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The Arshin (Zira) as a Historical Unit of Length in the Islamic World: A Comparative Study

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Abstract

Historical systems of measurement are essential for the accurate documentation, interpretation, and conservation of architectural heritage. In the Islamic world, the arshin (zira) was one of the principal units of length, yet its metric value varied considerably across regions, periods, and practical contexts. This study examines the arshin through a comparative historical framework based on major scholarship on Islamic and Ottoman metrology, together with relevant documentary and material evidence. The analysis focuses on the principal forms of the arshin, their reported metric equivalents, and their internal subdivisions. The results show that the arshin did not function as a single fixed unit, but rather as a family of related measures shaped by chronology, geography, and use. This variability is reflected not only in total length, but also in the organization of subunits such as fingers, knuckles, handbreadths, lines, and points. The study concludes that the arshin should be interpreted as a context-dependent metrological structure and that such an approach provides a more reliable basis for the documentation and interpretation of architectural heritage in the Islamic world.

Keywords: Arshin, Zira, Historical Metrology, Islamic World, Measurement Systems.

JEL Codes: N35

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1. Introduction

Historical systems of measurement are of central importance to architectural heritage studies because they inform the documentation, interpretation, and conservation of historic built environments. Recent research has emphasized that reliable documentation and structured information management are fundamental to the interpretation and conservation of historic buildings, particularly where dimensional logic must be reconstructed from heterogeneous evidence (Li et al., 2025). As Li et al. (2025:1) note, "balancing precision and efficiency, ambiguous information structures, and the absence of standardized protocols" remain persistent challenges in digital heritage documentation. This observation is especially relevant where historical dimensions must be interpreted together with documentary and material evidence. This point has also been reinforced in studies that approach heritage knowledge as an information-based process closely connected to documentation and conservation practice (Parente et al., 2025). The identification of original units of length is therefore essential for reconstructing design logic, proportional relationships, construction practices, and modular organization in historical buildings. When premodern units are inaccurately translated into modern metric values, the interpretation of dimensions, spans, proportions, and restoration evidence may become distorted.

Within the Islamic world, historical measurement systems present a particularly complex field of study because of their regional diversity and unstable correspondence with modern metric units (Hinz, 1990). Earlier work by Özdural (1990) has also shown that medieval Islamic architectural practice cannot be separated from broader systems of geometry and measurement. In the Ottoman context, the problem becomes even more pronounced because units of measurement changed over time and could not always be directly aligned with modern standards (Özdural, 1998). Arseven (1950) likewise records that multiple units of length continued to coexist in later Ottoman practice, reflecting the absence of a single fixed standard. Sönmez (1997) further demonstrated that Ottoman measurement systems were marked by both technical diversity and practical ambiguity. In a later study, the same author emphasized that these ambiguities created difficulties for architectural surveys and for the interpretation of original dimensions in historic structures (Sönmez, 1999). Taken together, these studies indicate that historical systems of measurement should not be treated as universally stable quantities, but as context-dependent structures requiring careful comparative analysis.

A broader theoretical perspective on this issue is provided by recent research on body-based units of measure, which has shown that such systems were not merely pre-standard survivals, but persistent and adaptive components of human technical culture (Kaaronen et al., 2023). Kaaronen et al. (2023:948) state that "Measurement systems are important drivers of cultural and technological evolution." This perspective is particularly useful for the study of Islamic metrology, where units such as the arshin were grounded in embodied reference systems while also acquiring administrative and technical meanings over time.

At the same time, body-based units must be interpreted critically, because anthropometric measurement systems may naturalize particular assumptions about whose body is taken as the normative basis of measurement. A later architectural example is Le Corbusier's Modulor, an anthropometric proportional system based on a standardized male body and intended as a universal architectural measure (Le Corbusier, 1954). Although this example is historically distant from Islamic metrology, it is useful as a reminder that embodied measurement can carry social and disciplinary assumptions as well as technical meanings. In the present study, this point is used cautiously: the arshin is not treated as a universal bodily constant, but as a unit whose meaning was shaped by its field of use, including architecture, trade, craft production, and textile measurement.

Among the units of length used in the Islamic world, the arshin (Persian), or zira (Arabic), occupies a particularly important place. The term appears in Turkish dialects in forms such as arshun, archin, arjin, alchin and is generally associated with the distance from the elbow to the tip of the middle finger; its Arabic equivalent is zira (Erkal, 1991). Yet the arshin did not correspond to a single immutable length. Historical evidence compiled by Hinz (1990) shows that several forms of the unit were in circulation, including the black cubit (zira al-sawda), the legal cubit (zira al-shariyya), the small and large Hashimi cubits (zira al-bilalliyya and zira al-hashimiyya), the public cubit (zira al-amma), the architect's cubit (zira al-benna / zira al-mimariyya), and textile or market-related measures such as zira al-bezz, the market arshin, and the endaze, each with different metric values and practical contexts. Özdural's (1998) study of Ottoman architectural metrology further confirms that the arshin must be understood as a historically variable unit rather than as a fixed equivalent. For architectural heritage research, this variability is especially important because the identification of the relevant unit may directly affect the reading of dimensions, modules, and constructional logic in historic structures.

The historical variability of the arshin becomes even more evident when its internal subdivisions are considered. In Islamic and Ottoman systems of measurement, subunits such as fingers, knuckles, handbreadths, lines, and points played a central role in structuring the unit (Hinz, 1990). A particularly impor-

tant source in this respect is Risale-i Mimariyye, edited by Gökyay (1975), which records that the Ottoman architectural arshin was divided into sixty equal parts until AH 994 (AD 1585/1586). Crane's (1987) study of the same treatise confirms this division and clarifies its architectural context. Özdural (1998) also interpreted this shift as more than a simple numerical adjustment, arguing that it reflected a structural change in the practical use of measurement. This observation is highly significant for architectural heritage studies because it shows that historical dimensions cannot be understood solely through total metric values; they must also be interpreted through the internal logic of subdivision and application.

Ottoman evidence likewise demonstrates that the arshin cannot be regarded as a standardized unit of fixed length. Ayverdi (1973) calculated the sixteenth-century architectural arshin at approximately 73.33 cm on the basis of construction records related to the Süleymaniye Mosque. Özdural (1998) reported a closely related value of approximately 73.4 cm for the same general period and situated this measure within a broader metrological framework. Arseven (1950), by contrast, recorded the nineteenth-century architectural arshin as 75.8 cm and also distinguished function-specific units such as the market arshin and the endaze (length measurement for fabric). More recent scholarship on Ottoman architecture has shown that dimensional logic and proportional order remain central to the interpretation of mosque architecture (Erdoğan, 2024). Erdoğan (2024: 89) identifies "the system of ratio-proportion" as a fundamental principle of architectural theory. This point is important because it links measurement directly to formal order in Ottoman architecture. This line of inquiry has been extended by studies that read Sinan's architecture through modular and recursive geometric design principles (Diker, 2026). As Diker (2026: 271) argues, modular circles and squares may have served as "a foundational design tool, guiding both the aesthetic and structural logic" of Sinan's architecture. This supports the view that systems of measurement were closely connected to the conceptual organization of architectural design. Although these recent studies do not address the arshin directly as a metrological problem, they reinforce the broader point that historical dimensions and proportional systems are indispensable for the interpretation of Ottoman architectural heritage.

This study approaches the arshin not only as a technical unit of measurement but as a historical construct shaped by cultural, administrative, and regional contexts. It also examines comparatively the various forms of the arshin used in the Islamic world and evaluates their historical variability in relation to architectural heritage research. Drawing on metrological studies, architectural treatises, documentary evidence, and recent heritage-oriented scholarship, the article considers different forms of the arshin, their metric equivalents, and their internal subdivisions within their historical contexts. It argues that the arshin should be interpreted as a context-dependent metrological structure rather than as a fixed universal unit. By doing so, the study aims to provide a more reliable framework for the documentation and interpretation of architectural heritage and to contribute to a more systematic understanding of historical measurement systems in the Islamic world.

2. Materials and Methods

2.1. Research Scope and Source Base

The study examines the arshin (zira) as a historical unit of length in the Islamic world through a comparative evaluation of textual, metrological, and material evidence. The primary source base consists of major studies on Islamic and Ottoman systems of measurement, especially those that discuss the terminology, metric equivalents, subdivisions, and historical transformation of the arshin and related units. Hinz (1990) provides the broadest comparative framework for Islamic measures across different regions. Özdural (1990, 1998) offers two distinct lines of contribution: one concerning the relationship between measurement and geometric reasoning in medieval Islamic architecture, and another focusing specifically on Ottoman architectural metrology and the Sinan-period arshin. Ottoman-period variation and practical diversity are further documented by Arseven (1950) and Sönmez (1997, 1999).

In addition to the published literature, the study also takes into account documentary and material evidence preserved in architectural and metrological sources. These include the Nilometer of al-Rawda in Cairo as a reference point for the black cubit described by Hinz (1990), the information preserved in Risale-i Mimariyye as edited by Gökyay (1975), and the architectural interpretation of the same treatise provided by Crane (1987). The study also considers the documentation of a nineteenth-century measuring rod identified locally as deiraa (zira), as reported in the historical material discussed in the source text, together with textile and market arshin values reported by Göyünç (1976) and Hinz (1990). Although the study does not generate a new numerical dataset in the modern statistical sense, it assembles dispersed historical evidence into a structured comparative framework relevant to the interpretation of architectural heritage.

2.2. Comparative Method

The study adopts a historical-comparative method in order to identify continuities, differences, and transformations in the recorded value and use of the arshin. In the first stage, references to different forms of the arshin were collected from the literature and

grouped according to period, geography, terminology, and reported metric equivalent. Hinz (1990) was used as the principal reference for the broader Islamic world. Özdural's (1998) work was used where Ottoman metrology and the Sinan-period arshin required closer definition. Arseven (1950) and Sönmez (1997) were used to identify later Ottoman variations and function-specific units.

In the second stage, the reported metric values were compared in order to determine whether similarly named units corresponded to identical or divergent measures. This step was necessary because the same unit name did not always denote the same absolute length. In the third stage, each occurrence of the arshin was interpreted in relation to chronology, regional setting, and field of application. This procedure made it possible to distinguish between terminological continuity and metrological continuity, which are not necessarily the same.

2.3. Terminological and Metrological Assessment

A central part of the method consists of the combined analysis of terminology and metric correspondence. Measurement terms were therefore treated not merely as lexical labels, but as indicators of historically specific metrological systems. Particular attention was paid to terms such as zira, arshin, zira al-shariyya, zira al-sawda, zira al-hashimiyya, and zira al-benna. The semantic history of the term arshin and its linguistic circulation were considered with reference to Erkal (1991). The metric values attached to these terms were primarily assessed through Hinz (1990) and Özdural (1998).

Where the literature records more than one name for units of similar or identical size, those terms were evaluated comparatively. Likewise, where the same term appears with different metric values depending on period or region, the variation was treated as historically meaningful rather than accidental. The purpose of the analysis is therefore not to establish one definitive value for the arshin, but to reconstruct the range and structure of its historical variability.

2.4. Analysis of Subunits

The study also examines the internal subdivisions of the arshin, since these are essential for understanding how the unit functioned in practice. Hinz (1990) was used to identify the role of subunits such as fingers and handbreadths in broader Islamic systems of measurement. Gökyay's (1975) edition of Risale-i Mimariyye was used for the Ottoman terminology of engüşt, boğum, hat, and nokta. Crane's (1987) study was used to clarify the architectural context and interpretive importance of these subdivisions.

Particular emphasis was placed on the shift from the sixty-part system to the twenty-four-part system in the Ottoman architectural arshin. This change was not treated merely as a numerical adjustment. Following Özdural's (1998) interpretation, it was examined as a structural transformation affecting the practical logic of measurement itself. By incorporating both total lengths and subdivision systems into the analysis, the study approaches the arshin as a layered historical unit rather than as a single scalar value.

2.5. Relevance to Architectural Heritage

The methodological perspective of this study is directly connected to architectural heritage research. Accurate identification of historical units of length is essential for recognizing original dimensional logic, modular systems, proportional organization, and constructional practice in historic buildings. Recent work on architectural documentation and information modeling has emphasized that reliable interpretation depends on structured and historically grounded knowledge (Li et al., 2025). This broader conservation-oriented perspective is also supported by recent work on heritage building information modelling and architectural heritage information management (Parente et al., 2025).

The present study therefore evaluates the arshin not only as an abstract metrological category, but also as a practical unit relevant to the documentation and interpretation of built heritage in the Islamic world. Recent scholarship on Ottoman architectural proportion and modular order also shows that dimensional systems remain central to the reading of historic buildings (Erdoğan, 2024). In this sense, the comparative study of historical measurement units provides a methodological tool for reducing interpretive uncertainty in architectural analysis.

2.6. Limitations of the Study

The study is limited by the nature of the historical evidence on which it relies. The available sources do not always provide precise chronological boundaries for the use of specific units. Hinz (1990) himself notes that many metric equivalents are approximate rather than absolute. Ottoman-period studies also show that practical and terminological inconsistency persisted over time (Sönmez 1997, 1999). In some cases, normative definitions and actual usage cannot be fully separated.

These limitations, however, do not weaken the comparative approach adopted here. On the contrary, they reinforce the central premise of the study: that the arshin should be approached as a variable and context-dependent metrological structure. The method used here is therefore intended not to eliminate ambiguity entirely, but to interpret it systematically within a historically grounded framework.

3. Results

3.1. Principal Metric Variants of the Arshin

The comparative review of the historical literature shows that the arshin (zira) did not correspond to a single fixed metric value across the Islamic world. Hinz (1990) records the black cubit (zira al-sawda) at approximately 54.04 cm. The same source gives the legal cubit (zira al-shariyya) as approximately 49.87 cm. Although both units were divided into twenty-four subunits, their total lengths differed. The same comparative framework also identifies additional forms such as the large and small Hashimi cubits, the Umariyya cubit, the Durr/Fiddiyya cubit, zira al-bezz in textile and commercial contexts, and architectural or carpenter's cubits in Ottoman and Egyptian settings. These examples show that the arshin functioned as a family of related measures rather than as a single technical value.

The literature also records more than one Hashimi cubit. Hinz (1990) reports a smaller Hashimi cubit, referred to as zira al-bilalliyya or zira al-hashimiyyat al-saghir, at approximately 60.05 cm. The same study gives a larger Hashimi cubit, identified by names such as zira al-amal, zira al-hashimiyya, zira al-malik, and zira al-ziyadiyya, at approximately 66.50 cm. Özdural (1990) further notes that Hashimi-type measures in medieval Islamic sources did not remain metrically stable and could vary over time. Selected historical length units used in the Islamic world are summarized in Table 1.

Table 1. Major historical arshin or zira units and their subdivisions. Textile-related measurements are indicated where relevant, while public, commercial, and architectural uses are listed in regular form. Source: Compiled by the authors based on Ayverdi (1973), Gökyay (1975), Göyünç (1976), Hinz (1990), Özdural (1990, 1998), Arseven (1950), and Sönmez (1997, 1999).

Unit Name	Region	Period	Metric Equivalent
Zira' al-'Amal (work arshin); Zira' al-Hāshimiyya; Zira' al-Malik; Zira' al-Ziyādiyya; Large Hashimi (royal) arshin	Middle East	Abbasid period	66.5 cm (32 fingers; 1 finger = 2.07 cm)
Zira' al-'Amma (public arshin); *Zira' al-Sawda' (black arshin);* *Zira' al-Raşāşiyya*	Middle East	Abbasid period	54.04 cm (24 fingers; 1 finger = 2.25 cm)
Zira' al-Shar'iyya (legal arshin); Zira' al-Yad (hand arshin); *Zira' al-Yūsufiyya (Qadi Yusuf arshin);* *Zira' al-Barīd*	Middle East	Abbasid period	49.87 cm (24 fingers; 1 finger = 2.07 cm)
Zira' al-Bilalliyya; Small Hashimi arshin	Middle East	Abbasid period	60.05 cm (24 fingers; 1 finger = 2.50 cm)
Zira' al-'Umariyya (Caliph Omar's arshin)	Middle East	Abbasid period	72.81 cm
Zira' al-Durr (Fiddiyya)	Middle East	Abbasid period	50.3 cm
Zira' al-Bezz (pik)	**Cairo**	**15th century**	**58.18 cm**
Zira' al-Bezz (pik)	**Aleppo**	**16th century**	**67.9 cm**
Zira' al-Bennā / al-Mi'māriyya *(architect's arshin)*	Ottoman World	16th–17th centuries 18th century 19th century	72.1–73.4 cm 76.4 cm 75.8 cm
Zira' al-Bezz (pik)	**India**	**17th century**	**68 cm**
Gez-Zar (zira)	Iran	17th century Present day	95 cm 104 cm
Zira' al-Mi'māriyya (architect's arshin); *Zira' al-Najjārīn (carpenter's arshin)*	Egypt	19th century	75 cm
Zira' al-Baladiyya	Middle East	19th century	58.26 cm

Market arshin	**Ottoman World**	**19th century**	**68.5 cm**
Endaze	**Ottoman World**	**19th century**	**65 cm**
Zira' al-Istanbulliyya	**Egypt**	**19th century**	**68.57 cm**
Zira' al-Bezz (pik)	**Jerusalem**	**19th century**	**64.77 cm**
Zira' al-Bezz (pik)	**Baghdad–Basra**	**-**	**82.9 cm**
Zira' al-Bezz (pik)	**Damascus**	**-**	**63.03 cm**
Zira' al-Bezz (pik)	**Tripoli al-Sham**	**-**	**64 cm**

3.2. Subdivision Systems of the Arshin

The results further show that the variability of the arshin extended beyond total length and included its internal subdivisions. In the case of the legal cubit, each of the twenty-four fingers measured approximately 2.07 cm. In the black cubit, each finger measured approximately 2.25 cm (Hinz, 1990). This indicates that the value of the finger itself varied according to the type of arshin to which it belonged.

Hinz (1990) also records that some medieval Abbasid measures were divided into twenty-four parts, while others were divided into thirty-two. The same study notes that Indian systems could be divided into forty or forty-one fingers. Ottoman practice likewise preserved several different subdivision schemes. Sönmez (1997) states that the Aleppo arshin and the market arshin were divided into twenty-two fingers. The same source records the endaze as divided into twenty-one fingers. Sönmez (1997) also notes that the architectural arshin (zira al-benna) was divided into twenty-four fingers. These findings show that the internal arithmetic of the unit varied historically.

According to Arseven (1950), the metric equivalents of certain units of measurement, as recorded in a study commissioned by the Bab-ı Ali for the French in 1841, are summarized in Table 2, together with major Ottoman architectural and market arshin units and their subdivisions.

These variations emerged because standards were established through different institutional and practical mechanisms. Legal and fiscal contexts required measures suited to administrative calculation; commercial and textile contexts favored units aligned with commodities and market exchange; and architectural or craft contexts required measures compatible with construction procedures, modular subdivision, and the transfer of dimensions on site. Regional centers also preserved local traditions, while imperial or administrative reforms could recalibrate and partially standardize units without eliminating earlier usages. For this reason, metrological variation should be read as the product of overlapping legal, commercial, craft, and regional contexts rather than as simple inconsistency.

Table 2. Ottoman Architectural and Market Arshin Units and Their Subdivisions

Unit	Metric Equivalent	Subdivision
1 architect's arshin *(zira' al-bennā)* / architectural arshin *(zira' al-mi'māriyya)*	75.8 cm	2 kadem, 24 fingers
1 *kadem*	37.9 cm	12 fingers
1 market arshin	68 cm	22 fingers
1 finger	3.15 cm	12 *hat*
1 *hat*	2.63 mm	12 *nokta*
1 *nokta (dot)*	0.21 mm	-

3.3. Ottoman Variants and Diachronic Change

Ottoman evidence reveals a clear diachronic transformation in the metric value of the arshin. Özdural (1998) reports that the Ottoman arshin measured approximately 72.1 cm in the 1520s. The same study gives 73.4 cm for the last quarter of the sixteenth century. Özdural also reports 76.4 cm for the third quarter of the eighteenth century. In the same context, the architectural arshin standardized under Selim III is given as 75.8 cm.

Ayverdi (1973) calculated the sixteenth-century architectural arshin as 73.33 cm on the basis of construction records related to the Süleymaniye Mosque. Cantay (1986) likewise identified a value of approximately 73.33 cm in analytical studies of sixteenth-century Ottoman architecture. In the same study, Cantay (1986) also reported a secondary measure of approximately 55 cm, corresponding to three-quarters of the period arshin. Arseven (1950) recorded the nineteenth-century architectural arshin as 75.8 cm. Arseven also distinguished the market arshin,

whose textile-related value is often treated as approximately 68 cm despite source values around 68.5 cm (Göyünç, 1976: 473; Hinz, 1990: 72). The same source gave the endaze as 65 cm. Arseven further recorded the Aleppo arshin at 68 cm. Together; these data indicate both chronological change and functional differentiation within Ottoman systems of length measurement.

3.4. Evidence from Risale-i Mimariyye

One of the clearest results of the present study concerns the structural transformation of the Ottoman architectural arshin described in Risale-i Mimariyye. Gökyay (1975) records that the zira al-benna was divided into sixty equal parts, referred to as engüşt, until AH 994 (AD 1585/1586). Crane confirms the same subdivision in his study of the treatise (1987). Gökyay (1975) also records that after this date the unit was divided into twenty-four knuckles. In the later system, each new finger was further divided into twelve hat. Each hat was further divided into twelve nokta.

Using the sixteenth-century arshin value of 73.4 cm, Özdural's (1998) calculation yields an engüşt value of approximately 1.22 cm. The later twenty-four-part system yields a knuckle value of approximately 3.05 cm. The same calculation indicates that ten engüşt correspond to four knuckles. These numerical relations show that the transition from the earlier to the later system involved a substantial reorganization of the internal structure of the unit. The transformation from the sixty-part finger (engüşt) system to the twenty-four-part knuckle (boğum) system is illustrated in Figure 1.

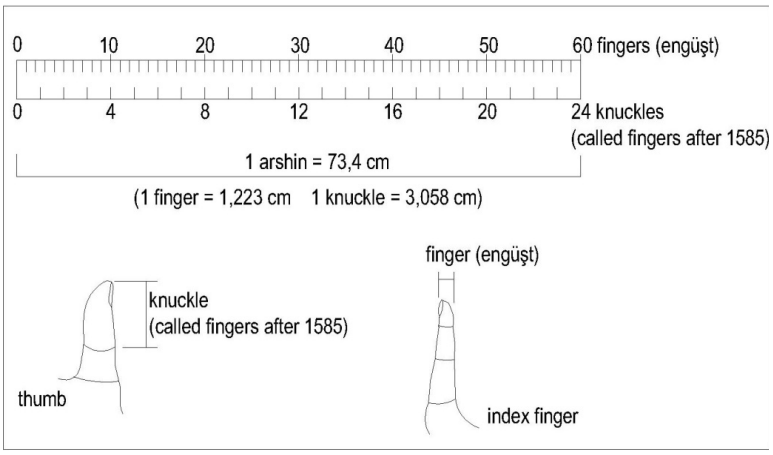

Figure 1. Schematic Representation of the Sixteenth-Century Ottoman Architectural Arshin (73.4 cm), Showing its Earlier Division into 60 Fingers and its Later Division into 24 Knuckles (Referred to as Fingers After 1585), Based on the Evidence of Risale-i Mimariyye and Özdural's (1990, 1998) Metrological Interpretation. Source: Drawing by Murat Çağlayan.

3.5. Material Evidence from a Nineteenth-Century Measuring Rod

The documentary evidence is supported by several material and applied references rather than by a single isolated object. At the scale of built infrastructure, the Nilometer of al-Rawda in Cairo provides a durable architectural reference point for the black cubit discussed by Hinz (1990). Although it is not a portable measuring rod, the Nilometer shows that a cubit value could be materially inscribed in a functional structure and linked to administrative measurement practice rather than preserved only as an abstract textual definition.

The Mardin rod remains the clearest portable measuring instrument considered in this study. The source text records a nineteenth-century zira rod documented in Mardin, Türkiye and identified locally as diraa. The object measures 75 cm in total length and is divided into twenty-four fingers arranged in six groups of four. The rod is made of walnut wood, and its grouped marking system indicates practical craft use rather than purely schematic representation (Çağlayan, 2017). This organization is significant because the six groups of four fingers would have allowed a craftsman to repeat, halve, group, and transfer dimensions in everyday building or carpentry work without converting each measurement into an abstract numerical value. The documented measuring rod, its front and side faces, and its twenty-four-part subdivision are shown in Figure 2.

A second comparative example is the nineteenth-century Egyptian architectural and carpenter's cubit of 75 cm reported by Hinz (1990). Its close agreement with the 75 cm Mardin rod suggests that comparable craft-oriented zira values circulated beyond a single local case. Documentary examples from textile and commercial practice, such as the Cairo, Aleppo, Jerusalem, Damascus, Baghdad–Basra, and Tripoli al-Sham zira al-bezz values listed in Table 1, together with the Ottoman market arshin and endaze, further demonstrate that concrete application varied by craft, commodity, and region. These examples do not have identical evidentiary status:

the Mardin rod is a surviving object, the Nilometer is a built-context reference, and the textile and market cases are documentary records of applied measures. Considered together, however, they strengthen the argument that the arshin was used through practical, context-specific measuring traditions.

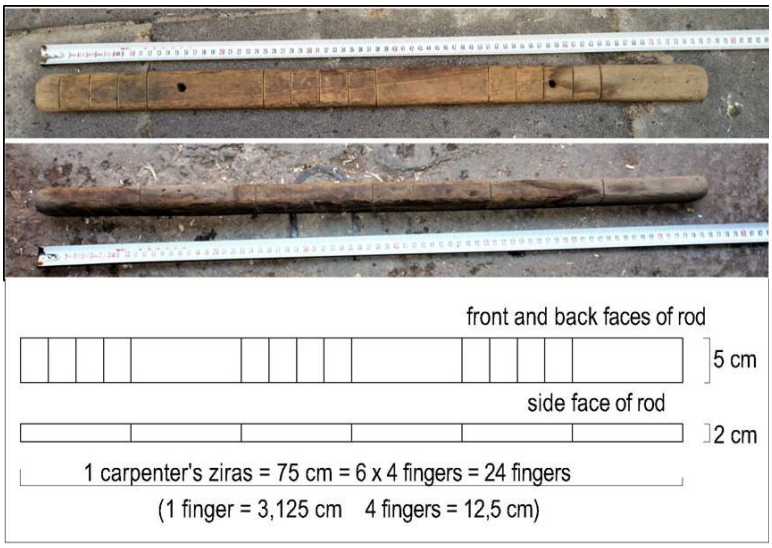

Figure 2. A nineteenth-century carpenter's zira documented in Mardin, illustrating the front and back faces, the side face, and the subdivision of the 75 cm rod into 24 fingers arranged in six groups of four. Source: Photograph and drawing by Murat Çağlayan.

3.6. Summary of Results

Taken together, the results show that the arshin should not be understood as a singular and immutable unit. Rather, the evidence reveals a historically layered system in which total length, subdivision pattern, terminology, and practical application all varied across time and space. This variability was shaped by legal-administrative, architectural, craft, commercial, textile, and regional contexts. The arshin thus appears not as one stable measure, but as a family of related units whose metric values and internal organization were historically contingent.

4. Discussion

The findings of this study show that the arshin (zira) cannot be treated as a fixed and universally stable unit of length in the Islamic world. Hinz (1990) demonstrated that several forms of the unit coexisted with different metric values. Özdural (1998) likewise showed that the historical meaning of the arshin changed according to period and technical context. This indicates that historical systems of measurement should not be approached through a simple one-to-one conversion into modern metric units.

A major implication of these results is that terminological continuity does not imply metrological continuity. The use of the terms arshin or zira across different regions and periods does not mean that they referred to the same absolute length in every case. This is clear in the distinction between the legal cubit and the black cubit, both documented by Hinz (1990) as twenty-four-part units with different total lengths. Özdural's (1990) earlier work also supports the view that measurement in the medieval Islamic world was embedded in broader technical and geometric systems rather than reducible to a single invariant scalar value. The historical meaning of a measurement term must therefore be reconstructed through documentary, technical, and regional context rather than inferred from nomenclature alone.

The Ottoman evidence further highlights the dynamic character of the arshin by showing that variation occurred not only across regions but also over time within the same political and cultural framework. Özdural (1998) recorded a progression from approximately 72.1 cm in the early sixteenth century to 76.4 cm in the eighteenth century. Arseven (1950) documented the nineteenth-century architectural arshin at 75.8 cm. Ayverdi's (1973) calculation of approximately 73.33 cm for the sixteenth-century architectural arshin confirms that an earlier Ottoman metric standard differed from the later one. Cantay (1986) also identified a closely related value in his analysis of sixteenth-century Ottoman architecture. These findings suggest that Ottoman architectural measurement underwent both recalibration and partial standardization over time.

At the same time, Ottoman practice remained functionally differentiated. Arseven (1950) distinguished the architectural arshin from the market arshin and the endaze. Sönmez (1997) likewise emphasized that different units could coexist according to use and technical domain. In a later study, Sönmez (1999) also pointed out that this variability complicates the interpretation of measured drawings and architectural surveys. Context-specific standardizati-

on here means that a unit could be regularized within a particular domain of use such as architectural surveying and construction, market exchange, textile measurement, or carpentry without becoming universally identical across all domains. Architectural arshin values were shaped by building practice and state-sponsored construction; market and textile measures were shaped by commercial exchange and commodity-specific conventions; and regional units reflected local administrative and craft traditions. Standardization in historical metrology therefore appears to have been partial and context-specific rather than absolute.

The transformation described in Risale-i Mimariyye is particularly significant because it demonstrates that the historical variability of the arshin operated at the level of measurement structure itself, not only at the level of total length. Gökyay (1975) records the earlier sixty-part organization of the Ottoman architectural arshin. Crane (1987) confirms the same subdivision system in his analysis of the treatise. Özdural (1998) interpreted the later shift to a twenty-four-part system as a structural transformation rather than a simple technical adjustment. In this respect, the arshin was not merely rescaled but reconstituted as a working unit through a new internal arithmetic. This supports the broader argument of the article: historical units cannot be interpreted only through their metric equivalents, because their subdivisions determined how builders and craftsmen divided dimensions, transferred measurements, and made proportional decisions in practice.

From the perspective of architectural heritage, these findings have direct interpretive consequences. Accurate identification of historical units of length is essential for reconstructing dimensional logic, modular systems, and constructional practice in historic buildings. Research on heritage documentation has shown that reliable interpretation depends on structured and historically grounded information (Li et al., 2025). Li et al. (2025: 1) likewise refer to "ambiguous information structures" as a central problem in documentation-oriented heritage workflows. Similar conclusions have been reached in recent work on heritage building information modelling and heritage knowledge management (Parente et al., 2025). If a historical measurement is assigned an incorrect metric equivalent, the interpretation of spans, openings, wall thicknesses, and proportional schemes may also become misleading. A historically grounded understanding of the arshin therefore contributes not only to metrological history, but also to more reliable architectural heritage analysis.

Recent scholarship on Ottoman architecture reinforces this point from another direction. Erdoğan (2024) has shown that proportional logic remained central to the interpretation of Ottoman mosque architecture. Diker (2026) has further demonstrated that modular and recursive geometric principles can be productive for understanding Sinan's design language. Although these studies do not focus directly on the arshin as a metrological problem, they support the broader conclusion that historical dimensions and proportional systems are indispensable for the interpretation of Ottoman architectural heritage.

The material and applied evidence discussed above provides an important bridge between textual definitions and practice. The Mardin rod is the most direct surviving object: it measures 75 cm and is divided into twenty-four parts (Çağlayan, 2017), corresponding closely to the late Ottoman architectural arshin documented by Arseven (1950) and to the nineteenth-century Egyptian architectural and carpenter's cubit reported by Hinz (1990). Its six groups of four fingers are especially significant because they translate the abstract unit into a usable craft instrument: a carpenter could repeat, halve, group, and transfer measurements without converting every dimension into a modern metric value. In this sense, the rod shows that the arshin functioned as a practical device of craftsmanship as well as a textual or administrative category. The Nilometer of al-Rawda in Cairo, by contrast, demonstrates how a cubit could be embedded in an architectural and administrative setting, while the zira al-bezz, market arshin, and endaze examples show how craft and commodity-specific practices generated different applied values. The evidence therefore suggests that the values recorded in written sources were not merely abstract definitions, but could also be embodied in built structures, instruments, and practical measuring routines.

Taken together, the evidence supports the interpretation of the arshin as a context-dependent metrological structure rather than a singular and invariant unit. Its variability in metric value, subdivision pattern, terminology, and practical function indicates that it operated as a family of related measures whose meaning depended on historical circumstances. A more reliable approach is therefore to treat the arshin as a structured field of variation, within which specific forms can be identified and compared. Such an approach offers a stronger basis for future research in architectural heritage, history of metrology, and the interpretation of historical building practice.

5. Conclusions

This study has shown that the arshin (zira) should not be understood as a single and universally fixed unit of length in the Islamic world. Hinz (1990) demonstrated that multiple forms of the unit coexisted with different metric values in different regions. Özdural (1998) further showed that the meaning and use of the arshin varied according to historical and technical context. Arseven's (1950) Ottoman data also con-

firm that different function-specific units remained in use in later periods. The arshin must therefore be understood not as one stable measure, but as a historically differentiated family of related units.

The findings also indicate that the variability of the arshin was structural rather than incidental. Differences in total length were accompanied by differences in internal subdivision. Gökyay (1975) documented the sixty-part organization of the Ottoman architectural arshin in Risale-i Mimariyye. Crane (1987) confirmed the same textual evidence in its architectural context. Özdural (1998) interpreted the later shift to a twenty-four-part system as a change in the internal logic of measurement rather than a mere rescaling. This shows that historical units of measurement should be approached as layered technical systems rather than as simple equivalents in modern metric form.

From the perspective of architectural heritage, these results are especially important because the identification of historical length units directly affects the interpretation of dimensional logic, modular systems, and construction practice in historic buildings. Research on heritage documentation has emphasized the importance of historically grounded data for reliable interpretation (Li et al., 2025). Similar emphasis has been placed on heritage knowledge management and conservation-oriented information structures (Parente et al., 2025). Recent studies of Ottoman architectural proportion and modular design also show that dimensional systems remain central to the interpretation of historic buildings (Erdoğan 2024, Diker 2026). A historically grounded reading of the arshin can therefore contribute to more reliable documentation, restitution, and conservation-oriented analysis.

Taken together, the evidence supports the interpretation of the arshin as a context-dependent metrological structure composed of related but non-identical forms. Instead of seeking a single universal metric equivalent, future research should continue to examine the historical conditions under which particular forms of the arshin were defined, transmitted, and applied. Further cataloguing of surviving measuring rods, built-context references such as nilometers, and craft-specific documentary cases would strengthen the connection between metrological history and material practice. The findings highlight the importance of historical metrology as a tool for understanding past systems of knowledge, practice, and standardization in the Islamic world.

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