



# The Influence of the Development of Chinese Porcelain on the Architecture of Wealthy Arab Merchants in East Africa

Xin Yan <sup>1\*</sup>, Changsheng Wang <sup>2</sup>, Mohd. Tajuddin Bin Mohd. Rasdi <sup>3</sup>

<sup>1</sup>Tutor, Academy of Fine Arts, Taizhou University, Taizhou, Jiangsu, China

Ph.D student, School of Architecture and Built Environment, FETBE, UCSI University, Wilayah Persekutuan Kuala Lumpur, Malaysia

<sup>2</sup> Ph.D student, Animation Department, Sejong University, Seoul, South Korea

<sup>3</sup> Professor, School of Architecture and Built Environment, FETBE, UCSI University, Wilayah Persekutuan Kuala Lumpur, Malaysia

\* **Corresponding Author:** [xinyan93721@gmail.com](mailto:xinyan93721@gmail.com)

**Citation:** Yan, X., Wang, C., & Rasdi, M. T. B. M. (2024). The Influence of the Development of Chinese Porcelain on the Architecture of Wealthy Arab Merchants in East Africa. *Mediterranean Archaeology and Archaeometry*, 24(2), 154–166. [10.5281/zenodo.11647801](https://doi.org/10.5281/zenodo.11647801)

## ARTICLE INFO

## ABSTRACT

Received:

Accepted:

To delve into the archaeological value of porcelain patterns, colors, and styles from the Tang and Song dynasties (618~1279 AC), explore the influence of patterns on patterns in the architecture of Arab merchants in East Africa. In this paper, Tang and Song dynasty porcelain is used to observe the patterns using a Sony DSX 4K electron microscope, and the observation indicators are patterns, porcelain materials and colors, etc., and compare them with Arab merchant buildings. The results show that the Tang and Song dynasty porcelain patterns are delicate and diverse, mainly circular and stripe patterns. The blue and white patterns and circular patterns in the architecture of the Arab merchants of East Africa are similar to those of explicit porcelain. Moreover, the sandstone and terracotta in the buildings of the Arab merchants in East Africa are similar to the materials of clear porcelain, which contains a large amount of FeO and SiO components and has good corrosion resistance. Therefore, Tang and Song dynasty porcelain had a certain influence on the architecture of Arab merchants in East Africa, mainly reflected in the shape and material of the pattern.

**Keywords:** China, Porcelain Pattern, East Africa, Wealthy, Arab Merchant, Architectural Art.

## INTRODUCTION

In today's era of globalization, cultural exchange and integration have become a trend that cannot be ignored (Ayieng, Wang, Lu, Song, & Watterson, 2022). Different regions' artistic and architectural styles have influenced each other, creating a unique and diverse architectural culture. Tang and Song dynasty porcelain patterns and East African Arab merchant architecture are two important art forms, but the cultural exchange between China and the West has led to a specific correlation between the two (Chen, Wang, Qin, Fang, & Li, 2023). Tang and Song dynasty porcelain motifs are known for their delicate, varied, and symbolic characteristics, while the shape of the patterns in porcelain has an impact on the spires and clay of Arabic architecture. However, for a long time in the past, the architecture of Arab merchants in East Africa has been based on sandstone and terracotta, which is similar to the kaolin of the Tang and Song dynasties (618~1279 AC) and contains a large number of oxides (Christiansen, 2022). During the Silk Road, wealthy Arab merchants absorbed the connotation of porcelain patterns from the Tang and Song dynasties (618~1279 AC) through trade activities and applied them to architecture, forming a unique architectural style (Colomban et al., 2023). Based on the literature, this paper analyzes the patterns and materials of porcelain from the Tang and Song dynasties (618~1279 AC) and observes them with the help of a microscope (Colomban, Franci, Girona, d'Abrigeon, & Schumacher, 2022). Then, compare the characteristics of porcelain, patterns, and materials, and excavate the influence of Tang and Song dynasty porcelain on the architecture of Arab merchants in East Africa, and excavate its archaeological value.

## LITERATURE REVIEW

### **The Influence of Chinese Porcelain Shapes on the Architecture of Arab Merchants in East Africa**

#### Historical Background and Characteristics of the Development of Arab Merchant Architecture in East Africa

The classicist architecture of the Greco-Roman period was an important starting point for the development of Arab merchant architecture in East Africa. Greco-Roman architecture focused on symmetry, proportion, and geometry, as well as colonnades, arches, and other elements (Colomban, Ngo, & Fournery, 2022). This architectural style pursues simplicity, elegance, and timeless beauty, embodying the rationality and order of ancient Greco-Roman civilization. Renaissance architecture is a return and reinvention of classicist architecture. This architectural style seeks to imitate and restore ancient Greco-Roman architecture (Coutinho et al., 2022), focusing on symmetry, proportion, and geometric shapes. Renaissance architecture emphasized humanist ideas, expressing human dignity and beauty through decorative elements such as sculptures and murals. In addition to the Chinese porcelain style (Cui, Zhu, Hu, & Chen, 2022), there are many other important architectural styles in East Africa, such as Baroque, Rococo, Neoclassical, etc., and the correlation between these architectural styles has formed architectural forms unique to East Africa. However, the architectural styles of different regions and phases in East Africa have unique characteristics and expressions, reflecting the time's social, cultural, and religious characteristics (dos Santos & Balao, 2022), as shown in Figure 1.



Figure 1. The Influence of Chinese Porcelain Shape on the Architecture Of Arab Merchants

### **The Impact of Central African Trade on the Architecture of Arab Merchants in East Africa**

There were long-standing trade links between the East African region and East Africa, in which Arab merchants played an important role. Through trading activities, wealthy Arab merchants from the East African region had access to goods and cultures from the East African region. This contact influenced the architectural styles and elements of Arab merchants in East Africa, inspiring wealthy Arab merchants to introduce Chinese porcelain elements into their architecture (Franci & Colomban, 2022).

First, trade activities promoted cultural exchanges between the East African region and East Africa (Gerritsen, 2023). As trade developed, wealthy Arab merchants from East Africa had frequent exchanges with merchants from the East African region. This exchange is not only the exchange of goods and goods (Gong, Xiong, Wang, & Chen, 2023), but also the exchange of culture, art and architecture. Through contact with merchants from the East African region, East African merchants had the opportunity to learn about and be influenced by the architectural styles and elements of Arab merchants in East Africa. Secondly, wealthy Arab merchants in East Africa became interested in and pursued the architectural style of Arab merchants in East Africa. Through trading activities, wealthy Arab merchants were exposed to luxury goods and works of art from the East African region, including

buildings with distinctive architectural styles (Herrmann, 2022). The architectural style of the East African Arab merchants impressed the East African merchants and inspired the wealthy Arab merchants to introduce Chinese porcelain elements into their architecture. Wealthy Arab merchants hoped to introduce Chinese porcelain elements to make their buildings more refined and ornate and to show their identification with and pursuit of East African culture (Huang et al., 2022). Finally, wealthy Arab merchants in East Africa introduced elements of Chinese porcelain into their architecture (Legostaeva, 2023). Through trade activities and cultural exchanges, wealthy Arab merchants learned about the architectural styles and elements of Arab merchants in East Africa and applied them to their buildings (Li, Yuan, Cao, & Hein, 2022).

### **Chinese Porcelain Elements were Incorporated into East African Arab Merchant Architecture**

Wealthy Arab merchants from East Africa came into contact with merchants from China through trading activities and learned about the characteristics and styles of Oriental architecture and the influence of Chinese porcelain on architecture (Mo, Cao, Han, & Zheng, 2023). Wealthy Arab merchants may have sublimated architectural styles such as Renaissance architecture through observation and exchange. They inspired their architecture and became interested in porcelain elements in oriental architecture, hoping to introduce them into their architecture (Norris, Braekmans, & Shortland, 2022). Secondly, East African merchants introduced Chinese crude elements into their architecture to show their identification and pursuit of Eastern culture. Wealthy Arab merchants probably used Renaissance elements of symmetry, proportion, geometry, columns, sculptures, etc. Norris and Delbey (2023) in their mansions, commercial premises, etc. Chinese porcelain elements not only add to the visual effect of the building but also show the acceptance and integration of different cultures by wealthy merchants (Pan, Shao, Li, Cheng, & Wang, 2022).

By incorporating elements of Chinese porcelain into their architecture, East African merchants showed their openness to different cultures and enriched their architectural style. In addition, East African merchants may have combined elements of Chinese porcelain with local traditional styles (Po, 2023). Wealthy Arab merchants may have introduced Chinese porcelain elements as decoration while retaining traditional Arabic architectural features. This fusion resulted in the architecture of wealthy Arab merchants that both had a unique East African character and demonstrated respect and pursuit of East African culture, as shown in Figure 2.



Figure 2. The Influence of Chinese Porcelain Patterns and Shapes on Arabic Architecture

### **The Influence of Chinese Porcelain Construction on the Architectural Style of Arab Merchants in East Africa**

By introducing Chinese porcelain elements, the architectural styles of East African merchants became more diverse and refined. Wealthy Arab merchants may have used Renaissance columns, sculptures, etc., for decoration. Chinese porcelain elements introduced into Chinese porcelain allowed East African merchants to blend with traditional Arabic styles, demonstrating the acceptance and integration of different cultures. Secondly, East African Arab merchant architecture provided new design concepts and decorative elements for East African merchants. The East African Arabic merchant architectural style focused on the use of symmetry, proportion, and

geometry, as well as the use of elements such as colonnades and arches. Chinese porcelain design concepts and decorative elements gave East African merchants new creative inspiration and options. Wealthy Arab merchants can learn from the structural characteristics of Arab merchant buildings in East Africa, such as arches and domes, to enrich their buildings' form and spatial layout. In addition, East African Arab merchant architecture had an impact on the architectural structural characteristics of East African merchants. East African Arab merchant architecture focused on structural stability and solidity, employing many engineering techniques and materials to support large buildings. East African merchants may have learned some structural techniques from this and applied them to their buildings.

## METHODOLOGY

### Research Methods

In this paper, four pieces of porcelain from the Tang and Song dynasties (618~1279 AC) are taken as the research object, and the patterns are observed with the help of Sony's DSX 4K electron microscope, and the artistic indicators such as patterns, materials and colors of the porcelain are observed, so as to find the archaeological characteristics of porcelain in the Tang and Song dynasties (618~1279 AC), as well as the similarities in the architecture of Arab merchants. Among them, the Sony microscope is a handheld type, with observation factors of 0.7x, 1x and 4.5x, and the identification content includes: oxides such as FeO and SiO, as well as particles of materials.

### Characteristics and Aesthetic Value of Tang and Song Dynasty Porcelain Patterns

Tang and Song dynasty porcelain is known for its exquisite patterns, which are characterized by delicacy, refinement, variety, and symbolism, making it a unique artistic treasure in the world. Porcelain patterns include text patterns, animal patterns, plant patterns, vessel patterns, text patterns, etc., as well as abstract geometric patterns and traditional cultural symbols. These patterns not only have a decorative effect, but also convey rich cultural connotations and aesthetic values, as shown in Figure 3.



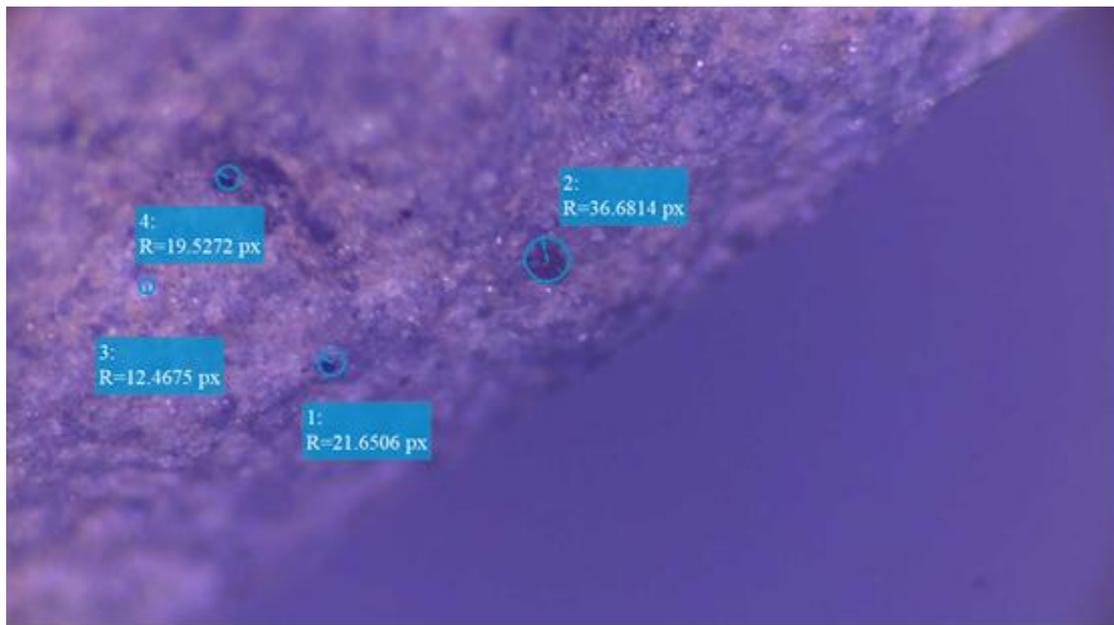
Animal Tattoos



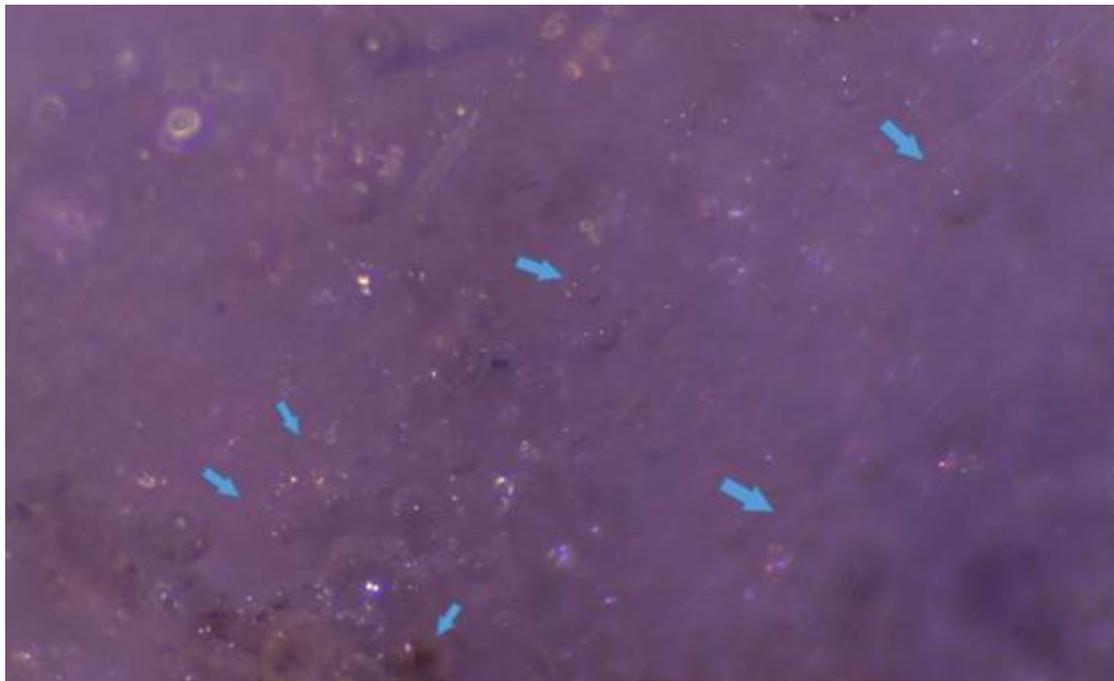
Plant Grains

Figure 3. Display of Patterns and Shapes of Chinese Porcelain

As can be seen from Figure 3, the patterns of Tang and Song dynasty porcelain are known for their delicate patterns. In the process of porcelain making, artists use knife carving or painting techniques to outline fine and clear patterns on the surface of the porcelain. Whether it is a figure or a botanical pattern, it can show a very high level of skill and artistic expression. The characteristics of delicate patterns made porcelain from the Tang and Song dynasties (618~1279 AC) famous all over the world. Secondly, the porcelain patterns of the Tang and Song dynasties (618~1279 AC) have diverse characteristics. In different historical periods and regions, the porcelain of the Tang and Song dynasties adopted various pattern designs. Human patterns, animal patterns, plant patterns, utensils patterns, character patterns, etc., are all common types of porcelain patterns. Microscopic observation of the plant pattern is shown in Figure 4.



Ingredients of Tang and Song dynasty Porcelain



Ingredients in the Building Materials of Arab Merchants in East Africa

Figure 4. Material Observation of a Microscope

The reverse color observation in Figure 4 shows that the Tang and Song dynasty porcelains contain a large amount of oxides around them, such as FeO, SiO and other substances. The building materials of Arab merchants in East Africa also contain substances such as FeO and SiO, which are in the form of complexes and bubbles, mainly due to the different heating temperatures of the materials, but they contain the same substances. The results of this study show that the method of anaerobic firing was used in the porcelain of the Tang and Song dynasties (618~1279 AC) to increase the corrosion resistance of the porcelain and prolong its preservation time. The integration of FeO, SiO, and other substances can make the color of porcelain more vivid, showing green, white, etc. Moreover, the diversity of patterns is abundant, and the decorative form of porcelain gives each piece of porcelain a unique artistic charm, as shown in Figure 5.



Artifact Pattern + Flat Circle



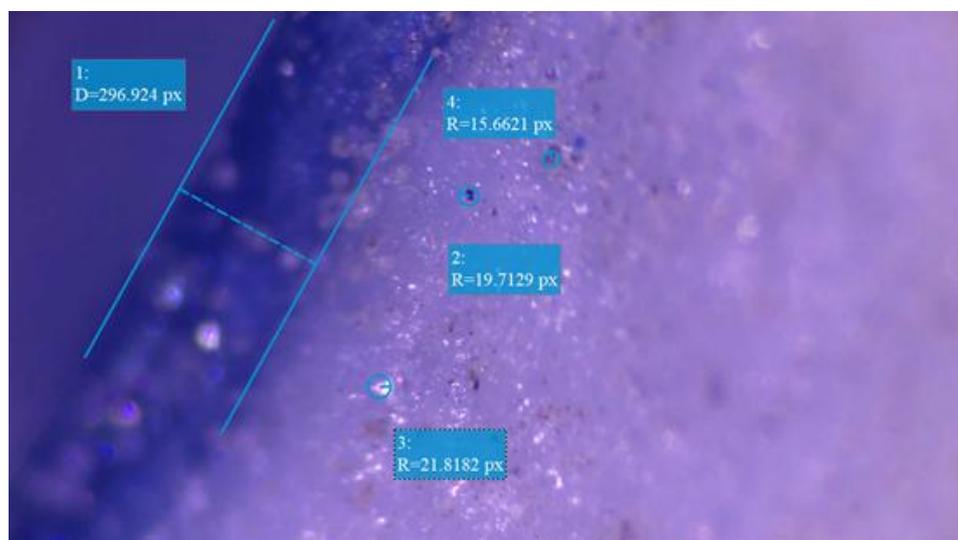
Lettering Pattern + Three-Dimensional Circle

Figure 5. The Artistic Charm of Chinese Porcelain

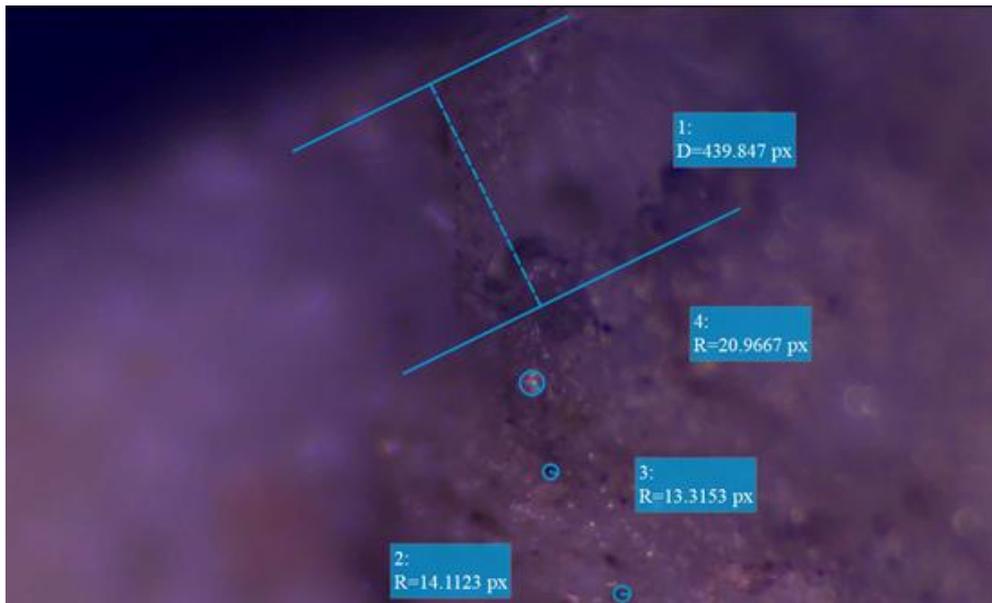
As can be seen from Figure 5, porcelain patterns in the Tang and Song dynasties (618~1279 AC) have rich symbolic meanings. In the traditional culture of the Tang and Song dynasties (618~1279 AC), many flowers, animals, and patterns had specific symbolic meanings. For example, peonies are seen as a symbol of wealth and beauty, and dragons are seen as a symbol of power and good luck. These symbolic meanings are conveyed through porcelain patterns, making porcelain an ornament and a cultural carrier that carries people's good wishes and blessings. Finally, porcelain patterns from the Tang and Song dynasties (618~1279 AC) also carry rich cultural connotations and aesthetic values. In the traditional culture of the Tang and Song dynasties (618~1279 AC), porcelain was regarded as an elegant work of art, which formed a close relationship with literati such as poetry and painting. The use of clouds, plants and other pattern movements in the building can not only reflect the cultural connotation of the Tang and Song dynasties (618~1279 AC), but also enhance the decoration of the building.

#### Conditions of Influence of Tang and Song Dynasty Porcelain on the Architecture of Arab Merchants in East Africa

Arab merchants brought Tang and Song dynasty porcelain to East Africa mainly through ancient trading activities. Arab merchants were important trade intermediaries in ancient East Africa, and wealthy Arab merchants brought Tang and Song dynasty porcelain to East Africa via the Maritime Silk Road. This process is influenced by a variety of factors, including business interests, cultural exchanges, and social status. It not only enriched the culture and art of the East African region but also promoted the development and prosperity of trade networks and a comparison of the enamel of Tang and Song dynasty porcelain shows that there are specific differences between the two, as shown in Figure 6.



Tang Dynasty Porcelain Enamel



Song Dynasty Porcelain Enamel

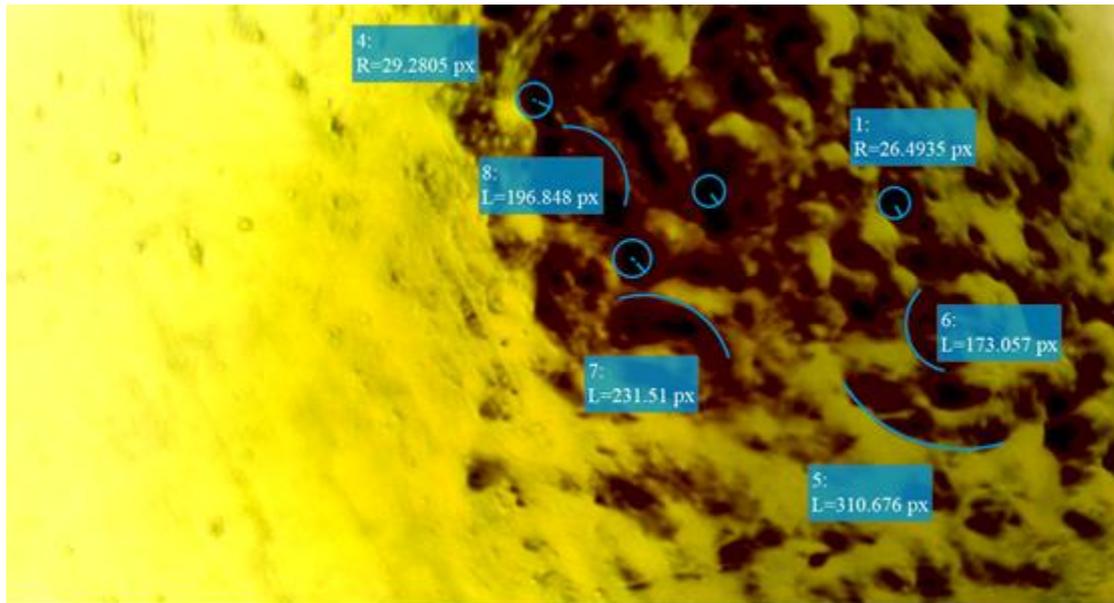
Figure 6. Comparison of Enamel Thickness of Porcelain in the Tang and Song Dynasties (618~1279 AC)

As can be seen from Figure 6, the enamel thickness of Tang Dynasty porcelain is 2.96mm, and that of Song Dynasty porcelain is 4.39mm, which nearly doubled, showing that the Silk Road promoted the development of Tang and Song Dynasty porcelain, especially the thickness of enamel. The thickness of the enamel is not only the result of the firing process but also the result of corrosion, acid, and alkali resistance. Due to the influence of sea breeze and high temperatures in East Africa, the building has high requirements for corrosion resistance, and great attention is paid to constructing the anti-corrosion layer. Therefore, under the influence of the Silk Road, the Tang and Song dynasties underwent great changes. In addition, the diameter of the particles contained in the porcelain has also changed, from 0.21mm to 0.20mm, while the firing of kaolin does not reach such an extent, indicating that the material of Tang and Song dynasty porcelain should contain fine yarn or small particles of sandstone. The reason why Tang and Song dynasty porcelain could have an impact on the architecture of Arab merchants in East Africa is mainly due to the following reasons.

First, commercial interests were one of the main motivations for Arab merchants to bring Tang and Song porcelain to East Africa. Tang and Song dynasty porcelain was regarded as a luxury item in ancient times, and its craftsmanship and quality were renowned worldwide at the time. Arab merchants were aware of the need for luxury goods from the wealthy classes of East Africa, so wealthy Arab merchants introduced porcelain from the Tang and Song dynasties (618~1279 AC) to the region as a high-value commodity. Through trading activities, Arab merchants could reap huge profits and expand their position and influence in the trade network. Secondly, cultural exchange was also one of the important factors in the introduction of Tang and Song porcelain to East Africa by Arab merchants. As trade unfolded, Arab merchants began to come into contact with Tang and Song culture. Wealthy Arab merchants became interested in the aesthetic value and cultural connotations of Tang and Song dynasty porcelain and saw it as a medium for cultural exchange. Arab merchants brought porcelain from the Tang and Song dynasties (618~1279 AC) to East Africa, satisfying the luxury needs of the local wealthy class and promoting cultural exchanges and integration between East Africa and the Tang and Song dynasties (618~1279 AC). In addition, social status was also one of the motivations for Arab merchants to bring Tang and Song porcelain to East Africa. In ancient societies, owning luxury goods and treasures was an important way for the wealthy to show their wealth and status. By introducing porcelain from the Tang and Song dynasties (618~1279 AC), Arab merchants not only met the luxury needs of the wealthy local class but also demonstrated their wealth and status as trade intermediaries. This display of wealth and status further cemented the social position of Arab merchants in East African society and increased the influence of wealthy Arab merchants in trade networks.

#### The Influence of Chinese Porcelain Patterns on Architectural Styles and Decorative Elements

The shape of the patterns in Tang and Song dynasty porcelain was observed by analyzing the cloud patterns in the buildings of Arab merchants in East Africa, and it was found that there was a strong similarity between the two, as shown in Figure 7.



Patterns of Tang and Song Dynasty Porcelain



Bricks of an Arab Merchant in East Africa

Figure 7. Comparison of Tang and Song Dynasty Porcelain Patterns with those of Arab Merchants in East Africa

As can be seen from the data in Figure 7, the brick patterns of the Arab merchants of East Africa were more diverse, enriching the decorative forms of the building and making it more diverse and refined. The porcelain patterns of the Tang and Song dynasties (618~1279 AC) are mainly circular and arc-shaped, and there is no excessive decoration. However, the bricks of the Arab merchants of East Africa are more refined, varied, and symbolic. Arab merchants introduced Tang and Song dynasty porcelain motifs into the architecture of wealthy East African merchants, enriching the decorative forms of the building. It not only adds to the visual effect of the building, but also adds a unique personality and charm to the building. Secondly, the introduction of porcelain patterns brought the architecture of wealthy Arab merchants in East Africa into contact with the Tang and Song dynasties (618~1279 AC), promoting cultural exchanges and integration. As a work of art with a long history and profound cultural connotation, Tang and Song dynasty porcelain was introduced by Arab merchants and combined with the architecture of East Africa. This cultural exchange is reflected not only in the decorative elements but also in the building's overall style and design concept. Wealthy Arab merchants in East Africa

incorporated the aesthetic concepts and artistic styles of Tang and Song culture into their architecture by introducing Tang and Song porcelain patterns, giving them a unique oriental charm. This cultural exchange and integration enriches the East African region's architectural culture and promotes mutual understanding and respect between different cultures. Eventually, Tang and Song porcelain motifs became a unique architectural element in East Africa, reflecting the identity and status of the wealthy local class. By applying Tang and Song porcelain motifs to architectural decoration, Arab merchants in East Africa demonstrated their artistic and aesthetic pursuits, as well as their wealth and status as trade intermediaries. The delicate motifs of Tang and Song dynasty porcelain became a unique and striking element in the architecture, highlighting the merchants' attention to quality and detail. At the same time, Tang and Song dynasty porcelain decoration also became a symbol of the identity and social status of the local wealthy class. By displaying Tang and Song porcelain motifs in their buildings, wealthy Arab merchants in East Africa cemented their position and influence in society.

## **THE COMBINED INFLUENCE OF GOTHIC ARCHITECTURE AND CHINESE PORCELAIN STYLE ON THE ARCHITECTURE OF ARAB MERCHANTS IN EAST AFRICA**

### **The Process of Fusion of Gothic Architectural Styles and Chinese Porcelain**

Gothic style and Chinese porcelain development can be traced back to France in the 12th century. During this period, East African societies experienced rapid economic prosperity and urbanization, and churches became important places of worship and a major gathering place for Arab merchants (Shuanghuai & Fang, 2022). In order to meet the growing demand for churches, architects began to explore new design concepts and techniques, and fused with Chinese porcelain, with architectural styles with Chinese and Western characteristics. Gothic architecture was widely used in the restoration and expansion of the Cathedral of Saint-Denis in France and also had an impact on church architecture in East Africa (Sun et al., 2023). Under the influence of Chinese porcelain, East African churches adopted novel structural techniques such as pointed arch windows, flying buttresses, and soaring spires, and the style also had an influence on wealthy local Arab merchants. The fusion of Chinese porcelain gave the Gothic architecture a more oriental character, and the appearance of the church was more vertical and light, in contrast to the traditional Romanesque architecture (S. H. Wang & Fang, 2022). Over time, the Gothic architectural style gradually spread to other countries in East Africa and was widely used in the architecture of Arab merchants. In eastern and southern East Africa, the new Gothic architectural style was widely used and formed in different regions with their styles and forms. For example, neo-Gothic architecture in the east incorporates the pattern art of Chinese porcelain, paying attention to detail carving and decoration, while Gothic architecture in the south incorporates the shape and structure of Chinese porcelain, paying more attention to structure and solidity (W. X. Wang et al., 2023).

The development of neo-Gothic architecture in East Africa peaked in the 13th and 14th centuries, and the trade in Central African porcelain reached its peak during this period. For example, churches in many parts of East Africa incorporate elements such as Notre Dame Cathedral and Cologne Cathedral, and there are shadows of Chinese porcelain. In this context, Chinese porcelain elements also had an influence on the architecture of wealthy Arab merchants, mainly spectacular spires, intricate pointed arches, and intricately detailed carvings (Wu et al., 2023). However, over time, neo-Gothic architecture was gradually replaced by the emerging Renaissance style, and Chinese porcelain merged with the Renaissance style, further influencing the architectural style of Arab merchants. The Renaissance emphasized the pursuit of Greco-Roman culture, while Gothic architecture was considered "barbaric" and "vulgar," but the Chinese porcelain style was considered delicate, elegant, and fused with the Renaissance style (Wu, 2022). As a result, the architectural style of neo-Gothic architecture gradually declined, but the influence of Chinese porcelain persisted and profoundly influenced later Arab merchant architecture.

### **Sino-African Trade Expands the Sphere of Influence of Chinese Porcelain**

With the development of trading activities, East Africa became one of the important trading centers of Chinese porcelain (Yang, 2022). Wealthy Arab merchants had frequent contacts and exchanges with merchants from all over China through porcelain trading activities. This exchange is not only the exchange of goods and goods but also the exchange of culture, art, and architecture. Through contact with merchants from the East African region, East African merchants had the opportunity to learn about the unique and spectacular features of the Oriental architectural style. Second, East African merchants became interested in the peculiarities of Chinese porcelain and introduced it into their architecture. Chinese porcelain's structural characteristics, shape, style, and color make Arab architecture more visually eye-catching, giving people a solemn and spectacular feeling. East African merchants became interested in the unique style of Chinese porcelain, adopting arched, circular, and

three-dimensional structures to show their identification and pursuit of oriental culture and Chinese porcelain (Zhang & Pollard, 2022).

East African merchants introduced Gothic architectural elements into their buildings, making the architecture of wealthy Arab merchants more diverse and refined. Wealthy Arab merchants probably used Gothic-style pointed arches, spires, and other elements in their mansions, commercial premises, etc. Chinese porcelain elements not only add to the visual effect of the building but also show the acceptance and integration of different cultures by wealthy merchants. In addition, East African merchants may have combined Gothic architectural elements with local traditional styles. Wealthy Arab merchants may have introduced Gothic architectural elements as decoration while retaining the characteristics of traditional Arabic architecture. This fusion gave the architecture of wealthy Arab merchants both a unique East African character and a demonstration of respect and pursuit of East African culture (Zhushchikhovskaya & Buravlev, 2022).

### **The Influence of Oriental Cultural Connotations on the Architecture of Arab Merchants**

The connotation of oriental culture is reflected in Chinese porcelain, making the building visually more vertical and lighter. By introducing elements such as patterns, colors, and other elements of Chinese porcelain, East African merchants made their buildings contrast with traditional Arabic architecture in appearance and show the connotation of Eastern culture. Second, East African merchants may have used large glass windows, such as pointed arches and rose windows, to increase indoor light and create a sense of space reflecting Eastern culture's solemnity. Gothic architecture focuses on vertical lines and a sense of space, but Chinese porcelain focuses on an elegance, predominantly cyan blue, which increases the solemnity of the building. East African merchants introduced patterns in Chinese porcelain to form the streamlined glass windows in the building, increasing the indoor lighting effect and creating an open and bright sense of space, making the building more magnificent and spectacular. In addition, East African merchants may have added decorative elements such as detail carvings and orchids to the exterior and interior spaces of the building to make it more elaborate and gorgeous (Zong, Lu, Wang, Li, & Xu, 2023). The architecture of wealthy Arab merchants paid more attention to detail carvings, enriching the appearance with decorative elements such as floral ornaments and sculptures. East African merchants made their buildings more decoratively decorated by introducing carvings and floral details of Chinese porcelain, showing the beauty of Eastern and Western architectural art.

### **The Lasting Influence of Chinese Porcelain on East African Architectural Styles**

Neo-Gothic architecture had a lasting influence on the architectural style of wealthy Arab merchants in East Africa. By introducing elements of Chinese porcelain, East African merchants enriched their architectural style and made it a unique blend of traditional Arabic architecture. This fusion reflects the businessman's openness to understanding between the different cultures of the East and the West and learning from each other. Even in modern times, traces of neo-Gothic architectural art, such as spires, pointed arches, etc., can still be seen in East African Arab merchant architecture. Chinese porcelain elements became a unique and striking part of the architectural style of East African merchants. Secondly, the inheritance of neo-Gothic architecture to the architectural style of East African merchants also indirectly proves the continuation of the connotation of Chinese porcelain. Wealthy Arab merchants in East Africa recognized Eastern culture and incorporated elements of Chinese porcelain into their architecture, giving them a certain sense of pride and identity. The unique architectural style of Chinese porcelain inherited from the rich Arab merchant architecture is a symbol of family identity and status. This inheritance is not only a recognition of the cultural exchange and integration between the East and the West but also an emphasis on the Eastern culture. In addition, neo-Gothic architecture's lasting influence on East African merchants' architectural style was reflected in local communities and urban planning, such as blue-and-white signs and streamlined logo designs. In some East African cities, we can see some public buildings, churches, etc., inspired by neo-Gothic architecture. Thus, the influence of Chinese porcelain on East African architecture not only perfected the local cityscape but also became a symbol of the pride and identity of wealthy local Arab merchants.

## **CONCLUSION**

The Tang and Song dynasties (618~1279 AC) were the golden development stage of Chinese porcelain, and trade with East Africa, Eastern Europe, and West Asia through the Silk Road influenced local architectural styles. In this paper, a hand-held microscope was used to test and compare porcelain from the Tang and Song dynasties (618~1279 AC) and East African architectural bricks. The results show that the Tang and Song Dynasty porcelain and the buildings of the Arab merchants in East Africa contain SiO, FeO and other materials, and the building materials of the Arab merchants in East Africa contain complexes of SiO and FeO, which is mainly caused by the difference in production technology. In addition, in terms of the thickness of the enamel, the porcelain of the Tang

Dynasty was slightly thinner, and the porcelain of the Song Dynasty was slightly thicker, mainly because the Arab merchants of East Africa had higher requirements for the enamel of porcelain, so there was thickening. In terms of patterns, Tang and Song dynasty porcelain paid more attention to arcs, circles, and single patterns. Arab merchants in East Africa deepened the pattern to make it varied and shaped. On the whole, the Tang and Song dynasty's porcelain influenced the architecture of Arab merchants in East Africa, making their building materials and patterns more abundant. At the same time, Arab merchants in East Africa also promoted the development of Tang and Song ceramics through the Silk Road. This study also has some limitations, mainly because it is difficult to obtain relevant materials, and there are few building materials about Arab merchants in East Africa in China. More materials with archaeological value will be available as supplements in the future.

### **AUTHOR CONTRIBUTIONS**

Conceptualization, Xin Yan and Mohd. Tajuddin Bin Mohd. Rasdi; methodology, Xin Yan.; formal analysis, Xin Yan, Tajuddin Bin Mohd. Rasdi. and Changsheng Wang.; resources, Xin Yan.; data curation, Xin Yan and Changsheng Wang; writing—original draft preparation, Xin Yan; writing—review and editing, Xin Yan and Tajuddin Bin Mohd. Rasdi.; All authors have read and agreed to the published version of the manuscript.

### **ACKNOWLEDGEMENTS**

I would like to express my sincere gratitude to Associate Professor MARTIN GOFFRILLER and Prof. Dr. Mohd. Tajuddin Bin Mohd. Rasdi for their invaluable support and contributions to this study.

### **CONFLICT OF INTEREST**

No conflict of interest.

## REFERENCES

- Ayieng'a, L. B., Wang, A., Lu, X., Song, Y., & Watterson, M. (2022). Research on porcelain material for product design and manufacturing in Kenya: Assessing SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> content. *Journal of Ceramic Science and Technology*, 13(1), 23-30.
- Chen, L. X., Wang, Y., Qin, B., Fang, H. W., & Li, Q. F. (2023). Reflectance confocal microscopy features of vulvar lichen sclerosus in Chinese juvenile girls. *Journal of Dermatology*, 50(11), 1497-1500.
- Christiansen, L. A. (2022). What is a fake? Viewpoints on Chinese Republican porcelain. *Arts of Asia*, 52(4), 110-116.
- Colomban, P., Franci, G. S., Burlot, J., Gallet, X., Zhao, B., & Clais, J. B. (2023). Non-invasive on-site pXRF analysis of coloring agents, marks and enamels of Qing imperial and non-imperial porcelain. *Ceramics-Switzerland*, 6(1), 447-474.
- Colomban, P., Franci, G. S., Gironde, M., d'Abrigeon, P., & Schumacher, A. C. (2022). pXRF data evaluation methodology for on-site analysis of precious artifacts: Cobalt used in the blue decoration of Qing dynasty overglazed porcelain enameled at customs district (Guangzhou), Jingdezhen and Zaobanchu (Beijing) workshops. *Heritage*, 5(3), 1752-1778.
- Colomban, P., Ngo, A. T., & Fournery, N. (2022). Non-invasive raman analysis of 18th century Chinese export/armorial overglazed porcelain: Identification of the different enameling techniques. *Heritage*, 5(1), 233-259.
- Coutinho, M. L., Veiga, J. P., Ruivo, A., Silva, T. P., Salas-Colera, E., Bottura-Scardina, S., . . . Lima, M. M. R. (2022). An insight into the firing conditions of Chinese blue-and-white porcelain through XANES. *Journal of Analytical Atomic Spectrometry*, 37(3), 632-640.
- Cui, M. F., Zhu, J. H., Hu, R., & Chen, S. Q. (2022). Research on the chemical composition and process feature of ancient porcelain produced in Dongmendu Kiln. *Spectroscopy and Spectral Analysis*, 42(3), 726-731.
- dos Santos, N., & Balao, S. M. R. (2022). Natural resources as an asset of city diplomacy: A portrait of Jingdezhen and its white gold. *Diplomatica*, 4(2), 251-268.
- Franci, G. S., & Colomban, P. (2022). On-site identification of pottery with pXRF: An example of European and Chinese red stonewares. *Heritage*, 5(1), 88-102.
- Gerritsen, A. (2023). Reading late-imperial Chinese merchant handbooks in global and micro-history. *Journal of Early Modern History*, 27(1-2), 132-155.
- Gong, Y. W., Xiong, Y. F., Wang, E. Y., & Chen, J. (2023). Enamels analysis of Doucai porcelain with Chenghua mark by non-destructive micro-EDXRF. *X-Ray Spectrometry*, 52(2), 62-71.
- Herrmann, K. (2022). Yang Enlin (1929-2014) Sein Leben und Werk zwischen China und Deutschland. *Monumenta Serica-Journal of Oriental Studies*, 70(2), 499-519.
- Huang, L. Y., Chen, Q. L., Li, Y., Yin, Z. W., Xu, F. S., Gao, X. X., & Du, Y. (2022). Composition and spectral characteristics of porcelain-treated turquoise. *Gems & Gemology*, 58(4), 438-457.
- Legostaeva, A. S. (2023). Bleus de hue: Blue-and-white wine bottles in the context of vietnamese cobalt ceramics history. *Russian Journal of Vietnamese Studies-Vyetnamskiye Issledovaniya*, 2, 41-57.
- Li, Z. H., Yuan, F., Cao, J. W., & Hein, A. (2022). Insights into the residue trapped in glaze cracks of archaeological ceramics using microchemical analysis. *Microscopy and Microanalysis*, 28(6), 1878-1889.
- Mo, Y. J., Cao, C. E., Han, G. D., & Zheng, N. Z. (2023). Analysis on the spectral characteristics and origin of "Binary" formula of Jingdezhen traditional ceramic body. *Spectroscopy and Spectral Analysis*, 43(11), 3412-3418.
- Norris, D., Braekmans, D., & Shortland, A. (2022). Emulation and technological adaptation in late 18th-century cloisonne-style Chinese painted enamels. *Archaeometry*, 64(4), 951-968.
- Norris, D., & Delbey, T. (2023). The influence of Qing glass technology on Qianlong and Jiaqing painted enamel copperwares. *Journal of Cultural Heritage*, 61, 160-167.
- Pan, Q. L., Shao, J. F., Li, R. W., Cheng, L., & Wang, R. (2022). Non-destructive analysis of red and green porcelain in Qing Dynasty. *Spectroscopy and Spectral Analysis*, 42(3), 732-736.
- Po, R. C. (2023). Consuming China in early modern England and beyond: A survey and reexamination. *Asian Review of World Histories*, 11(2), 180-209.

- Shuanghuai, W., & Fang, J. (2022). Chaiyao: A "Lost" porcelain ware from tenth-century China. *Chinese Historical Review*, 29(2), 115-129.
- Sun, J. M., Lu, H. L., Qiao, L., Li, X. L., Chen, K. H., & Cao, W. R. (2023). Identification of porcelain ewers in Tang, Song, and Yuan dynasties by digital shape characterization. *Ceramics International*, 49(9), 14246-14254.
- Wang, S. H., & Fang, J. (2022). Chaiyao: A "Lost" porcelain ware from tenth-century China. *Chinese Historical Review*, 29(2), 115-129.
- Wang, W. X., Sciau, P., Zhu, J., Jiang, J. X., Wen, R., & Brunet, M. (2023). Microstructure analysis of "Iron Spots" on Qinghua porcelain from Jingdezhen imperial kiln. *Journal of the European Ceramic Society*, 43(2), 708-717.
- Wu, B., Zhao, W., Zhao, H., Ren, X., Liu, X., Zhang, B., ... Zhao, D. (2023). Inheritance relationship between Zhanggongxiang kiln celadon and Ru Guan celadon: Comments on the rationality of Raman  $\rho$  value evaluating firing temperature. *Archaeometry*, 65(2), 247-258.
- Wu, M. (2022). Fanning out possibilities: Dung Kai-cheung and the multiplicities of time. *Modern Chinese Literature and Culture*, 34(2), 420-444.
- Yang, P. Y. (2022). Focalization and embodied viewing experience in exhibition narrative: Asia > Amsterdam at the Rijksmuseum. *Journal of Curatorial Studies*, 11(2), 180-206.
- Zhang, Y., & Pollard, A. M. (2022). The archaeological and scientific analysis of blue-decorated ceramics in the Tang and Song dynasties (618~1279 AC). *Archaeometry*, 64(6), 1394-1410.
- Zhushchikhovskaya, I. S., & Buravlev, I. Y. (2022). A "Red-and-Green Porcelain" figurine from a Jin period archaeological site in the Primor'ye region, Southern Russian far East. *Ceramics-Switzerland*, 5(4), 673-689.
- Zong, R. F., Lu, X. K., Wang, H. M., Li, W. D., & Xu, C. S. (2023). Tracing the origin of Chinese early white porcelain in the late sixth century-evidence from Xing kiln. *Archaeometry*, 65(3), 515-529.