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The Important Meaning of the Archives of the Indonesian Sugar Plantation Research Center for the Period 1893-1982 in the Collective Memory of the Nation and UNESCO

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ABSTRACT

Background: The archives of the Indonesian Sugar Research Center (P3GI), spanning 1893 to 1982, represent more than technical records; they are a vital repository of the nation's colonial and postcolonial industrial identity. Within the framework of Jan Assmann's Cultural Memory, these archives serve as a cornerstone for shaping Indonesia's collective historical consciousness.
Purpose: This study argues for the recognition of the P3GI archives as significant national documentary heritage. It examines their historical, symbolic, and institutional value in recording the complex interplay between science, technology, power, and the socio-economic dynamics of the Indonesian sugar industry.
Methods: Utilizing a qualitative exploratory approach, the researchers conducted semi-structured interviews with six key informants, supplemented by an extensive review of P3GI documents and archival policies. Data were analyzed using content analysis mapped against Assmann's five dimensions of cultural memory: content, form, media, time structure, and participation structure.
Findings: The results show that the P3GI archives meet all of the requirements for cultural memory. Beyond being mere data sources, they function as an infrastructure for collective memory, documenting the evolution of the sugar industry through various political eras. Furthermore, the digitization of these records and their registration as Memoria Mundi Bangsa (MKB) highlights the role of multi-actor collaboration in legitimizing and transmitting memory across generations.
Originality/Value: These findings reinforce the strategic position of the P3GI archives as a national documentary heritage and support the development of archive preservation policies based on cultural and historical values.

Keywords: Archives; Sugar plantation; Collective memory; Archives research

1. INTRODUCTION

The Indonesian Sugar Plantation Research Archives (P3GI) is a collection of documents that record research and development activities in Indonesian sugar plantations. This archive is not merely a collection of technical documents, but rather a corpus of colonial

documentary heritage that details the process of scientific and technological knowledge in the Indonesian sugar industry from the late 19th to the late 20th Century (1893–1982). Various forms of sources, ranging from research reports, statistical data, institutional correspondence, to visual documentation, reflect how science, technology, and plantation administration practices were designed to maximize the exploitation of colonial resources and regulate power relations in the Dutch East Indies (Stoler, 2002). In a global context, similar archives in the Caribbean, Egypt, and various other colonial sites have been reinterpreted as arenas of conflict between imperial narratives and local communities' claims to dignity, justice, and postcolonial identity (Bastian & Griffin, 2024; Turunen, 2020). Therefore, the preservation and reinterpretation of the P3GI archives is crucial for rewriting the history of the sugar industry in Java as an important part of industrial archaeology and the economic history of the archipelago (Alemayehu Tegegn & Dhont, 2025; Najla et al., 2025; Putra & Wirasanti, 2019), for enriching the national collective memory and opening up space for critical readings that challenge the dominant colonial narrative (Hariyono & Leksana, 2025; Yao, 2025) The P3GI archives are a vital primary source for researchers and academics seeking to gain a comprehensive understanding of the history and development of the sugar industry in Indonesia (Sastro, 2018).

Historically, P3GI was founded in 1887 in Pasuruan, East Java, as a sugar research institute that supported the colonial sugar industry through the development of sugarcane varieties, increasing productivity, and processing efficiency in sugar factories. Over time, this institution has produced various studies and publications that have had a significant impact on the advancement of the sugar industry in Indonesia, both during the colonial period and after independence (Lindblad, 1998). The archives produced by P3GI reflect the scientific achievements, document institutional changes, policies, and research orientations that follow national political and economic dynamics.

The P3GI archives have high historical and cultural value because they contain empirical records of the sugar industry's development, a strategic sector of the Indonesian economy. Through these archives, it is possible to trace how the sugar industry has played a role in shaping the economic structure, labor relations, and social life of communities in plantation areas from the colonial period to the era of independence (Nawiyanto et al., 2023; Robison, 2009). The P3GI archives also provide important information about the role of the state and regulatory agencies in regulating, developing, and reforming the sugar industry. The administrative and technical documents stored in these archives show how the colonial government and the post-independence Indonesian government formulated policies, production strategies, and resource management for the sugar industry in various historical contexts (Suharto, 2015). The P3GI archives not only serve as a record of the past, but also as a source of knowledge relevant to the formulation of policies and strategies for the development of the sugar industry today.

Academic studies on the archives and history of P3GI have been conducted by numerous researchers. Sastro (2018) highlights the history of establishment and development of P3GI as a sugar research institute, while Lindblad (1998) emphasizes the strategic role of P3GI in supporting the advancement of the Indonesian sugar industry. In addition, Suharto (2015) examines the P3GI archives as an important source for understanding the history of the sugar industry and its management policies. Other studies on the sugar industry generally focus on colonial policies, production dynamics, and relationships (Arsiansyah & Aji, 2022; Nazri & Artono, 2024; Rimasari, 2021). Although these contributions enrich the historiography of the sugar industry, existing literature has not conceptualized the P3GI

archives as cultural memory or national collective memory. The archives are still positioned as a source of economic and institutional data, rather than as an object of analysis that reflects the construction of national identity and collective memory. In fact, as an institution that operated across regimes from colonial to post-independence, P3GI recorded the transformation of scientific knowledge, agricultural technology, and industrial policy, with broader implications for the formation of national identity. This study fills this conceptual void by arguing that the P3GI archives function as a symbolic infrastructure that connects colonial heritage with the construction of modern Indonesian national identity.

Based on this background, this study aims to argue that the archives of the Indonesian Sugar Research Center (P3GI) from 1893 to 1982 constitute a documentary heritage that, in Jan Assmann's perspective of cultural memory, plays a key role in shaping the National Collective Memory of Indonesia's colonial and postcolonial sugar industry history. This study is based on the national regulatory framework in the field of archiving, particularly Regulation of the National Archives of the Republic of Indonesia Number 20 of 2021 concerning the Implementation of the Archive Registration Program as the Collective Memory of the Nation and Law Number 43 of 2009 concerning the Implementation of Archiving. Both regulations emphasize that archives are viewed as administrative products, documentary heritage that has historical, cultural, scientific, and national identity value. In this context, the archives of the Indonesian Sugar Plantation Research Center (P3GI) from 1893 to 1982 hold a strategic position as a source of collective national memory, documenting the dynamics of research, technological development, and sugar industry policies in Indonesia from the colonial period to post-independence. Regulation of the National Archives of the Republic of Indonesia Number 20 of 2021 regulates the mechanism for registering archives as the Nation's Collective Memory to ensure the preservation of archives of strategic value and to increase their use for education, research, and strengthening national identity. This policy framework is in line with UNESCO's Memory of the World (MoW) concept, which treats archives as part of the world's documentary heritage and requires their protection, preservation, and public accessibility. At the regional level, the East Java Provincial Library and Archives Office plays a key role in implementing archiving as regulated by East Java Provincial Regulation Number 4 of 2015. This institution functions as an implementing agency of the provincial government responsible for the rescue, management, and preservation of static archives.

Theoretically, this study is based on the concept of cultural memory as proposed by Jan Assmann (Assmann, 2011), who views collective memory not merely as spontaneous social memory, but as memory that is institutionalized, materialized, and passed down through relatively stable symbolic media, including archives. Within this framework, archives are understood as the primary vehicle for preserving, maintaining, and transmitting collective memory of a society's historical experiences, knowledge, and social practices across generations. Jan Assmann's theory of cultural memory is used in this study through five main indicators, namely content, forms, media, time structure, and participation structure. In this context, this study positions the P3GI archives not merely as a collection of administrative documents or historical data sources, but as a cultural entity that has an epistemological function in shaping a shared understanding of the history of the Indonesian sugar industry.

Although a number of studies have discussed the history of the sugar industry, the role of P3GI in agronomy research, and the importance of archives as primary sources of historiography, no study has been found that systematically maps the P3GI archives using Jan Assmann's five dimensions of cultural memory as an analytical framework. Previous studies tend to treat archives as historical data sources rather than as cultural memory infrastructure

that can be analyzed to strengthen the legitimacy of documentary heritage within the Nation's Collective Memory. Therefore, this research fills this gap by offering a theoretical approach that integrates archival studies, the historiography of the sugar industry, and cultural memory theory into a comprehensive analytical framework. The process of registering the P3GI archives in the National Collective Memory program is understood as the institutionalization of cultural memory, in which archives obtain symbolic and institutional legitimacy as part of the national memory. Thus, Jan Assmann's cultural memory approach enables this study to explain how the P3GI archives function as a medium connecting the past, present, and future in the construction of the collective memory of the Indonesian nation. This study seeks to answer how the archives of the Indonesian Sugar Plantation Research Center (P3GI), from 1893 to 1982, functioned as a medium of cultural memory in the formation of the collective memory of the Indonesian nation. This research is relevant to global readers because it shows how scientific and industrial archives from a colonial context record economic practices, forming the foundation of the identity and historical consciousness of postcolonial nations. This study contributes to the international debate on the decolonization of archives, the politics of memory, and the preservation of documentary heritage by offering a concrete example from Indonesia of how colonial heritage can be critically reinterpreted as a source of historical legitimacy and reflection on national identity in the contemporary era.

2. METHODS

This study uses a qualitative, exploratory approach to examine in depth the significance of the archives of the Indonesian Sugar Plantation Research Center (P3GI) from 1893 to 1982 in the context of the nation's collective memory and the UNESCO Memory of the World Program (MKBU). The qualitative approach was chosen because it allows researchers to understand the construction of meaning, historical value, and symbolic dimensions of archives as cultural products that cannot be measured quantitatively. Meanwhile, the exploratory approach was used to broaden the conceptual and empirical understanding of the P3GI archives' position as a source of knowledge on the history of the sugar industry and as national documentary heritage.

Data collection was conducted through two main sources, primary and secondary data. This study uses a historical approach and archival research, drawing on the archives of the Indonesian Sugar Plantation Research Center (P3GI) from 1893 to 1982 as the primary source. These archives are treated as direct historical records, the object of analysis, not merely supporting material. The documents analyzed include research reports, institutional correspondence, scientific publications, documentary photographs, and technical archives on the development of sugar plantations. The archival search focused on identifying their informative, historical, and symbolic value in the formation of the nation's collective memory.

Secondary sources in this study consist of scientific literature on the history of the sugar industry, colonialism, archival policy, and documents related to the National Collective Memory Program. This literature was used to construct a conceptual framework and strengthen the interpretation of primary sources. In addition, this study also utilized in-depth interviews with six key informants (see Table). The six informants were purposively selected to represent scientific and institutional authorities relevant to the study of archives and collective memory, particularly in historiography, archiving, and documentary heritage management. The interviews were conducted in a semi-structured manner using purposive

sampling techniques, based on the relevance of the informants' expertise and strategic roles to the research topic. Within this methodological framework, the interviews are treated as contextual and complementary data, providing clarification, interpretive reflection, and contemporary perspectives on the significance of archives, rather than as primary sources for the period 1893–1982 under study.

Table 1. Research Informants

Code	Informant Role/Position	Institutional Affiliation	Area of Expertise	Relevance to Study
INF-01	Director of P3GI	P3GI (Indonesian Sugar Research Center)	Industrial heritage, archival management	Provides insight into institutional archives and historical documentation practices
INF-02	History Lecturer	University of Jember	Historiography, Indonesian history	Contributes academic perspective on historical interpretation and collective memory
INF-03	Chair	Indonesian Historians Association (East Java)	Historical scholarship, historiography	Represents professional historians' perspective on memory construction
INF-04	History Lecturer	Airlangga University, Surabaya	Cultural history, historiography	Offers academic analysis of historical narratives and memory
INF-05	Chair	Indonesian Archivists Association (AAI), East Java	Archival science, records management	Provides expertise on archival governance and preservation practices
INF-06	Director of Services and Utilization	National Archives of the Republic of Indonesia (ANRI)	Archival policy, access, and utilization	Offers national-level perspective on archival systems and public access

Data analysis was conducted using content analysis techniques within Jan Assmann's theoretical framework of cultural memory (Assmann, 2008). The analysis focused on five main dimensions, namely content, forms, media, time structure, and participation structure. Each dimension is broken down into categories and operational indicators used to identify, group, and interpret archival data.

Table 2. Analytical Framework of Cultural Memory

No	Dimensions	Coding Categories	Operational Indicators
1	Content	Historical narratives, ideological values, symbols of identity	The presence of important events, normative values, representations of national identity, and continuity of knowledge
2	Form	Narrative structures, institutional symbols, and artifacts	Historiographical patterns, use of official symbols, documentation formats, and canonization of documents
3	Media	Written, visual, material, and digital archives	Storage stability, public accessibility, media sustainability
4	Time Structure	Patterns of inheritance, repetition, and historical legitimacy	Intergenerational references, the use of history for policy legitimization, and periodic reinterpretation
5	Participation Structure	Official institutions, cultural actors, and communities	Involvement of state institutions, distribution of the roles of producers and recipients of memory, and the level of inclusivity

The analysis procedure was conducted in three stages: (1) identification of units of analysis in the archives (documents, narratives, symbols, policies); (2) coding based on five dimensions of cultural memory; and (3) interpretation of inter-dimensional patterns to explain the function of archives as a medium of collective memory. Data validity is maintained through the triangulation of sources and methods, namely by comparing the results of archive coding with contextual interviews and supporting literature to ensure consistency in interpretation across sources.

3. RESULTS AND DISCUSSION

Content

Sugarcane research has been conducted systematically and scientifically since the colonial era through an institution formerly known as Proefstation voor de Java Suikerindustrie. This is reflected in the large number of research documents on sugarcane varieties, particularly the Proefstation Oost-Java (POJ) varieties and letter varieties, which record the process of plant breeding, crossbreeding, field trials, and seed distribution to various plantations and sugar factories in Java. These archives contain the final results of the research, experimental plans, field observations, and productivity evaluations. The archives also contain research on soil fertility and fertilization, including the use of ZA (zwavelzure ammoniak), urea, phosphate, lime, and chilisalpeter, accompanied by soil analysis, soil maps, and testing of fertilizer doses on sugar yields. The existence of these archives confirms that increasing sugar production depends on superior varieties, but also on proper agronomic management based on scientific data. The classification of P3GI archive content is shown in the following table.

Table 3. Classification of P3GI Archive Topic

No	Main Theme	Scope of Archive Contents	Inventory Number
1	Sugar Industry Production & Statistics	Production data, milling results, production status, harvest statistics	4, 8, 11, 12, 13, 14, 18, 50, 52, 54
2	Sugar Cane Seeds & Varieties	Seed delivery, overseas seed exchange, POJ variety testing	5, 10, 11, 21, 31, 32, 33, 34, 35, 36, 66
3	Fertilization & Soil Fertility	Urea, plant nutrients, and fertilization results	6, 37, 38, 39
4	Pests & Plant Diseases	Mice, whiteflies, ratoon disease, pest control	1, 19, 41, 43, 44, 45, 59
5	Climate & Rainfall	Regenstaat, the effect of weather on production yields	7, 15, 16, 17, 20
6	Soil Analysis & Land Mapping	Soil analysis, soil maps, soil structure, drainage	1, 3, 12, 21, 22, 25, 26, 28, 30, 35, 41, 42, 45, 54, 58, 89
7	Factory & Industrial Machinery Technology	Condenser, carbonation, laboratory equipment, production machine	2, 9, 10, 21, 22, 42, 46, 47, 48, 49, 60
8	Plantation Administration & Management	Land lease, transfer of control, official letter, institutional relations	24, 25, 26, 27, 28, 29, 57, 62
9	Cooperation & International Relations	Exports, overseas visits, ASEAN, and global cooperation	51, 55, 56, 58
10	Organizational Publications & Documentation	Annual archives, P3GI reports, official publications	30, 63, 64, 65
11	Strategic Research &	Atomic technology and future industrial	23

	Innovation	development	
12	Photos of P3GI Leaders & Scientists	Director, assistant director, researcher, scientific staff	2, 3, 4, 10, 11, 12, 43, 44, 45, 47, 63
13	Photos of P3GI Buildings & Infrastructure	Main building, offices, laboratories, museum, research facilities	1, 6, 7, 13–17, 19–38, 60–62
14	Photos of Research & Laboratory Activities	Chemistry experiments, physiology, sugarcane breeding, and meteorological observations	39, 48–55
15	Photos of Sugar Industry Technology & Equipment	Grinding machine, laboratory equipment, instrument workshop	50, 51, 52, 58, 59
16	Sugar Cane Cultivation & Production Photos	Planting, harvesting, and transporting sugarcane	5, 40, 57, 67
17	Institutional Museum & Archives Photo	Exhibition hall, museum interior, historical documentation	60, 61, 62
18	Photos of Historical Events & Political Transitions	Damage caused by military aggression, nationalization, and building inauguration	13, 15, 17
19	Photo of International Relations & Scientific Diplomacy	Visit of the King of Siam, an international figure	64, 65, 66
20	Photos of Social Environment & Institutional Settlements	Official residence, Heerenstraat area, Proefstation complex	18–26
21	Photos of Institutional Transportation & Mobility	Official vehicles, sugar cane distribution	56, 57

The P3GI archive also includes documentation on sugarcane diseases and pests, such as gomziekte (sap disease), yellow streak disease, pokkahbung, fusarium, root rot, and stem borer attacks. These reports are supplemented with field observations, laboratory analyses, and control recommendations. Various reports on production, yield, and performance evaluations of machinery, such as boilers, evaporators, centrifuges, and steam systems, show the close relationship between agricultural research and industrial technology, especially in efforts to reduce production losses and maintain the stability of raw material supplies for sugar factories. Environmental and climate aspects also receive serious attention in the P3GI archives. Records of rainfall, sunlight, and local climate conditions in various plantation areas show that environmental factors have been systematically analyzed in relation to sugarcane growth and crop yields. From an institutional and network perspective, the P3GI archives reveal extensive links among sugar research institutions, plantations, sugar factories, banks, and national and international institutions.

Forms

The concept of forms in this study comes in various forms, both textual and visual. Textual archives include research reports, correspondence, production statistics, legal agreements, and institutional administrative documents. Meanwhile, visual archives comprise photographs of buildings, laboratories, sugarcane varieties, research activities, institutional leaders, and the impact of political conflict on P3GI infrastructure. The photo archives of the Indonesian Sugar Research Institute (P3GI) are a visual record that documents the institutional history, scientific activities, and social dynamics of the sugar industry in Indonesia from the late 19th Century to the 1970s. P3GI photo archives show the early stages of establishing a sugar research institute in East Java in 1887, which later became the largest sugar research center in Asia. The scientific dimension of the P3GI photo archives is evident in the documentation of superior sugarcane varieties, particularly the POJ (Proefstation Oost-

Java) 2878 variety, discovered in 1908. The photo archives also record the infrastructure supporting the research, such as the sugarcane quarantine facility in Ranu Darungan, the chemistry laboratory, the soil and fertilizer laboratory, the plant physiology room, the cytology room, the library, and the meteorological observation station. This confirms that sugar research focuses on the plantation, laboratory analysis, and scientific data processing. The forms of P3GI archives can be classified as follows.

Table 4. Classification of P3GI Archive Forms

No	Archive Format	Inventory Number
1	Official Letters	24, 25, 26, 27, 28, 29, 57
2	Technical Reports	2, 6, 23, 41, 50
3	Production Statistics & Tables	8, 12, 13, 14, 18, 52
4	Publications & Annual Reports	63, 64, 65
5	Visit & Cooperation Reports	55, 56, 58
6	Portraits of Important Figures	2–4, 10–12, 43–45, 47
7	Building Documentation Photos	1, 6, 7, 19–38
8	Laboratory Activity Photos	48–55
9	Field Activity Photos	40, 57, 67
10	Official Event Photos	15, 17, 64–66
11	Museum & Archive Photos	60–62

Political regime changes are reflected in the photo archives from the Japanese occupation period. Photos of the Director and Assistant Director of P3GI during the Togyo Shikensho period (1943), such as Dr. Yukio Okade, Dr. Shosuke Tanaka, and Takeo Takeshita. The visual archives are important evidence of how the Sugar Research Institute was maintained and operated as a strategic institution, despite being in a situation of war and military occupation. The P3GI photo archives also record the impact of armed conflict on the research institute. The social and cultural dimensions are captured in the photo archives, which record the atmosphere of the official residence, the P3GI museum, the director's official vehicle, and visits by important figures such as the King of Siam. These photographs show that P3GI functioned as a research center, a space for social representation and scientific diplomacy, and a symbol of institutional authority. The presence of the museum and its interior documentation indicates an early awareness of the importance of preserving institutional memory.

Media

The P3GI archive preservation activities managed by the East Java Provincial Library and Archives Office are not carried out incidentally, but are designed and implemented continuously through structured annual planning. The commitment to P3GI archive preservation is reflected in the integration of programs and activities related to archive preservation into regional development planning and budgeting documents for both the 2023 fiscal year and previous years. Institutionally, static archive preservation is carried out through the Archive Management Program, specifically in the Provincial Static Archive Management activity with sub-activities of Acquisition, Processing, Preservation, and Access to Static Archives. Static archives are managed by professionals, including expert and skilled archivists, restoration technicians, and reproduction technicians, with support from general staff who have undergone training and internships in archive restoration at the National Archives of the Republic of Indonesia. The P3GI archive storage media are presented in the following classification table.

Table 5. Classification of P3GI Archive Media

No	Archive Media	Inventory Number
1	Typed Documents/Letters	The majority of administrative archives
2	Technical Archive Bundles	2, 10, 21, 22
3	Official Printed Books	63, 64, 65
4	Scientific Reports	23, 41, 50
5	Digitized Analog Photos (JPG)	All archives
6	Black and White Photography	The majority of the collection
7	Reproductions of Colonial Archives	Photos before 1945
8	Modern Institutional Documentation	Photos after nationalization

The P3GI archives are stored in the East Java Provincial Library and Archives Office's Static Archives Depot, which was specially designed by the East Java Provincial Public Works Agency and located on the second floor of the building, and is equipped with a gas-based fire-extinguishing system and other firefighting facilities. The archives are wrapped in acid-free paper, placed in standard archive boxes, and stored on roll-o-pack shelves to maximize security and storage space efficiency. In addition, the archive depot is equipped with humidity-measuring devices and a temperature-control system to maintain stable storage conditions in accordance with static archive preservation standards. In line with developments in information technology, the East Java Provincial Library and Archives Office also digitized the P3GI archives, accompanied by authentication. This digitization serves as a risk-mitigation strategy against information loss while also expanding public access to archives. As part of the integration of the national archival information system, P3GI archive data has been entered into the National Archival Information System.

Various preservation efforts have been made on the P3GI archives submitted to the Collective Memory of the Nation, but they are not yet fully free from the risk of damage and security threats. This condition is mainly due to the limitations of the archive depot facilities, which to date have not fully met the minimum national standards for archive depots. In addition, the volume of archives requiring restoration is relatively large, requiring considerable resources and funding. Budget constraints have prevented the East Java Provincial Library and Archives Office from optimally and independently fulfilling its P3GI archive preservation efforts. Efforts to preserve and provide access to P3GI archives have also been strengthened through socialization and information dissemination activities. These activities include publishing static archives, compiling an archive guide on sugar plantation research, and providing archive user education services for public and private universities in East Java. In addition, the East Java Provincial Library and Archives Office provides an archive restoration internship program for students and cooperates with various universities in the Merdeka Belajar Kampus Merdeka (MBKM) program.

Time Structure

The P3GI archives cover a long period, from the colonial era (late 19th and early 20th centuries) through the Japanese occupation (1942–1945) to the post-independence and nationalization periods, as identified in the following table.

Table 6. Archival Period for P3GI Administrative Records and Photographs

No	Timeline	Inventory Number
1	Early Colonial Period (1887–1904)	1-7
2	Central Colonial (1915–1925)	34, 45, 48, 55
3	Mature Colonial (1926–1939)	5, 8, 9, 15, 16, 19-26, 28, 30, 47-49
4	War Period (1940-1945)	10-12, 37, 39, 66–72
5	Transition of War & Revolution	13, 31, 32
6	Early Post-Independence Period	5, 9, 15, 16, 24–29, 33–36, 50, 59, 90
7	Industrial Modernization (1960–1979)	13, 18, 23, 43–45, 54, 58, 59, 63, 89

This temporal structure is evident in research archives, administrative records, and photographs, which continuously document institutional transformations, technological changes, and political and economic dynamics that have influenced the sugar industry. This long temporal span allows for tracing continuities and changes in the history of Indonesia's sugar industry.

Participation Structure

The P3GI administrative archives generally contain correspondence between research institutions and various parties, including sugar factories and plantations (suikerfabriek), private companies, local and central government agencies, banking institutions, and international institutions. These documents show that P3GI functioned as a coordinating hub between scientific, industrial, and public policy interests in the sugar sector. Correspondence regarding plant diseases such as gomziekte, seed delivery, fertilization, and weather and production reports shows how technical aspects of agriculture were managed through formal administrative mechanisms. Another important dimension is the archives related to institutional and legal relations. Documents on land lease agreements, compensation payments, and the transfer of control over P3GI assets reflect the change in institutional status from the colonial period to the period of nationalization. These archives provide administrative evidence of the transfer of ownership, organizational restructuring, and adjustments to working relationships among the state, plantation companies, and research institutions after Indonesia's independence. The involvement of actors in the production of memory is shown in the following table.

Table 7. Actor Involvement in Memory Production

No	Actor	Inventory Number
1	P3GI / Proefstation	Almost all archives
2	Regional Sugar Factory	2, 3, 4, 7, 8, 18, 15, 27, 41
3	Central/Regional Government	24–29, 50, 51, 89, 91
4	Foreign Partners	33, 35, 36, 55, 58, 71, 93, 94, 97
5	Sugar Industry Organization	8, 63, 64, 65, 70, 78

The P3GI administrative archives also document the institution's involvement in national and international agendas. This shows that it was also part of the global sugar research and industry network and served as a record of scientific and economic diplomacy in

agriculture. The administrative archives reflect P3GI's response to political and social dynamics. Documents related to the Japanese occupation, the takeover of Dutch companies, and the liberation of West Irian show that the administration of research institutions cannot be separated from the country's political context. In addition, archives document mass pest-control efforts, such as rat extermination and the use of chemical pesticides. The planning documents, operational reports, and evaluations of these activities show that P3GI also served as a technical and administrative coordinator for regional-scale crop protection programs.

The process of proposing the archives of the Indonesian Sugar Plantation Research Institute (P3GI) as part of the National Collective Memory (MKB) program was carried out through a series of consultations and coordination with various key stakeholders. As stated by the Director of P3GI,

> *"We greatly appreciate and support the plan to register the P3GI archives into the Nation's Collective Memory. For us, this is not just a matter of archives but also a recognition of P3GI's role in the history of the Indonesian sugar industry. Hopefully, this step will encourage the government to give P3GI space to contribute to the development of the national sugar and cane industry. We are also ready to provide explanations regarding the archives that have been submitted."* (INF-01).

It also expressed by a history lecturer and the Chairman of the Indonesian Historians Association for East Java,

> *"I strongly support the Library and Archives Office's move to register P3GI archives into the National Collective Memory program. These archives are highly significant, both for their informational and historical value. If we look further, the P3GI documents record the nation's important journey, especially in the context of socioeconomic history, the development of the sugar industry, and the dynamics of plantations in Indonesia. So, in my opinion, this proposal is important and highly relevant academically."* (INF-02).

> *"I believe that the nomination of the P3GI archives is of great strategic significance in the context of Indonesia's economic history. These archives reflect the development of the sugar industry and reveal the relationship between policy, production, and national economic dynamics. With their historical value and comprehensive information, I am optimistic that the P3GI archives have a good chance of being accepted and designated as part of the nation's collective memory.*" (INF-03).

A history lecturer and the Chair of PW AAI Easj Java, also provided support for academic activities through the following statement:

> *"Currently, several history students at Airlangga University are utilizing P3GI archives as their primary source for writing their theses. The archives stored at the East Java Provincial Library and Archives Office are very helpful to students in studying the history of the sugar industry and socioeconomic dynamics in East Java. This shows that the P3GI archives are of historical value, actively used in academic activities.*" (INF-04).

> *"We fully support the plan to propose static archives as part of the Nation's Collective Memory. As concrete support, we also held a seminar on one of the main sub-themes, discussing the registration of archives as the Nation's Collective Memory. Through this activity, we want to encourage greater understanding and participation among archive managers so that they are more active in proposing archives of historical value.*" (INF-05).

Additionally, the Director of Services and Utilization of the National Archives of the Republic of Indonesia, also stated at the AAI East Java Regional Seminar and Conference that:

> *"The National Memory Program is one of the strategic efforts of the National Archives of the Republic of Indonesia to protect and utilize archives that have historical and national value. We encourage all archival institutions and archive managers in the regions to actively participate in this program, whether by proposing archives, improving management quality, or strengthening collaboration between institutions. Through seminar forums such as this, we hope that understanding of the mechanisms and substance of the MKB will increase so that regional participation will also be optimized."* (INF-06).

Intensive consultations were held with intellectuals, experts, and archival communities as an important part of the process of proposing the P3GI archives. The East Java Regional Board of the Indonesian Archivists Association (AAI) supported the plan to propose P3GI's static archives as the nation's collective memory, which was realized in practice through the East Java AAI Regional Seminar and Conference. This forum served as a space for dissemination, advocacy, and strengthening of joint commitment in supporting the MKB program organized by the National Archives of the Republic of Indonesia.

DISCUSSION

Collective memory refers to the construction, maintenance, and transmission of shared memories by a community or nation through symbolic, institutional, and documentary media. This memory is not spontaneous or individual, but rather organized through a process of selection, legitimization, and transmission involving social institutions, cultural practices, and public policy. In the context of the nation-state, collective memory serves as the foundation for the formation of national identity, historical legitimacy, and future orientation. The National Collective Memory Program (MKB) and the UNESCO Memory of the World framework represent the institutionalization of this memory, in which archives and documentary heritage are positioned as the main infrastructure for maintaining the continuity of historical knowledge and experience across generations. Thus, the analysis of the P3GI archives aims to identify their historical value, understand how these archives contribute to the construction of the nation's collective memory through the mechanisms of documentation, preservation, and institutional recognition.

The results of the study show that the P3GI archives meet the main characteristics of cultural memory as formulated by Jan Assmann, in terms of content, form, media, temporal structure, and participatory structure. These findings broaden our understanding of the role of archives as a source of historical data, an infrastructure of collective memory that serves to build continuity of knowledge, institutional identity, and the historical legitimacy of the Indonesian sugar industry (Erll, 2011; Hoskins, 2018; Nora, 2019). In this context, the P3GI archives can be understood as a medium that records the complex relationship between science, technology, colonial and national power, and the political economy of plantations (Jimerson, 2009; Mintz, 1986; Sattler, 2010; Schwartz & Cook, 2002).

In terms of content, the findings show that the P3GI archives record technical data on sugarcane research and document the institutionalized system of scientific knowledge production. Archives on POJ variety breeding, fertilization, pest control, and yield evaluation reflect how agronomic research became the main foundation for sugar industrialization. This

reinforces Assmann's argument that cultural memory is not formed solely by individual events but rather by institutionally inherited knowledge systems.

These findings are in line with research (Nawiyanto et al., 2023) showing that the colonial sugar industry in Indonesia developed through the integration of scientific research, production technology, and colonial economic interests. The comparative study confirms that sugar research institutions played an important role in building the knowledge base that supported the sugar industry system (Knight, 2000). The P3GI archives, containing research on sugarcane varieties, fertilization, and disease control, provide empirical evidence that supports the findings (Nawiyanto et al., 2023) while also showing how this scientific knowledge has been institutionalized and passed down as part of the nation's cultural memory. These findings are also in line with research (Boomgaard, 2006; Knight, 2013), which asserts that the success of the plantation industry in Southeast Asia was highly dependent on the integration of scientific research, field experiments, and colonial administrative systems (Booth, 2016). In the Indonesian context, the P3GI archives show how agronomic knowledge was systematically produced and used as an instrument of economic policy, thus serving as a record of structural memory about science-based industrialization. Furthermore, research (Van Niel, 1995) The economic history of colonial Indonesia emphasizes that the sugar sector was one of the pillars of colonial fiscal policy that shaped the post-independence national economic infrastructure (Dick et al., 2002). The P3GI archives reveal the micro dimension of this process, namely, how the production of scientific knowledge was translated into industrial practices and operational policies in sugar factories. Thus, the P3GI archives serve as a source of economic history, an institutional memory of the transformation of knowledge into productive power (Bowker, 2008).

Furthermore, the continuity of this knowledge production did not stop at the historical period of 1893–1982, but continued in contemporary research practices, as seen in the research project Integrated Disease Management of Sugarcane Streak Mosaic in Indonesia (Magarey, 2019). This project focuses on the integrated control of Sugarcane Streak Mosaic Virus (SCSMV) through molecular virology approaches, agroecosystem mapping, identification of resistant varieties, and the development of adaptive cultivation strategies. Substantively, the research agenda reflects the continuity of the scientific tradition documented in the P3GI archives, particularly in relation to sugarcane variety breeding, plant disease control, and the integration of agronomy research with industrial needs. The historical archives of P3GI show that plant disease has long been a major concern in the plantation research system, and that management strategies have been developed systematically through laboratory experiments and field trials. Thus, the contemporary research project can be understood as a continuation of the institutional memory documented in the archives, as well as evidence that the agronomic knowledge system built since the colonial era still has strategic utility today.

From UNESCO's Memory of the World perspective, this continuity reinforces the indicator of continuing relevance, namely the extent to which a documentary heritage remains meaningful and useful to today's society. UNESCO guidelines emphasize that global significance is determined by the age or rarity of a document, as well as by its continuing relevance in addressing global issues. In the context of food security, climate change, and the threat of tropical plant diseases, the historical documentation of the sugarcane research system stored in the P3GI archives has relevance that transcends national boundaries. These archives provide an epistemological basis for understanding how scientific knowledge is cumulatively produced and transformed into adaptive industrial strategies. Therefore, the

P3GI archives have retrospective value as a historical record of the sugar industry, prospective value as a reference for future policy development, and as a repository for tropical agricultural innovation.

The connection between historical archives and contemporary research practices shows that the P3GI archives function as a living documentary heritage that continues to engage with the latest social and scientific needs. Within the framework of Jan Assmann's cultural memory theory, this continuity represents the transmission of knowledge across generations, institutionalized in a stable manner through the medium of archives. Meanwhile, within the framework of Memory of the World, the sustainability of this epistemological function reinforces the argument that the P3GI archives have global significance because they document the evolution of a tropical agricultural research system that remains relevant in the global context. Thus, the content dimension of the P3GI archives documents the historical foundations of sugar industrialization, demonstrating the continuity of scientific knowledge that serves as intellectual infrastructure for the development of Indonesia's strategic food sector.

The continuity of this research practice shows that the production of agronomic knowledge documented in the P3GI archives does not end as a historical record but continues to be reactualized in the context of contemporary agricultural challenges. Within the framework of Jan Assmann's cultural memory theory, this condition confirms that cultural memory operates through a long-term temporal structure, in which institutionalized knowledge systems can transcend generations and adapt to social, technological, and environmental changes. The P3GI archives thus represent the historical phase of sugar industrialization, serve as a temporal node connecting the colonial era, the period of national transition, and the modern research agenda. From UNESCO's Memory of the World perspective, this cross-temporal continuity reinforces the indicator of continuing relevance, namely the ability of a documentary heritage to retain its meaning and strategic function in present and future contexts. By providing documentary evidence of the evolution of the sugarcane research system, which remains a reference for disease management and productivity improvement, the P3GI archives demonstrate their character as a retrospective and prospective documentary heritage.

In terms of forms, the diversity of textual and visual archives reinforces the role of archives as a medium for stabilizing memory. Archives of reports, statistics, correspondence, and photographs form a multi-dimensional representation of the history of P3GI and the sugar industry. Photographic archives, in particular, serve as material evidence that connects written historical narratives to visual representations of power, technology, and social life in the sugar industry. This is relevant to Assmann's concept of "media of memory," which emphasizes the importance of relatively permanent material forms in preserving collective memory so that it can be passed down across generations. This aspect correlates with research (Rimasari, 2021) on sugar industrialization in East Java, which emphasizes the importance of factory infrastructure, production technology, and work organization in the development of the sugar industry. The P3GI photo archive complements this historiographical narrative with concrete visual evidence, thereby giving the industrialization process described in Rimasari's research a material dimension that strengthens the collective memory of the sugar industry's history in East Java.

A study (Burke, 2001) on visual culture in Historiography shows that archival photographs have symbolic power in constructing historical narratives because they are able to present concrete representations of technology, power, and social practices. In the context

of P3GI, photographs of laboratories, production machines, institutional buildings, and leaders serve as visual documentation and symbols of scientific legitimacy and institutional authority. Research (Edwards, 2021) on industrial visual archives shows that industrial photographs often function as tools for representing modernity and technological progress (Edwards & Morton, 2015; Rose, 2022). The P3GI photo archive shows how the Sugar Research Institute represented itself as a center of innovation and a symbol of tropical agricultural progress. Thus, the formal dimension of the P3GI archives supports the function of documentation, shapes the symbolic construction of institutional identity, and the strategic role of P3GI in national development.

In terms of media, the transfer and integration of P3GI archives into a digital archiving system represent an important transformation in the transmission of cultural memory. Digitization serves as a preservation strategy, a means of democratizing access to collective memory, so that memories of the sugar industry are no longer limited to physical archives, but can be accessed by the wider community (Duff et al., 2013; Kirschenbaum, 2016). Digitization enables expanded public access, strengthens the educational function of archives, and supports interdisciplinary research. In this context, research findings (Nazri & Artono, 2024) on the dynamics of the Ngadiredjo Sugar Factory reveal a high need for continuously accessible archival sources to reconstruct the history of the sugar industry at the local level. The digitization of P3GI archives enables expanded access to previously limited primary sources, thereby supporting research on the history of the sugar industry while strengthening archives as a medium for transmitting cultural memory across space and time. This is in line with the findings (Conway, 2010), which emphasizes that digital preservation is about the physical preservation of archives and transforming the way people interact with collective memory. In the context of P3GI, the integration of archives into the National Archival Information System expands the user base, from academics and students to the general public. Research by (Ketelaar, 2008) also shows that the digitization of archives contributes to the democratization of memory, as access is no longer monopolized by certain institutions.

The temporal structure of the P3GI archives shows a long continuity spanning the colonial era, the Japanese occupation, and the post-independence period, demonstrating how cultural memory works across generations. This pattern confirms Assmann's concept of long-term cultural memory that supports national identity and historical understanding. This temporal continuity reinforces the findings (Arsiansyah & Aji, 2022) that show the development of the Lestari Sugar Factory in Nganjuk cannot be understood in isolation from the broader historical context of the sugar industry. The P3GI archives span a long time period, allowing connections between the dynamics of local sugar factories and structural changes in the national sugar industry, thereby integrating local memory into the nation's collective memory. This is in line with research (Reid, 2020) showing that colonial economic memory in Southeast Asia shaped postcolonial development patterns through the continuity of institutions and infrastructure (Cribb, 2000). In the national context, the P3GI archives serve as a bridge between colonial memory and national industrial identity. These findings reinforce the argument that the history of the sugar industry cannot be understood as a separate event, but rather as a layered process that shaped the structure of modern Indonesia's economy. By providing extensive temporal evidence, the P3GI archives enable the integration of local plantation memories, P3GI institutional memories, and the nation's collective memories regarding the development of the strategic food sector.

The participation structure in the process of registering P3GI archives as the Nation's Collective Memory confirms that cultural memory is not formed spontaneously, but rather through mechanisms of selection, legitimation, and institutional recognition (Yakel, 2005). The involvement of archive owners, archive managers, academic experts, professional communities, local governments, and the National Archives of Indonesia shows that the proposal of the P3GI archives as the Nation's Collective Memory is the result of multi-actor interaction and a structured social and institutional process. A series of consultations with stakeholders showed cross-stakeholder consensus on the importance of the P3GI archives as part of the nation's documentary heritage. This process strengthened the legitimacy of the P3GI archives' nomination to the Collective Memory of the Nation program and also affirmed the collaborative role of various actors in the preservation and use of archives as sources of historical knowledge, national identity, and development policy.

This is in line with the view (Cook, 2013) which emphasizes that archives are products of social construction shaped by professional practices, institutional policies, and public interests. Furthermore, research (Flinn, 2007) on community archives show that stakeholder participation strengthens the social legitimacy of archives and increases their public relevance (Caswell, 2014). In the context of P3GI, the support of academics and the archival profession community strengthens the position of archives as a documentary heritage of national value. The consultation and seminar processes also show that MKB registration is not merely an administrative procedure, but an arena for negotiating the meaning of history and the value of archives.

This finding complements historiographical studies of the sugar industry, which have thus far emphasized analysis of production and economic policy. This research shows that archives serve as sources for historical reconstruction and as objects of memory that are negotiated in contemporary archival practices. Thus, the P3GI archives are at the intersection of history, archival policy, and the construction of national identity. Conceptually, this research reinforces the relevance of Jan Assmann's cultural memory theory to Indonesian archiving. The P3GI archives show that cultural memory is formed through monuments and rituals, as well as through organized scientific and administrative archival systems. This study also shows that modern archival practices, such as digitization, public dissemination, and MKB programs, serve as mechanisms for the actualization of cultural memory within the nation-state.

4. CONCLUSION

The archives of the Indonesian Sugar Plantation Research Center (P3GI) demonstrably embody the characteristics of cultural memory as conceptualized by Jan Assmann, encompassing the dimensions of content, form, media, temporal structure, and participation. These archives function not merely as repositories of historical data but as infrastructures of collective memory that document the interplay between science, technology, power, and political-economic dynamics in the development of Indonesia’s sugar industry. As such, they constitute a strategic medium linking colonial legacies, institutional transformation, and the construction of national industrial identity. The content dimension reveals the centrality of institutionalized scientific knowledge, particularly in sugarcane research, fertilization, and disease control, while the diversity of textual and visual forms reinforces memory stabilization and symbolizes scientific authority and modernity.

At the same time, the transformation of archival media through digitization enhances accessibility and extends the transmission of memory across spatial and temporal boundaries. The temporal structure reflected in the archives illustrates continuity from the colonial period to the post-independence era, enabling the integration of industrial memory into the broader national narrative. Participation structures further demonstrate that cultural memory is shaped through institutional legitimacy and multi-stakeholder collaboration, particularly through initiatives such as the National Collective Memory program. Conceptually, these findings affirm the relevance of cultural memory theory within Indonesian archival studies, while practically underscoring the need for strengthened preservation policies, sustainable digitization, and integrative frameworks that position archives as instruments of public learning, national identity formation, and knowledge-based development..

AUTHORS' CONTRIBUTIONS

Tiat S. Suwardi: Conceptualization; Writing - original draft preparation.
Siti Rokayah: Conceptualization.
Susilo Dwi Atmodjo: Conceptualization.
M. Ubaidillah Faqih: Conceptualization.

CONFLICT OF INTERESTS

We state that there are no known conflicts of interest linked with this publication, and that there has been no significant financial assistance for this work that could have influenced its outcome.

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