relied on and reinforced gendered divisions as part of its developmental strategy.¹¹ Building on this perspective, I argue that the gendered structure of Korean modernity was deeply entrenched in the female-dominant keypunch service industry, which embodied both the promises and the lived realities of modernization.

This essay begins with the introduction of keypunch machines in 1961 to handle the 1960 Population and Housing Census, which laid the foundation for long-term

⁸ Chihyung Jeon, “A Road to Modernization and Unification: The Construction of the Gyeongbu Highway in South Korea,” *Technology and Culture* 51:1 (2010), 58.

⁹ Marie Hicks, *Programmed Inequality: How Britain Discarded Women Technologists and Lost its Edge in Computing* (Cambridge, MA: MIT Press, 2017); Tinn, *Island Tinkerers*, 157-190. For insights into how gender shaped the culture of computing, see Janet Abbate, *Recoding Gender: Women’s Changing Participation in Computing* (Cambridge, MA: MIT Press, 2012).

¹⁰ Seungsook Moon, *Militarized Modernity and Gendered Citizenship in South Korea* (Durham: Duke University Press, 2005), 2.

¹¹ Hyun Mee Kim, “Modernity and Women’s Labor Rights in South Korea 한국의 근대성과 여성의 노동권,” *Journal of Korean Women’s Studies* 한국여성학 16:1 (2000), 37-64; Chun-soo Kim, “The State’s Strategies of Excluding Women in the 1960s and 1970s: Focusing on Technical Education and Training 1960~70년대 국가의 여성배제 전략: 기술 교육 훈련을 중심으로,” *The Journal of History* 역사연구 12 (2003), 69-107.

economic development plans. It highlights both the praise and the precariousness of keypunch work at the Statistics Bureau, where hundreds of women were hired but soon lost their jobs when the leased keypunch machines were returned after the census data processing was completed. The following sections focus on the emergence of keypunch service exports to the United States and Japan since the late 1960s as a critical component of computerizing the nation. Keypunch operators were celebrated for producing visible and tangible results that could advance the nation by generating foreign exchange. In this process, keypunch work was feminized to demand compliant and meticulous workers with nimble hands, encouraging more women to join the workforce. I conclude by highlighting the harsher reality of their working conditions, which only began to draw scholarly attention as the export industry declined. Pride and discontent coexisted in a state of ambivalence that not only shaped the technological experiences of keypunch operators but also crystallized into the very logic of South Korea's economic development and modernization.

Keypunch Operators in the “Computing Barrens”

The punch card system was already in use in South Korea well before the government's official introduction of electronic computers in 1967. The Economic Planning Board adopted IBM punch card systems, specifically the IBM 101 and IBM 604, to process data from the 1960 Population and Housing Census conducted in December.¹² It comprised a total of 163 machines, including punchers and verifiers.¹³ A substantial shipment of the equipment arrived in March 1961, but clearance of funds was delayed due to the turbulent political climate surrounding the May 16th Military Coup. It was not until the end of June 1961 that the funds were released, and most of the equipment finally reached the warehouse in Seoul. Once in operation, the Korean Data Processing Center, established under the Bureau of Statistics of the Economic Planning Board, became both a foundation for elevating the Korean government's administrative capacity and a showcase for its technological

¹² “The National Census is Underway: Sorting and Tabulating the Cards 이렇게 진행되고 있다 <국세조사> 카드 정리 집계,” *Kyunghyang Shinmun*, 1962. 4. 28.

¹³ The principal operating unit would be composed of five multi-purpose statistical tabulating and sorting machines, “for which there is no direct counterpart for speed, accuracy and efficiency in equipment of any other manufacture.” Other machines included in the system would be 76 punches, 45 verifiers, 16 sorters, 3 accumulating tabulators, 8 reproducers, 2 collators, and 8 summary punching machines. Surveys & Research Corporation, *The Korea Statistics Project, April 23 1958 – May 31 1963*, (Surveys & Research Corporation, n.d.), 37-8.

ambitions.¹⁴

Early computers were introduced in developed nations since the early 20th century, where they were employed to support national governance. As historian of computing Jon Agar illustrates in *The Government Machine*, the British government's capacity developed alongside its recognition of the importance of statistics and information, as well as its adoption of office machinery and computers from the late 19th to early 20th centuries. In Britain, the concept of a "government machine" gained traction even before the widespread deployment of actual machines, and its imaginaries helped drive the government's proactive adoption of computers.¹⁵ Technological and organizational changes in governments are closely tied to the ideals of how an efficient administration should function.

This essay does not directly examine whether a similar vision of ideal government functioning existed in South Korea during the early 1960s. It is clear, however, that the Korean government was aware of the crucial role of national statistics in shaping its long-term economic development plans. The importance of having dependable statistical data was acknowledged with guidance provided by the Statistical Advisory Group (SAG).¹⁶ SAG was established with the assistance of the United Nations Korean Reconstruction Agency (UNKRA), which allocated funds from the International Cooperation Administration (ICA) to enhance South Korean statistical capabilities. In addition to offering recommendations on personnel training, publications, public relations, and organizational changes, SAG emphasized the need for the government to acquire up-to-date mechanical equipment to improve the quality of its statistics.

Key punch work expanded alongside the growing demand to process vast amounts of census data. The 1960 Population and Housing Census gathered information in unprecedented detail, ranging from the number of rooms and kitchens in each household to the total floor space, and even whether families owned radios or barns. The Agriculture Census was equally exhaustive, recording the surface area of cultivated land, yields across seventeen grain types, and even the square meters of

¹⁴ The name was given and mostly used by the Statistical Advisory Group, which discouraged the use of the name "census building," as it implied its limited use by the Bureau of Statistics alone. See Surveys & Research Corporation, op. cit., 44.

¹⁵ Jon Agar, *The Government Machine: A Revolutionary History of the Computer* (Cambridge, MA: MIT Press, 2003).

¹⁶ For the development of South Korea's statistical system and the institutionalization of statistical knowledge, see Eunjoo Cho, "Statistics and Knowledge-Making Practices: Focusing on the 'Statistical Advisory Group'(1958-1963) in South Korea 1960년대 한국의 통계 발전과 지식 형성의 실천: 주한 통계 고문단(1958-1963)을 중심으로," *The Korean Journal for the History of Science* 한국과학사학회지 38:1 (2016), 213-238; For a study that focuses on the specific activities of SAG and the context in which the need to improve the statistical system emerged, see Daehoon Chung, "Activities of the Statistical Advisory Group and the 1960 Census in Korea 주한통계고문단의 활동과 1960년 인구주택국세조사," *Sahak Yonku: The Review of Korean History* 사학연구 154 (2024), 107-140.

rocks and boulders scattered on paddy fields.¹⁷ To manage this overwhelming volume of information, Sidney Binder, an expert in data processing equipment at SAG, proposed that the government purchase or rent IBM's modern punch card processing units, for there was "no direct counterpart for speed, accuracy, and efficiency in equipment of any other manufacturer."¹⁸ The decision was made to rent the IBM machines, but even the "atomic brains" of these "electronic calculators wrestling with numbers were breaking a sweat," as one newspaper article remarked on the enormity of the task.¹⁹ Modernization was to be achieved with elaborate data collection, precise calculation, and evidence-based future planning. Such ambitions could only be realized through the personnel who performed the painstaking labor of working with the data processing machines.

At the Korea Data Processing Center of the Bureau of Statistics, 246 women were working relentlessly in two shifts as keypunch operators. After only a month of training, each operator was expected to produce between 1,500 and 2,000 punched cards per day. Newspapers proudly presented this figure as more than double the 800-card daily output of an average American operator, who typically underwent three months of training (see Figure 1). With such speed and accuracy, the women were described as becoming "one with the machine," allowing the national census, originally expected to take ten years, to be completed in just two and a half years.²⁰

¹⁷ Economic Planning Board, *1960 Population and Housing Census of Korea 1960 인구주택 국세조사보고* (Economic Planning Board, 1960).

¹⁸ Surveys & Research Corporation, *op. cit.*, 38.

¹⁹ "Even the Atomic Brains Breaks a Sweat 원자두뇌도 진땀," *Chosun Ilbo*, 1961. 4. 30; Lee Ju-yong, who briefly returned to Korea in 1962 while working at IBM, recalled "The homeland I returned to was a complete computer barren. The Bureau of Statistics under the Economic Planning Board was using IBM's punch card system (PCS), but it was an outdated accounting and statistical machine that had been used by the U.S. military during World War II." See Ju-yong Lee, *op. cit.*, 119.

²⁰ "Electronic Brain and the Young Ladies' Small Kingdom 전자뇌와 아가씨 소왕국," *Kyunghyang Shinmun*, 1962. 8. 24.



◇ 「아가씨들만의 小王国」—근무시간중에는 병어리가원체 오직 기계와 한몸이되고있다.

Figure 1. “Keypunch Ladies Working as One with Machines,” in “Electronic Brain and the Young Ladies’ Small Kingdom 전자뇌와 아가씨 소왕국,” *Kyunghyang Shinmun*, 1962. 8. 24.

The operator’s remarkable speed and precision in keypunching carried with it a paradoxical cost: the exceptional efficiency eventually accelerated their own displacement. Keypunch work was inherently precarious and highly contingent, tied to the availability of data to be processed. With no data left to process, the demand for the operators also came to an end. On August 23, 1962, the Bureau of Statistics gave back 93 of its leased machines, and plans were underway to lay off 400 of its 600 staff members by the year’s end, including keypunch operators.²¹

Whether a worker was retained or dismissed depended on her keypunching performance. Designed to process and store data, the punch card system also served as a tool for surveillance, keeping track of each operator’s weekly output and error rates. As one article pointed out, “the machine reveals without hesitation how many cards each person processed in a week and what percentage of them were errors.” The article also highlighted the “relentless scrutiny and discipline of the machines,” reflecting on the unusual fate of these workers, who were “being watched over by the very machines that embodied the civilization they helped build, and may even

²¹ Ibid.

come to resent the machines themselves.”²² In this dynamic, operators and machines were bound in a reciprocal relationship of monitoring and control, each shaping and disciplining the other.

Following the Population and Housing Census, there was a strong sense of anticipation that computing technology could open new opportunities. SAG, having already witnessed how these technologies streamlined administrative tasks in the United States and Japan, was even more eager to introduce computers to Korea than the Korean institutions themselves. As their official activities concluded, discussions emerged among the Korean-American Foundation, Surveys & Research Corporations (the organizing body of SAG), the IBM World Trade Corporation, and the Korean government regarding IBM’s donation of an IBM 650 for educational and research purposes.²³ In his memoir, Lee Ju-yong, who was working for IBM and soon founded KCC, also mentions a donation around this period. IBM’s president, Thomas J. Watson Jr., was hoping to donate IBM computer systems worth approximately \$1 million to Korean universities. Lee returned to Korea in 1963 with the task of soliciting proposals from universities that could utilize this donation and exploring the potential of the Korean market. Yonsei University, the only institution to submit a proposal, envisioned installing the computer at the Bureau of Statistics so that it could be used jointly by the government and the university, which did not meet the conditions set by IBM. This was because, even if the equipment was donated, the university alone was unable to cover the installation costs due to its limited financial resources.²⁴ Punch card systems struggled to establish themselves in a “computer barren” country, as scarce institutional support and financial resources hindered their adoption beyond a few isolated projects.

It was not until three years later, in 1967, that the first electronic computers, distinct from the previous IBM machines, were introduced to South Korea. That year, the Bureau of Statistics acquired an IBM 1401 to prepare for the preliminary census for the Second Five-Year Economic Development Plan (1967-1971), while the Korea Productivity Center adopted a FACOM 222.²⁵ These acquisitions coincided with the broader effort to institutionalize computing technologies. In 1966, the Economic Planning Board launched the Five-Year Plan for the Promotion of Science and Technology, which led to the enactment of the Science and Technology Promotion Act (Law No. 1884) in 1967. The legislation included provisions for the introduction of the Electric Data Processing System (EDPS), particularly the development of related technologies and the training of information processing

²² Ibid.

²³ Surveys & Research Corporation, op. cit., 45-46; Ju-yong Lee, *My Life with Computers for Half a Century* (note 5), 134.

²⁴ Ibid., 139.

²⁵ Dongwon Jo, “Computopia and Its Discontents: Dual Narratives in South Korea,” in Dick van Lente eds. *Prophets of Computing* (note 6).

personnel. The establishment of the Ministry of Science and Technology on April 21, 1967, and its subsequent seven-year plan for computer applications, further reflected the state's optimism about the role of computing technology in modernizing governance and society. Within this bureaucratic vision, particular emphasis was placed on training the people who would operate and manage the new machines.²⁶

In these early years, nevertheless, the precarity of keypunch work persisted. Institutions that acquired electronic computers actively recruited keypunch operators and other personnel. The Bureau of Statistics alone hired more than 120 people to transfer data onto punch cards for the IBM 1401. Working in three shifts, these operators played a crucial role in bridging the gap between analog and electronic information systems. However, as each data-processing project was completed, most of the operators lost their jobs, leaving only about twenty highly skilled and efficient operators.²⁷ Keypunch operators were both the foundation of Korea's nascent computing infrastructure and its first casualties: indispensable to the establishment of the EDPS yet fated to disappear with the lifespan of the datasets they created.

The Emergence of Keypunch Service Exports

Introducing computers into a nation with no prior experience required more than simply installing these machines and recruiting their operators. Unlike developed countries, where computers were already widely regarded as tools for accelerating data processing and enhancing governance and research, in South Korea, the imperative was to demonstrate how these technologies could align with local discourses, such as “modernization of the fatherland” and “economic self-reliance.” It demanded new socio-economic justifications. The success of the technology's integration depended on its ability to produce tangible and immediate outcomes that could persuade the nation.

The Feasibility Study of EDPS for Government and Financial Institutions (hereinafter referred to as the Feasibility Study) clearly addresses these concerns. The study was published in December 1967 by KCC, which had recently gained independence from the Korea Productivity Center, at the request of the Ministry of Science and Technology. The Feasibility Study proposed ways to pursue the “effective utilization of EDPS,” a concept that extended beyond the technical operation of the system. Using EDPS “effectively” was understood as more than just setting up computer-based administrative and management systems within

²⁶ Hyunjin Seo, *The First Written History of Computing in Korea* (note 5), 23-24; “First Step to Korea's Electronic Era 첫걸음마 한국의 전자시대,” *Chosun Ilbo*, 1967. 5. 25.

²⁷ Interview with Choon-hee Lee, 2019. 10. 15.

government agencies and financial institutions for policy development. It also carried the more ambitious aim of generating income to help meet the goals of the Second Five-Year Economic Development Plan (1967–1971).²⁸

Among the different strategies considered for earning income through computing technology, the most straightforward and practical approach was to export data processing labor, specifically keypunch services. According to Lee Ju-yong, who founded KCC and oversaw the Feasibility Study, his initial awareness of keypunch service export as a viable model emerged during his time at IBM's Service Bureau Corporation (SBC) in the United States. During his time, SBC relocated its keypunch operations to San Antonio, Texas, near the Mexican border, to reduce data processing costs. Although the absence of direct flights between San Antonio and SBC's headquarters in New York caused delays in receiving punched card outputs, the substantial savings in labor costs led the company to consider the initiative a success.²⁹

By the late 1960s, the outsourcing of data processing labor had already become a well-established practice in the United States. When domestic relocation proved insufficient, companies increasingly turned to countries with lower labor wages, including Brazil, the Philippines, and Mexico. In East Asia, firms based in Hong Kong had begun operating service export ventures with workers from Southeast Asia, while Taiwan and Thailand had also entered the burgeoning market.³⁰ One example is the China Data Systems Corporation, a New York-based firm that ran its keypunch operations in Hong Kong. Ben Ross Schneider, Jr., an English professor who was running a grand project of converting *The London Stage*, an 8,000-page theatrical performance calendar, into a computer-accessible database in the 1970s, had to turn to offshore keypunching because it offered him a “ridiculously low price.”³¹ This transnational flow of outsourced labor positioned data processing as a global industry driven by wage disparities.

Being aware of the globalized network of data processing labor, Lee anticipated that South Korea could also provide competitive services. He estimated that the turnaround time for transferring data between the United States and Korea would not be a major obstacle. Using Japan Airlines and Northwest Airlines, a round trip would only take two days, meaning that work could be completed on a Sunday in Korea to arrive in time for U.S. deadlines.³² For Lee, this logical feasibility underscored Korea's potential role in the global keypunch service market.

²⁸ KCC, “Introduction,” *Feasibility Study of EDPS for Government and Financial Institutions* 정부 및 금융기관에 대한 EDPS 타당성 조사 (Ministry of Science and Technology, 1967).

²⁹ Ju-yong Lee, op. cit., 268.

³⁰ Shin-Gwi Kang, “Keypunch Service Export 키펀치 용역 수출,” *Kyunghyang Shinmun*, 1971. 5. 29.

³¹ Ben Ross Schneider Jr., *Travels in Computerland: Or, Incompatibilities and Interfaces* (Reading, MA: Addison-Wesley Publishing Company, 1974), 98-99.

³² KCC, op. cit., 497.

According to the Feasibility Study, exporting keypunch and software services was identified as a central axis alongside its recommendations for introducing electronic computers to government and financial institutions. According to the report, South Korea possesses two significant advantages that make it well-suited for keypunch service exports. The first was socio-economic: the cost of labor. Korean keypunch operators earned an average of 130 won per hour, merely one-twelfth of the 1,620 won hourly wage of their American counterparts.³³ When factoring in both labor costs and machine usage fees, the report argued, South Korea offered a compelling solution for American industries seeking to reduce operational expenses. This alignment with global trends in using cost-cutting outsourcing made the country particularly attractive as a site for offshore data processing.

The second advantage was in human capital. The report highlighted that, unlike the hardware industry, which relies heavily on large investments in manufacturing facilities, the software service sector primarily relies on human resources, making it well-suited to South Korea's economic and labor conditions. The qualities considered essential for each step of the keypunch work, from managing the sequence of operations to performing special operations and protecting operation files in emergencies, were manual dexterity and precision, which were traits commonly found in Korean female workers. It praised the "dexterous hands and sharp minds of the Korean people" as valuable national assets.³⁴ Korean women, who were defined as "surplus labor," were explicitly described as having "delicate dispositions" and "exceptionally nimble hands."³⁵ The narrative resembles the myth depicted in Fairchild's brochures, which suggests that Navajo women had "nimble fingers" due to their experience of weaving blankets, a notion critically examined by Lisa Nakamura's history of electronic manufacturing in the late 1960s.³⁶ Universities, meanwhile, were producing 35,000 graduates annually, who were portrayed as an underutilized resource amid rising elite unemployment. In this context, keypunch and software service exports were described as "especially suited to the temperaments of our people."³⁷

The report also suggested that the keypunch and software service exports could be pursued as a form of "bonded processing 보세가공적 수출," in which imported

³³ Ibid., 494.

³⁴ Ibid., 11.

³⁵ Ibid., 491-492.

³⁶ Nakamura explicitly states that "Race and gender are themselves forms of flexible capital" that are mobilized to justify the convergence of corporate interests with indigenous governance and ultimately changing the indigenous identities. See Lisa Nakamura, "Indigenous Circuits: Navajo Women and the Racialization of Early Electronic Manufacture," *American Quarterly* 66:4 (2014), 933; A similar pattern could be observed for female assembly line workers in Taiwan. See Tinn, *Island Tinkers* (note 3), 162-3.

³⁷ KCC, op. cit., 490.

goods were processed and re-exported.³⁸ The idea was in line with a broader labor regime that relied heavily on women, where 428,000 women in 1970 were already employed in the manufacturing sector, most often referred to as “factory girls 여공”³⁹. As anthropologist Hyun Mee Kim has observed, South Korea’s modernization project sought to build the nation through rapid economic growth, which required workers to be recast not as modern individual laborers or stratified social groups, but as a “productive nationalist collective.” To accomplish this, the state mobilized patriarchal traditions to accelerate a gendered division of labor, describing women’s work as “selfless devotion without expectation of reward.” Female workers were redefined as a flexible labor force, valued for their ability to respond to the uncertainty and volatility of global markets. This strategy proved successful as female-dominated manufacturing industries experienced rapid growth, and by 1975, they accounted for 70 percent of total exports.⁴⁰

The benefits of keypunch exports were not only economic but also symbolic. Those who oversaw the Feasibility Study emphasized their multifaceted values: earning foreign exchange, reducing unemployment, and, importantly, showcasing “the excellence of the Korean people” on the global stage, driven by the rapid growth of the software industry.⁴¹ In this perspective, data processing work was portrayed both as a practical response to domestic economic challenges and as a way to promote national pride within the growing data-processing industry.

The recommendations from the Feasibility Study gained momentum with support from the Blue House, South Korea’s presidential office. After submitting the report, Lee Ju-yong personally suggested the idea of exporting keypunch service abroad during his meeting with Kim Hak-ryeol, the Senior Secretary for Economic Affairs. The proposal later reached President Park Chung Hee, who became interested after learning about it at a meeting of the Export Promotion Committee. According to Lee’s recollections, the president’s interest was further sparked when representatives from the CDC and IBM were invited to Korea and performed what Lee described as a “well-orchestrated one-act play.” As a result, government funding was secured: 4 million won in 1968 and 3 million won in both 1969 and 1970, allocated to support Korea’s entry into the overseas keypunch service market.⁴²

The keypunch export initiatives were soon incorporated into a broader national agenda, appearing as a regular item on the agenda of the Council of Economic Ministers under the title “Comprehensive Development Plan for Electronic Data Processing Systems (1969-1971).” This plan aimed to encourage both the domestic adoption of computing systems to improve organizational workflows and the export

³⁸ Ibid., 489, 492.

³⁹ “Increasing Women Workforce 증가하는 여성인력,” *Maeil Business*, 1972. 9. 26.

⁴⁰ Hyun Mee Kim, “Modernity and Women’s Labor Rights in South” (note 11).

⁴¹ KCC, op. cit., 489, 492.

⁴² Ju-yong Lee, op. cit., 266.

of related technical services. The government support for keypunch exports was centered around three main areas: financial aid for operator training facilities, diplomatic support to open U.S. and Japanese markets, and protective measures to nurture domestic service providers.⁴³ Perhaps the most notable aspect of the plan was its proposal to establish a dedicated Service Export Center, which would encompass both keypunch services and software development. The center would direct foreign currency earned from keypunch service exports into research and development of software.⁴⁴ The plan sought to ensure that keypunch work and software development were closely linked at both policy and financial levels, creating a virtuous cycle between them.

As Lee noted elsewhere, keypunching was not merely a matter of punching holes into punch cards with keypunch machines. Specific stages of the work required passing data through an electronic computer, which in turn necessitated the use of appropriate programs. For example, when providing data processing services that involved encoding data onto magnetic tapes rather than punch cards, operators had to edit and correct errors using the electronic computer system, a process that demanded software support (see Figure 2).⁴⁵ In other words, the sharp distinction between keypunched labor and software development, so often assumed in policy documents and public discourse, proved difficult to sustain in the actual provision of services. The two forms of labor were deeply intertwined, creating a space where human operators and computational systems collaborated to shape Korea's emerging industry.

⁴³ Ki-Hyung Kim, *Comprehensive Development Plan for Electronic Data Processing System* 전자계산 조직 종합 개발 계획안, Agenda for the Economic Ministers' Meeting 경제장관회의안건, March, 1969. Agenda No. 83. National Archives of Korea.

⁴⁴ Ibid., 40-41.

⁴⁵ Ju-yong Lee, "Prospects and Countermeasures for Keypunch Processing and Software Exports Key Punch 가공 및 Software 수출 전망과 대책," *Administration and EDP* 행정과 EDP 1:1 (1973), 81-88.

전자계산가공수출경로

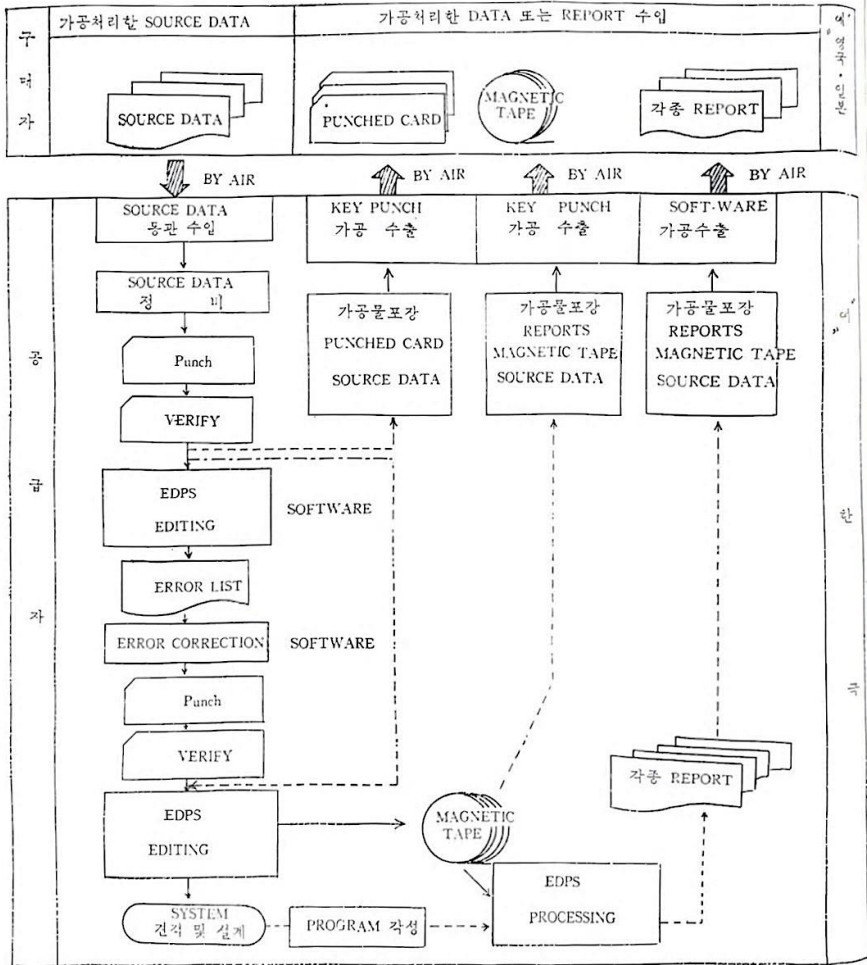


Figure 2. "Pathways for EDP Service Exports," Ju-yong Lee, "Prospects and Countermeasures for Key punch Processing and Software Exports Key Punch 가공 및 Software 수출 전망과 대책," Administration and EDP 행정과 EDP 1:1 (1973), 82

By July 1973, the Office of Information Management within the Ministry of Science and Technology had identified a total of 24 companies engaged in the export of keypunch and software services. Among these, the most dominant players were KCC and a Korean branch of the American firm ICR. Other notable companies

included Korea Keyboard, the National Business Service, and Korea Business Consultants, all of which had begun reporting measurable results. The Ministry also maintained oversight of the equipment holdings of these service providers, tracking the number of keypunch and verifier machines each company possessed.⁴⁶ This administrative surveillance reflected the government’s role in coordinating and monitoring the emerging service export sector, which it considered a vital part of South Korea’s involvement in the globalized information economy (see Table 1).

* 과학기술과 정보관리산업 제품 *		Key Punch 용역 및 Software 수출회사 현황			73년 8월 31일 현재(단위 : US \$) (無誤)			
구 분 업 체 명	대 표 전 화	직원수 (명)	사 설 현 황 (단위 : 대수)	수 출 실 적 및 계 획				
				72년	73년	73년 7월 현 제	74년	
1. 한국키보드(주)	최영근	26-7355	180	Code Paper Tape Punch 50, PDP/8-E 1 set, MDS 1102 Pulling System 2 Set, Microfilm Reader 50, MDS 9200 Conversion 1 set, MDS Data Recorder 50.	70,000	250,000	50,000	500,000
2. 한국전자계산소(주)	이주영	27-7921	125	Microfilm Viewer 10, OCR Typewriter 22 set, 029, 024 Punch 75 UNIVAC VP 30.	250,000	400,000	215,000	800,000
3. 서울컴퓨터센터(주)	주요한	26-8681	72	029 Punch 11, 059 Verifier 5.	8,000	50,000	28,000	100,000
5. 네오날비서비스(주)	이용원	74-5142	70	024 Punch 44, 056 Verifier 22.	90,000	250,000	100,000	500,000
6. 인티네오날컴퓨터센터	최도열	24-4064	24	029 Punch 6, 059 Verifier 4.	—	50,000	9,000	150,000
7. 통일컴퓨터센터(주)	박기억	23-4437	46	029 Punch 6, 024 Punch 2, 059 Verifier 5, VP 10.	5,000	50,000	20,000	100,000
7. 광운전자계산소	박정열	94-6880	20	029 Punch 9, 054 Verifier 1, Paper Tape Punch 1.	—	—	—	—
8. 부산컴퓨터센터	박영하	6-3386	20	Key Punch 8, Verifier 4.	2,292	5,000	2,000	—
9. 한국비즈니스콘실인트	최태규	26-9351	48	Key to Tape Punch 20, 029 Punch 12.	10,000	250,000	105,440	550,000
10. 이계전산(주)	이재철	42-6153	30	029 Punch 10, 056 Verifier 7.	—	40,000	10,000	—
11. ICR	이시영	26-2942	150	029 Punch 23, 059 Verifier 4, Microfilm Reader 40.	110,000	350,000	250,000	600,000
12. 나라고역(주)	최대섭	22-5804	16	029 Punch 9, 059 Verifier 6.	—	150,000	5,000	300,000
13. 신라기업(주)	이현준	73-6173	—	029 Punch 10, 059 Verifier 7, VP 10.	—	30,000	—	100,000
14. 서울전기(주)	김종학	23-7904	150	029 Punch 21, 059 Verifier 13, Juki Punch 22.	—	300,000	80,000	500,000
13. 부산중앙전산(주)	안규영	—	15	Key Punch 4.	—	—	—	80,000
16. 대한전자공업(주)	김태문	69-2961	40	Mag. Data Inscribe Punch 40.	—	50,000	25,000	100,000
17. 한국보림전산(주)	원종훈	94-7761	55	Key Punch 36.	10,000	100,000	35,000	150,000
18. KIST 전자계산소	인상준	94-0141	84	029 Punch 17, 059 Verifier 15, Sorter 1.	50,000	100,000	50,000	—
19. 대경진흥(주)	김수학	27-3255	43	029 Punch 21, 059 Verifier 14.	—	70,000	2,500	100,000
20. 경준기업(주)	최찬섭	22-3512	—	VP 15대 계약중	—	—	—	—
21. 데이터비즈니스센터	이창배	대정로2가69	—	VP 10대 계약중	—	—	—	—
22. 제일데이터서비스	이병환	27-1296	20	029 Punch 6, 059 Verifier 4, VP 10.	—	—	—	150,000
23. 부덕복제회	김미희	22-7998	16	029 Punch 5, 059 Verifier 3.	—	—	—	—
24. EMSK(중앙주출산하)	김진용	75-1568	—	—	—	—	—	—
총 계			1,224	Key Punch 335대, Verifier 114대, 기타 3:0대 계 819대	605,292	2,495,000	986,940	4,780,000

Table 1. Central Computer Center, Ministry of Science and Technology, “Status of Domestic Keypunch Service and Software Export Companies 국내 key punch 용역 및 software 수출회사 현황,” *Administration and EDP 행정과 EDP* 1:3 (1973), 176.

The earliest export market for Korean keypunch service providers was geographically and logistically proximate: Japan. In 1970, KCC signed a contract with ABC, while Tongil Trading Co. secured an agreement with the Electronic Data Processing Center in Chiba Prefecture. Both deals generated approximately \$10,000

⁴⁶ Central Computer Center, Ministry of Science and Technology, “Status of Domestic Keypunch Service and Software Export Companies 국내 key punch 용역 및 software 수출회사 현황,” *Administration and EDP 행정과 EDP* 1:3 (1973), 176.

in monthly exports.⁴⁷ Building on these initial successes, keypunch service companies soon expanded into the more lucrative American market. For example, Korea Keyboard, a joint venture with a U.S. partner whose facilities were completed in 1972, was to export all its keypunch and film processing services exclusively to the United States.⁴⁸ KCC also reported notable achievements in the U.S. market, earning \$180,000 from keypunch services for the U.S. Department of Justice's legal code project and an additional \$70,000 for work related to a hospital planning project.⁴⁹

The rapid growth of the industry led to unintended consequences. The surge of service providers triggered severe price undercutting, as companies engaged in aggressive domestic competition to secure contracts. To address this "dumping" crisis, the Korean Data Processing Service Export Association was created in December 1972 to coordinate pricing and protect the industry from destabilizing market practices.⁵⁰ The establishment of the export association was part of an initiative to professionalize the sector, aiming to improve the accuracy of its products for international clients and bolster its public image at home. Media coverage worked in tandem, portraying keypunch operators as the mainstay of Korea's technological modernization and export-driven economy.

The Proud Ladies Who Became "One with the Machine"

The 1970s marked a pivotal moment in South Korea's effort to mobilize female "surplus labor" as part of its national strategies. Government policies began to explicitly target the expansion of women's participation in society.⁵¹ The Third Five-Year Human Resource Development Plan (1972-1976) included a significant policy shift as the development of female labor was presented as its key objective for the first time. This agenda was informed by the 1970 report from the Human Resource Development Institute, which highlighted the necessity to move beyond viewing

⁴⁷ Hak-Rae Cho, "Three Years After the Introduction of Computers: Current Status and Issues 컴퓨터 도입 3년 실태와 문제점," *Donga Ilbo*, 1970. 6. 24.

⁴⁸ "Keyboard Company Completed Through Korea-U.S. Joint Venture 한미합작으로 키보드 회사 완공," *Maeil Business*, 1971. 5. 28.

⁴⁹ "Lack of Support for Card Punch Exports 지원 아쉬운 카드펀치 수출," *Kyunghyang Shinmun*, 1972. 5. 18.

⁵⁰ "Korea Electronics Data Processing Service Association to be Launched Soon with 10 Member Companies 한국전자계산기 용역 수조 10개회원으로 곧 발족," *Maeil Business*, 1972. 11.30; Hyunjin Seo, *The First Written History of Computing in Korea* (note 5), 87.

⁵¹ Ministry of Science and Technology, *The Third Five-Year Plan for Human Resource Development (1972-1976)* 제 3차인력개발 5개년 계획(1972-1976) (Ministry of Science and Technology, 1971); Human Resources Development Institute, *Women Workforce in Korea 한국의 여성인력* (Human Resources Development Institute, 1970).

women as “substitute labor.” The report argued that “in anticipation of widespread labor shortages across diverse sectors by the 1980s, and in pursuit of full employment, the cultivation of female labor should be regarded as a priority in our policy.”⁵²

Among the wide range of occupations available to women in the early 1970s, keypunching was portrayed as especially desirable. A 1972 newspaper article listed over 200 jobs held by women, grouped by monthly wages, such as over 40,000 won, over 3,000 won, and over 20,000 won. Key punch operators were placed in the last category, alongside machine and chemical technicians, pharmacists, radiology technicians, journalists, actors and stage directors, typists, and telephone operators.⁵³ Since the average monthly wage for women at that time was 11,784 won, keypunching was a relatively well-paid job. Working conditions added to its appeal. One newspaper article explained that “because these machines respond sensitively to their surroundings, the atmosphere is kept very pleasant,” noting that “for women who prefer calm work in relatively fresh air and a moderate indoor temperature, this job may be ideal.” Although the clattering of the machines could be considered “somewhat noisy,” the article emphasized the overall comfort of the workspace, portraying keypunching as a promising career well-suited for women.⁵⁴

More detailed descriptions of the keypunching environment can be found in records from the early 1960s, when SAG, the group supporting the South Korean government’s efforts to enhance its statistical capabilities, provided assistance in building the facility that housed the IBM punch card system. The building needed to have “structural strength for heavy equipment, adequate electrical wiring, and appropriate levels of cleanliness, humidity, and temperature.”⁵⁵ Yet such conditions were virtually nonexistent within government facilities in South Korea at the time. As a result, SAG offered technical advice to Korean officials on the architectural design of a new building for the Bureau of Statistics in Gyeongun-dong. In the meantime, the punch card system was temporarily installed in a minimally renovated section of the second floor of the Japanese-built Capitol Building.⁵⁶ Only in November 1961, after the new facility was completed, did the system finally find a permanent home.

The focus on maintaining minimum environmental conditions in keypunch facilities, particularly temperature and humidity, came from the heat produced by the IBM 604 punch card system to be installed at the Bureau of Statistics. The IBM 604’s electronic circuits were made up of 1,250 vacuum tubes, whose glass

⁵² Ibid., 2.

⁵³ “Increasing Women Workforce.”

⁵⁴ “Skilled Women Course (7): Key punch 기능여성 코오스 (7) 키이펀치,” *Donga Ilbo* 1975. 11. 18.

⁵⁵ Surveys & Research Corporation, op. cit. (note 13), 39.

⁵⁶ Ibid., 42-43.

enclosures emitted intense heat during operation. Although its official manual did not specify specific environmental requirements, in practice, the machines were installed near large, gridded ventilation outlets to dissipate heat effectively. According to a survey, every institution with an IBM 604 covered in the study was equipped with a central air conditioning system, with some facilities featuring additional exhaust fans for venting excess heat.⁵⁷

The newly constructed Bureau of Statistics building appears to have adopted a similar facility. A *Kyunghyang Shinmun* article dated August 24, 1962, published in mid-summer, described “three \$7,000 American air-conditioning units maintaining a cool autumn-like temperature inside the office, despite the outdoor heat exceeding 90 degrees Fahrenheit.” Within this climate-controlled space, “young women working while sitting on 7,000 to 8,000 won American chairs” were described as enjoying the “full benefits of air-conditioning systems designed to protect the costly machines.”⁵⁸ In other words, the climate control infrastructure, originally intended to protect the delicate electronic equipment, was inadvertently found to create an environment that enhanced the comfort of the women working within it.

Other articles highlighted the pride expressed by the keypunch operators themselves. Cho Nam-ok, head of the keypunch room at the Bureau of Statistics of the Economic Planning Board, described her delight in “feeling a deep sense of fulfillment and responsibility in being at the forefront of the times,” adding that she was “standing in the dazzling spotlight of society as a professional woman.”⁵⁹ Journalists reinforced this image by portraying the operators as “another part of the brain of the computer,” emphasizing that without their contribution, the extraordinary memory capacity of computers would be useless.⁶⁰ The keypunch operator was thus introduced as a respected profession that contributed to the advancement of modern science. However, reporters also noted a “strange phenomenon” in which little was known about the operators themselves, despite their importance in the computer age. Yoo Hyun-soon, an operator with 10 years of experience, voiced hope that someday society would recognize both the importance of their work and the value of their contributions (see Figure 3). Even without that recognition, the article explained, these women carried themselves with pride and confidence, exemplifying the spirit of diligent and hardworking modern women.⁶¹

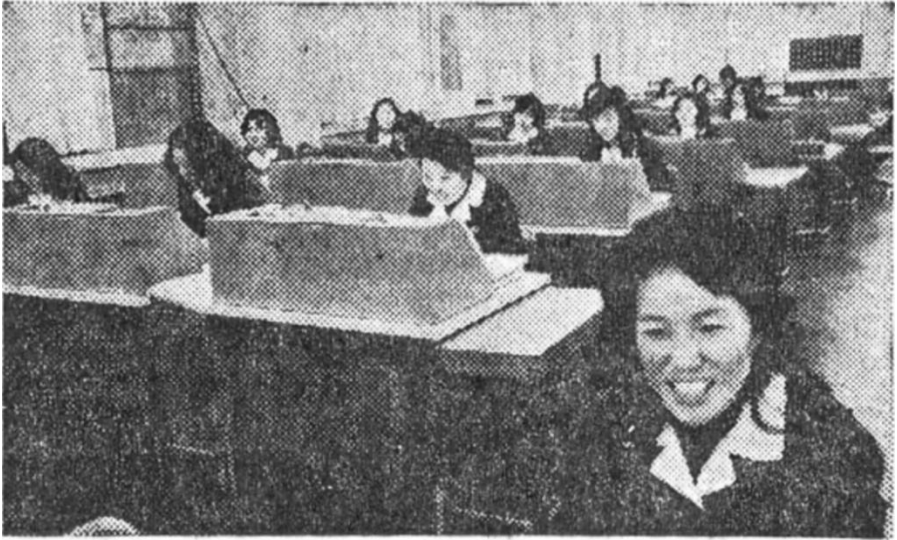
⁵⁷ Martin H. Weik, *A Third Survey of Domestic Electronic Digital Computing Systems*, Report No. 1115 (Ballistic Research Laboratories, 1961), 332, <https://ed-thelen.org/comphist/BRL61.html#TOC> (accessed on July 1, 2025).

⁵⁸ “Electronic Brain and the Young Ladies’ Small Kingdom.”

⁵⁹ “Saleryman B.G. (10) 셸리맨 B.G. (10),” *Maeil Business*, 1970. 5. 9.

⁶⁰ “Living with Pride (5): Highlight on These Workers 보람에 산다 (5) 이 일꾼들에게 하일라이트를,” *Maeil Business*, 1973. 1. 8.

⁶¹ *Ibid.*



◇柳賢順양은 일반에 잘알려지지않은 직종에 종사
한지 근10년... 그래도 과학의 첨병으로서 보람을
느낀다.

Figure 3. Yoo Hyun-soon, the head of the keypunch room at the Bureau of Statistics, “Living with Pride (5): Highlight on These Workers 보람에 산다 (5) 이 일꾼들에게 하일라이트를,” *Maeil Business*, 1973. 1. 8.

The significance of keypunch work was further underscored in media reports that detailed the specific tasks of the operators. The head of the Identification Division at the National Police Agency gives an evocative account, introducing the 300 young women under his supervision as the “vanguards of scientific investigation.” Their job was to systematically classify and encode fingerprint data from resident registration forms and punch them onto cards, producing the essential input for the new data-cell system scheduled for implementation in November 1970. This initiative to computerize investigations was praised as a revolution in police work, promising the immediate identification of unknown bodies or disaster victims, verification of forged registration cards, checking criminal records, and tracking hit-and-run vehicles, all within seconds. The tedious task of administrative record-keeping and statistical reporting for police and local governments could now be completed in an average of fifteen minutes. Such technological innovations were framed as a critical response to the increasingly rapid and complex nature of crime, helping the police to handle cases more efficiently at the earliest stages of

investigation.⁶² Yet, such advances relied on the work of keypunch operators; without their painstaking and repetitive data processing, the promise of “scientific” investigation could never be realized.

The work was also perceived as a promising avenue for female operators seeking to elevate their status as professional programmers. On May 4, 1970, *Kyunghyang Shinmun*’s series “Unusual Jobs in the Age of Women” introduced keypunch operators and programmers as its first featured occupations.⁶³ The article introduced Lee Choon-hee, a “veteran” programmer with seven years of experience, who was one of the five female programmers at the Korea Institute of Science and Technology’s (KIST) newly established Computer Center. Lee was originally a keypunch operator who transferred from the Bureau of Statistics to KIST in 1968. Upon the arrival of the CDC 3300 in 1969, she completed a three-month course in assembly language, FORTRAN, and COBOL, and eventually transitioned into a programming role.⁶⁴

The number of female programmers grew markedly throughout the 1970s. In 1971, the Ministry of Science and Technology reported that women made up 7 percent of all programmers. By 1973, a study on job satisfaction among programmers found that women accounted for 10 percent of the respondents, 34 out of 336.⁶⁵ By 1975, more than half of Korea’s computer operators, including both programmers and keypunch operators, were women.⁶⁶ This female dominance in computing was not unique to Korea. In Britain and the United States, women had constituted a significant portion of the programming workforce before the field underwent masculinization in the 1960s.⁶⁷ Faced with the new phenomenon of female dominance in technology-related jobs in Korea, one reporter drew an unexpected analogy, comparing a female programmer to Jessica Lange, who played Dwan in the 1976 film *King Kong*. Just as *King Kong*’s superpower was said to be useless

⁶² Joo-hwan Son, “The 1970s are Ours (8) Computer Investigation 70년대는 우리의 것 (8) 컴퓨터수사,” *Kyunghyang Shinmun*, 1970. 1. 15.

⁶³ In 1970, *Kyunghyang Shinmun* published a feature titled “Unusual Jobs in the Age of Women,” highlighting women working in a variety of skilled and technical professions. See Mihyun Jang, “‘I Claim the Right to Work’: The Discussion on Discrimination Against Women’s Employment and Women’s Action in the First Half of the 1980s ‘일할 권리를 청구합니다’: 1980년대 전반기 고용차별 비판과 여성들의 실천” *The Review of Korean History* 사학연구 138 (2020), footnote 4.

⁶⁴ Ki Soo Sung, op. cit., 67; Interview with Sung Ki Soo, 2019. 10. 23.

⁶⁵ Kil Cho Kim, “A Study on the Background and Professional Consciousness of Domestic Programmers 국내 programmer의 배경 및 직업의식에 관한 연구” *Administration and EDP 행정과 EDP* 1:3 (1973), 53-4.

⁶⁶ “Pioneers of the Technological Age (9): Women Computer Operators 기술시대의 첨병들 (9) 여성 컴퓨터 요원,” *Kyunghyang Shinmun*, 1977. 3. 23.

⁶⁷ Hicks, op. cit. (note 9); Nathan Ensmenger, *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise* (Cambridge, MA: MIT Press, 2012); Abbate, op. cit. (note 9).

without Dwan's presence, computers, too, were thought to be unable to unleash their extraordinary capabilities without the care and support of female programmers. The reporter suggested that these machines needed a kind of "motherly care" and gentle sensibility. From this ground, the reporter issued a warning about a looming "computopia," a world dominated by computers, where female "computopians" might outnumber their male counterparts and challenge traditional gender norms.⁶⁸

The feminization of keypunch work in South Korea reflected both opportunities and persistent constraints faced by women in the country's emerging computing industry. Key punching brought thousands of young women into modernized workplaces and offered them a nascent sense of professional identity. Yet, the realities of their working conditions remained largely invisible, overshadowed by the promise that computing systems would deliver efficiency and progress. Cast as quiet contributors to the nation's technological ambitions, these women sustained the expanding global demand for data processing services. By the mid-1970s, however, the foundations of this industry had begun to erode. The decline of keypunch service exports marked a turning point, exposing not only the vulnerabilities of the data-processing sector but also the hidden costs borne disproportionately by its female operators.

Data Processing Labor in Crisis

By early 1974, signs of decline in South Korea's keypunch service export industry had already become evident. Although the spring months from February to April were typically considered the sector's busiest season, only three or four of the 22 companies registered with the Korean Data Processing Service Export Association remained fully operational. The rest had started to scale back, foreshadowing the contraction of an industry that once symbolized the country's entry into the global computing economy.⁶⁹

This downturn stemmed from a confluence of factors. The global oil crisis of 1973 triggered skyrocketing energy prices, which slowed economic growth worldwide and disrupted international trade. Keypunch service was not alone in its struggles. Exports of textiles, steel plates, and ships, which were among South Korea's seven major industrial products, also saw significant declines.⁷⁰ Meanwhile, in Japan, keypunch service companies, which were previously concentrated in Tokyo,

⁶⁸ "Pioneers of the Technological Age" (note 66).

⁶⁹ "Sharp Decline in Service Orders, Leaves Only 3-4 Key punch firms in Full Operation 용역주문 크게 줄어 키펀치 업계 정상활동 3~4개 업체 불과," *Maeil Business*, 1974. 2. 19.

⁷⁰ "Global Recession Ripple Effects Spread to Export Industries: KITA Survey on Export Trends by Industry 세계 불경기 파문 수출 업계에 파급: 무협 조사 업종별수출동향," *Maeil Business*, 1974. 4. 2.

relocated to peripheral cities in Hokkaido to reduce costs, narrowing the price advantage that Korean firms once had.⁷¹ Domestically, the sector faced additional pressure from the rising cost of punch card raw materials, which were monopolized by Hanil Card Industry.⁷² Conditions were just as harsh overseas. The Japanese keypunch industry, comprising 200 to 300 companies, reported average operational rates below 60 percent. In the United States, data processing practices evolved from handling large, infrequent “master files” in bulk to shorter and more frequent cycles, such as daily transaction files.⁷³ Under these new conditions, the three-day delay in transporting processed materials from Korea was no longer acceptable.

By the end of 1974, 10 keypunch service export companies in South Korea had either closed or suspended operations, and the crisis showed little sign of abating.⁷⁴ In response, the government and the export association pursued new strategies, including organizing a tour around keypunch service companies with the heads of 18 Japanese information processing firms.⁷⁵ However, the high profits that keypunch firms once expected turned out to be unsustainable.

Although the export market faltered, keypunch service continued domestically through outsourcing by government institutions and the use of computers by private companies.⁷⁶ The increasing number of keypunch operators soon drew scholarly attention to their working conditions and professional identities. In the mid-1970s, Kim Kiljo, a former analyst at KIST Computing Center who later became a professor at Inje University and Chung-Ang University, conducted one of the first sociological studies on keypunchers and programmers. As part of broader research on development strategies for the National Information System, Kim examined the backgrounds and occupational awareness of these workers, emphasizing their importance to the efficiency and cost-effectiveness of computing systems. Insights into their qualifications, training needs, and links between their work environments and occupational health issues were seen as essential for managing what policymakers once described as Korea’s “human export assets.”⁷⁷

⁷¹ “Keypunch Industry Decline in Service Exports to Japan <키펀치>업계 대일용역수출 줄어,” *Maeil Business*, 1974. 1. 24; “Sharp Decline in Service Orders” (note 69).

⁷² “Management Difficulties Likely to Deepen 경영난 심화될 듯,” *Maeil Business*, 1975. 1. 25

⁷³ Ibid.

⁷⁴ “Four Companies Closed, Six Suspended Operations 폐업4, 휴업 6개사,” *Maeil Business*, 1974. 12. 2.

⁷⁵ “Representatives from 18 Japanese Information Processing Firms Visit Korea as Industrial Inspection Delegation 18개 정보처리업체대표 일산업시찰단 내한,” *Maeil Business*, 1974. 4. 17.

⁷⁶ “Public Institutions to Outsource Keypunch Work to Private Companies 공공기관 키펀치업무 업자에 위탁키로,” *Maeil Business*, 1975. 12. 9.

⁷⁷ Kil Cho Kim, “A Study on the Background and Profesisonal Consciousness of Korean Keypunch Operators 한국 Key Puncher들의 배경 및 직업의식에 관한 연구,” *Labor Studies 노동연구* 5 (1975), 172.

By June 1974, approximately 2,000 keypunch operators were employed across various institutions, of whom 500 were surveyed for Kim's study. With an 80 percent response rate, 398 questionnaires were analyzed.⁷⁸ Among the findings, the working environment emerged as a particularly salient concern. While media accounts often depicted keypunching as a desirable occupation carried out in clean, air-conditioned offices, the reality was far more taxing. Despite the relatively neat surroundings, operators suffered from severe visual fatigue and the incessant noise from the machines, which made prolonged work difficult. The workspace was also highly constrained: most were confined to a cubicle roughly the size of a single Korean *pyeong* (about 3.3 square meters), barely large enough to fit a keypunch machine, a chair, and a small auxiliary desk.⁷⁹ In these cramped conditions, operators typically took breaks every one or two hours and generally reported working a standard eight-hour day. About 70 percent of respondents worked 25 to 26 days per month, with nearly 20 percent indicating they worked even on Sundays. The researcher raised his concern that such schedules posed serious risks for occupational illnesses.⁸⁰

By the mid-1970s, occupational health issues among keypunch operators were well established abroad, yet no systematic study had taken place in Korea. The researcher, lacking a medical background and cautious not to provoke excessive scrutiny from surveyed institutions, limited the analysis to a general overview of health conditions rather than a systematic medical assessment.⁸¹ Even so, the findings were alarming. Anticipated ailments included hearing loss from prolonged exposure to machine noise, visual impairment from constant data reading, and musculoskeletal disorders affecting the wrists, back, and spine as a result of repetitive motions and long periods of sitting. Although the study did not catalog specific illnesses, 69 percent of respondents reported experiencing physical pain, with 70 percent stating that they felt ill "often" or "very often."⁸² Follow-up interviews with keypunchers with five to six years of work experience revealed that symptoms typically began to appear within two to three years of employment. The researcher concluded with an urgent call for comprehensive occupational health studies of keypunch labor.

The most notable finding of the study concerned job satisfaction among keypunch operators. When asked about the overall satisfaction with their work, 60 percent reported dissatisfaction. This stood in sharp contrast to the male-dominated group of programmers surveyed under similar conditions, 60 percent of whom expressed satisfaction with their positions.⁸³ This discontent was further illuminated by a

⁷⁸ Ibid., 173-174.

⁷⁹ Ibid., 194.

⁸⁰ Ibid., 188.

⁸¹ Ibid., 203.

⁸² Ibid., 194-195.

⁸³ Kil Cho Kim, "Domestic Programmer," table 2-36.

follow-up question: “Would you recommend keypunching as a career to your younger sister (or, if you do not have one, hypothetically)?” Only 8.8 percent of keypunchers responded affirmatively, while nearly half (49.3 percent) said they would leave the decision to personal preference. Strikingly, 41.9 percent expressed strong disapproval, indicating they would advise against or actively discourage pursuing such a career.⁸⁴ Taken together, these responses pointed to a broader critique of the keypuncher’s status within the hierarchy of data processing labor. Whereas programming was a prestigious and intellectually rewarding profession, keypunching remained tied to repetitive, physically demanding, and undervalued work, a perception reinforced by the operators themselves.

As conditions worsened for both the export industry and keypunch operators through the 1970s, the editors of *Management and Computers* 경영과 컴퓨터 convened a roundtable in 1981 to discuss the problems facing the keypunch service sector. Participants included two representatives from client institutions (a government official from the Bureau of Statistics and the head of the Computing Division at the Korea Broadcasting System) alongside three representatives from service companies.⁸⁵ Together, they outlined the structural challenges of opening and sustaining a firm. Despite widespread closures, new ones continued to appear, as the barriers to entry were low: machines were relatively inexpensive, and oversight from the Ministry of Science and Technology was minimal. Once in operation, however, companies confronted dual challenges in managing both data flow and human resources. The Bureau of Statistics, for example, became a major client beginning with the 1975 census, which generated massive amounts of data every five years but little in between.⁸⁶ In other words, data arrived in cycles, creating long periods of scarcity.

The management of human resources proved no less difficult. Newly hired operators required a month of training before showing moderate performance and six months to reach full proficiency. Yet, once skilled, many left for other firms offering higher wages, sometimes double their previous pay. Small and medium-sized companies, lacking a steady flow of data, could not afford to compete. Yang Hye-Suk, the head of one service company, acknowledged that neither she nor other firms could sufficiently increase the operator’s wages to reduce turnover. Instead, she proposed wage standardization as a means of stabilizing the industry.⁸⁷

Yet, these structural and managerial efforts did little to address the growing physical and psychological strain on keypunch operators. Their bodies bore the brunt of excessive working hours, repetitive motions, cramped workspaces, and the

⁸⁴ Kil Cho Kim, “Korean Key punch Operator” 197-198.

⁸⁵ Ik-Hong Um et al. “Problems in Key punch Service: A Roundtable Discussion 키펀치 용역에 문제 있다 <좌담>,” *Management and Computer* 경영과컴퓨터 57 (1981), 68-75.

⁸⁶ Ibid., 69.

⁸⁷ Ibid., 74.

relentless noise of machines, while the human costs of this labor remained largely invisible within industry and policy discussions. During the 1981 roundtable, the moderator reflected on the composition of the workforce, remarking that “keypunch operators are mostly young women with sensitive dispositions, and in that sense, small firms, with their more familial atmosphere provide an indirect social service by offering them a nurturing environment.” Yang echoed this sentiment, describing her employees as the “children of the center” who “remained unsettled, which leads to a lack of motivation and frequent errors.”⁸⁸ Speaking as both a manager and a fellow woman, she expressed her sympathy: “I feel sorry for them from the perspective of a mother or as another woman. Twice a month, I have conversations with them and encourage them to have hope that things will improve.”⁸⁹ Such maternalistic remarks, even if well-intentioned, ultimately obscured the underlying causes of the operators’ suffering. The occupational hazards remained invisible until later medical studies confirmed their presence.

The first comprehensive study of occupational health issues among keypunch operators was conducted by Kim Kook Hyang in 1982. Surveying 125 keypunch operators employed at service companies and computer divisions within larger firms, Kim used the questionnaires originally developed in 1971 by the Japanese Association of Industrial Health’s Research Committee on Cervicobrachial Syndrome. A control group of 188 female office workers, including typists and schoolteachers, was also surveyed. The results showed that keypunch operators were 8.3 times more likely to report “pain in the arms,” 3.3 times more likely to experience “dullness in the lower extremities,” and exhibited significantly higher rates of sensory and motor symptoms in daily life, including difficulty hearing (3.3 times), dizziness (2.1 times), and objects slipping from their hands (6.0 times). Even more alarming, these symptoms were reported at higher rates than in comparable Japanese studies, prompting Kim to issue an urgent call for improvements in the working conditions of keypunch operators.⁹⁰

It was not until 1989 that South Korea saw its first legal recognition of a “keypunch-related disease 키펀치병,” when a typist employed by Munhwa Broadcasting Corporation won a landmark compensation case. This delayed acknowledgment underscored the inadequacy of South Korea’s occupational disease provision, which had been imported wholesale from Japan’s 1969 statute that

⁸⁸ Ibid., 74; Sociologist Ho Keun Song argued that the ideology of familism extended into businesses by being selectively invoked to suppress or control workers’ demands. Workers who were addressed by employers as “our children” were expected to passively submit with unconditional devotion and sacrifice. See Ho Keun Song, *Labor Politics and Market in Korea 한국의 노동정치와 시장* (Nanam, 1991).

⁸⁹ Ik-Hong Um et al. op. cit.

⁹⁰ Kook Hyang Kim, “A Study on Cervicobrachial Syndrome in Key punchers and Telephone Operators 키펀치 및 전화교환원의경견증후군에 관한 조사연구” (M.P.H. thesis, Seoul National University, 1983).

narrowly defined such illnesses as “muscle, tendon, and joint disorders resulting from heavy and strenuous work.”⁹¹ The provision had remained unchanged for two decades, failing to recognize the repetitive motions and postural strains inherent in clerical and data-processing labor.

Although keypunch operators were already being displaced by newer technologies, the case marked the beginning of a broader movement to improve working conditions for South Korean office workers. The terms “keypunch operators” and “keypunch disease” may seem unfamiliar to most computer users today, but they remain attached to the legal and medical categories used to define occupational illness. The technological experience of these workers—the pride they took in their jobs, their precarious relationship with the machines, and the physical tolls of repetitive labor—also persists. It is resurfacing in new forms and regions within the globalized data-processing system, where workers, often cast as flexible labor, continue to bear the hidden costs of digital modernity.

Conclusion

This essay has explored the emergence of the keypunch service exports and their operators in South Korea from the 1960s through the 1970s, a period when the country was, in many ways, a barren land for computing. By mobilizing women labeled as “surplus labor,” Korea’s keypunch services gave purpose and meaning to the newly adopted computing technologies: a tool that could contribute to economic development and modernization by generating foreign exchange. The immediate and visible benefits of these practices motivated longer-term computerization efforts, laying the foundation for South Korea’s entry into what was heralded as the “information society” within a few decades.

From the industry’s perspective, the greatest challenge in exporting keypunch services was managing both data and personnel. Data was abundant globally, but trained operators to process it were in short supply. Korean keypunch service companies attempted to attract overseas clients with lower prices, but they faced obstacles such as unpredictable international politics and economy, language barriers, and rapid technological advancements. Clients grew increasingly impatient with the three-day delays required to transport data and punch cards across the Pacific Ocean. As for the people, keypunching was often celebrated as a sign of women’s growing participation in modern society, but the reality was far more precarious. Employment was unstable, the work monotonous and repetitive, and job satisfaction remained strikingly low. In principle, the success of the industry

⁹¹ “First Recognition of Keypunch Disease as an Occupational Injury 키펀치병 첫 산재 인정,” *Hankyoreh*, 1989. 8. 25.

depended on striking a balance between the volume of data and the availability of skilled personnel. In practice, however, these rarely aligned, resulting in processing errors, operators working overtime, undervalued labor, and reports of poor working conditions and health problems.

This essay contributes to ongoing discussions about the unseen labor that underpins the building and maintenance of artificial intelligence (AI) systems. Recent scholarship in critical data and AI studies has drawn attention to the workers performing “ghost work” for AI, often outsourced to low-wage countries in ways that reproduce postcolonial patterns of exploitation.⁹² This historical case extends and complicates these critiques by examining the motivations and justifications articulated by South Korean providers, who framed their participation in the globalized data-processing chains as part of a national modernization project. At the same time, it foregrounds the technological experiences of data-processing workers, which were made visible through statistics and newspaper reports. Such accounts are essential not only for recovering the lived realities of South Korean keypunch operators but also for prompting further research into the historical continuities that link their experience to the hidden labor sustaining contemporary digital infrastructures.

⁹² Mary L. Gray and Siddarth Suri, *Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass*. (Boston: Houghton Mifflin Harcourt, 2019); Julian Posada, “The Coloniality of Data Work: Power and Inequality in Outsourced Data Production for Machine Learning” (Ph.D. dissertation, University of Toronto, 2022).

Abstract

This essay examines the rise of the keypunch services export in South Korea during the 1970s. Keypunch service export involved labor-intensive, semi-skilled work of entering data into punch cards, performed by young women for overseas clients in the United States and Japan. Based on government documents, media reports, journal publications, and memoirs of historical figures, I argue that keypunch services were shaped by and aligned with local discourses such as “modernization of the fatherland” and “economic self-reliance,” producing visible and tangible outcomes to advance a nation that did not yet have the “computer-mind.” In this process, the service became a symbol of South Korea’s readiness to enter the new age of technological modernization, and its operators were regarded as meticulous workers with nimble hands, who could become compliant contributors to this endeavor. The problems in their work environment only came to light after the decline of the export industry, revealing the heavy toll of South Korea’s move toward modernization. This historical case adds depth to the common critique of outsourced data work as part of postcolonial exploitation, demonstrating how developmental states like South Korea actively mobilized their people and justified expanding labor-intensive services within their borders.

Keywords: keypunch operator, offshore data-processing labor, computer, modernization, economic development, feminization