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Research Article

Architecture of ecumenical spaces in public buildings in the 21st century: Links among the architecture of multi-faith spaces, their names, and the functions they serve in Polish airports

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Multi-faith room;
Place of worship;
Airport

Abstract This study explores the architecture and arrangement of prayer spaces in public buildings. It examines whether Polish airports have prayers spaces and whether a correlation exists between the name (e.g., "multi-faith space," "place of prayer," and "place of focus") and design. The study is supported by analyses of ecumenical spaces, which have recently been brought into service and where a visible symbiosis exists between their names and functions. This study includes in situ investigations and is conducted based on a wide range of literature, statistical data, comparative methods, and logical reasoning. This study may provide an important indication for countries that are only beginning to face a design problem concerning architecture of multi-faith spaces.
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1. Introduction

Over the last 30 years in Poland, annual surveys conducted by the Institute for Catholic Church Statistics SAC have shown a progressive decline in faith of approximately 20% (Annuarium Statisticum Ecclesiae in Polonia Ad, 2018). A visible confirmation of these statistics are churches commonly adapting to new usages (Kuśnierz-Krupa and Krupa, 2008; Kurek, 2011; Fiorani et al., 2017; Szuta and Szczepański, 2020). By contrast, an increasing number of public facilities have arranged rooms for prayer spaces of different faiths.

Recently, the trend in arranging multi-faith prayer rooms in public facilities, such as airports and universities, has dynamically developed, which has mainly been driven by economic factors due to the expanding tourism industry and the internationalization of tertiary education (Graham,

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2009; Johnson and Laurence, 2012; Cadge, 2018). Therefore, equipping a place to pray with such facilities may be an essential criterion for people to choose it for privacy. The following questions arise: Is there a link between the name of a space (e.g., multi-faith room and ecumenical space) and its design? Do newly designed ecumenical spaces fulfill the needs of the 21st century society? Is it possible to ensure tolerance and respect for religious differences by means of architecture?

Although a wide range of literature related to airport design (Blow, 1991; Kazda and Caves, 2015; Edwards, 2005) and its interiors (Adey, 2008; Van Oel and Van den Berkhof, 2013; Graham 2009) is available, a problem related to designing multi-faith places at airports has not been mentioned. This phenomenon may suggest that designing such spaces within the border of airports is treated marginally. However, notably, the arrangement of multi-faith spaces in public facilities may contribute to, among others, increased interest and benefit because of the financial input of tourism and global mobility, including business trips (Graham, 2009). Moreover, assuring tolerance and respect for religious differences may be possible by means of architecture. Hence, the evaluation of the current state of affairs in a broad scope might be crucial.

2. Methodology and process of the study

This study presents the process of developing multi-faith prayer spaces in public facilities and the factors affecting the need for such places. On the basis of the literature, this study presents the process of evolving multi-faith spaces in public facilities (Crompton, 2013; Cadge, 2017; Gilliat-ray, 2005; Grubiak and Parker, 2017; Johnson and Laurence, 2012).

The main objectives of this study is to examine whether a correlation exists among the name of prayer spaces, such as "multi-faith space," "multi-faith room," "place of prayer," "place of focus" and "ecumenical space", which are used interchangeably, and their design in public buildings. Examples of separate multi-faith spaces located at airports, where mixing of cultures and tradition is especially visible, and are connected by tourism and global mobility were used in this study. Polish airports were selected among public facilities to achieve the proposed research goals. Then, whether places of worship are assigned in the airports was checked, and an analysis was conducted to determine if a correlation exists between the name given to the spaces and the function they serve. The accessibility of these spaces to people of different faiths was confirmed to verify if the analyzed spaces fulfill the needs of the 21st century society and, simultaneously, if they ensure tolerance and respect for religious differences (Table 1). The data were compiled and presented in Table 1. The percentage of the places where the current design reflects its name was shown in diagrams (Figs. 5 and 6), as well as in the Conclusion section.

Multi-faith prayer rooms, where the symbiosis between the name suggesting its ecumenical character (i.e., multi-faith space, place of prayer, and place of focus), its actual function, and adjustments made for the followers of different religions, were studied to determine the factors that may affect the long-term success of the designed spaces. This stage of research was supported with the examples of spaces where the correlation between their space names and their functions was observed. These cases were selected from a group of public buildings where people of various cultures frequently gather, such as airports, universities, and shopping centers. This step allows for seeking an answer to the posed question: Is it possible to design a multi-faith space that fulfills the needs of the 21st century society and simultaneously ensure tolerance and respect for religious differences? Thus, the results and conclusions were presented, and the study was summarized. The study was conducted based on literature studies, statistical data, comparative methods, and logical reasoning, as well as research from in situ investigations.

3. Evolution of multi-faith prayer space

In the 1950s, the expansion of architecture of multi-religious buildings became noticeable. An iconic example of a multi-faith chapel from this time is the Air Force Academy Cadet Chapel at the Air Force Academy (Fig. 1) in Colorado, USA (Architect Walter Netsch, completed in 1962). The interior of the chapel includes individual features of three religions—Catholic, Jewish, and Protestant—which are divided into three areas (Fig. 2; Grubiak and Parker, 2017; Cadge, 2017; Perez, 2010). Shortly after, places bringing together people of different faiths began to appear not only as separate buildings but also as a space separated inside other facilities. Precisely determining the time of the first space of this kind is difficult; nevertheless, the room at Vienna Airport designed in 1988 is considered to be the oldest one (Crompton, 2013). Prayer rooms at airports were initially provided mainly for the staff and not for travelers (Grubiak and Parker, 2017; Cadge, 2017). The opposite situation was true for hospitals; internal chapels were intended to serve patients. Nevertheless, in the 1990s, a specific transformation occurred: prayer spaces began to be used mostly by staff and visitors. This change suggests that chapels have ceased functioning as places of mass gatherings (e.g., Holy Masses) as they had been initially. They began to function rather as more private, intimate spaces/rooms for individual focus, silence, or personal prayer (Gilliat-ray, 2005).

The 21st century, a time of global mobility and widespread student exchanges, is inseparably involved with intensifying mixing of cultures and traditions, and religious and cultural diversity. As a result, the last 20 years have seen visible changes in the design of places for prayer located in public buildings. Multi-faith rooms appear in shopping malls (e.g., Lakeside Shopping Center in Thurrock, England and Trafford Center in Manchester, England), universities (Johnson and Laurence, 2012), and airports. Moreover, places of worship are being adapted to the new requirements of society—from being renamed "chapel" to "multi-faith space," "place of prayer," and "place of focus" to redesigning and having separated rooms (Gilliat-ray, 2005). Nevertheless, many public buildings still need redesigning, such is Nicolaus Copernicus University in Toruń, Poland, where students still need to ask access to such a space.

A group of facilities that particularly reflects these changes are airports, shopping malls, and universities. The aim of the architecture of these spaces is to strengthen the sense of security, tolerance, and accessibility for all users.

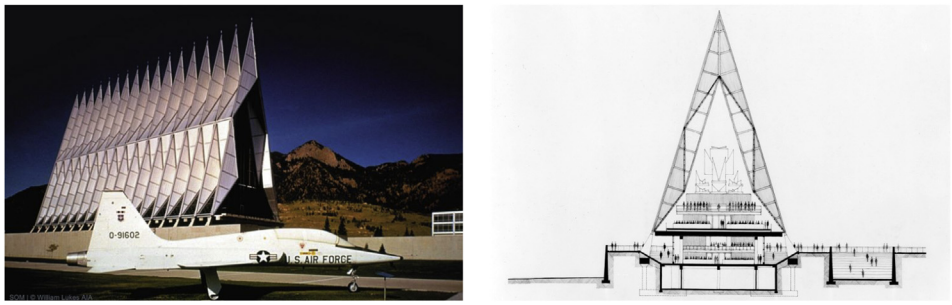

Fig. 1 Air Force Academy Cadet Chapel at the Air Force Academy, Colorado—façade and cross-section. Source: Perez (2010).

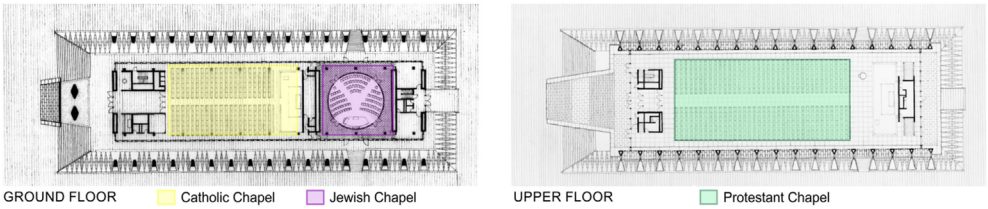

Fig. 2 Air Force Academy Cadet Chapel at the Air Force Academy, Colorado—zones separated in its interior. Plan on the left: lower level. Source: Sketches by the author based on photos from Perez (2010).

Consequently, brand new buildings are expected to have multi-faith places of worship at the design stage, and the issue of facilitating a prayer room that is not associated with any particular religion inside an existing building has become a new design problem.

4. Architecture of ecumenical spaces in Polish airports

Airports occupy a special place among public facilities. In the literature, they are classified as a "nonplace" (Augé, 2011). Although their external form is extremely diverse, the internal structure remains unchanged, which is an effect of their precisely defined task, that is, moving people from one place to another. Similar struggles are faced by people in each of them, such as identity verification, waiting for departure, passengers' anxiety associated with loss of luggage, flight delay, or taking off. In today's world of global mobility, these nonplaces occupy more space than ever, as well as filling larger areas of human life. Their determination as "specifically noninteractive" and anonymous is directly linked with the mixing of various cultures, races, and genders (Dymnicka, 2011). In the 21st century, the notion of rooting changes and the sense of geographical closeness moves to the background. Paradoxically, the anonymity of airports might provoke and escalate a need for silencing, calming and building co-presence, or prayer. Such feelings can prompt

Fig. 3 Multi-faith chapel in Szczecin—Goleniów Airport (photo by Szełemej).

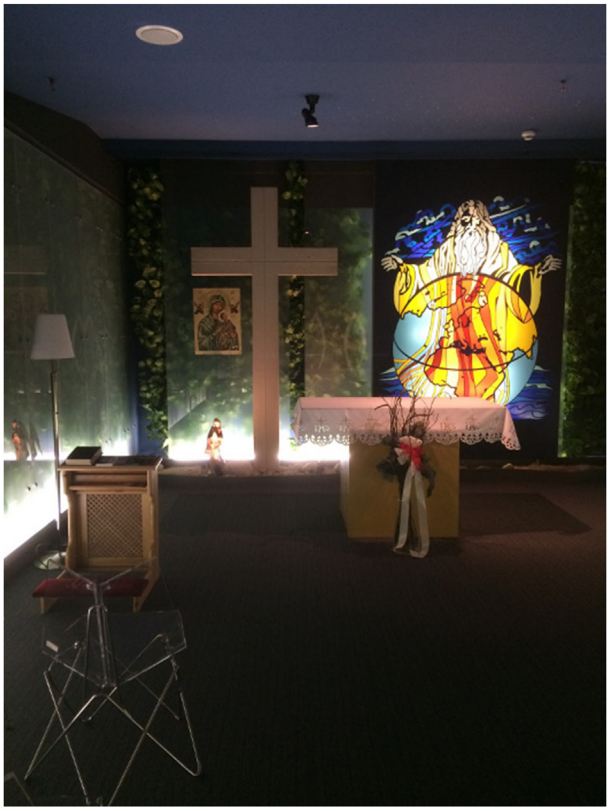

Fig. 4 Ecumenical Chapel in Katowice—Pyrzkowice Airport (photo by Sołtysek).

travelers to seek a peaceful space (to relax or engage in spiritual practices). The question arises as to whether the architecture of the multi-faith prayer space at airports corresponds with the needs of the 21st century, and does its name correspond to its form?

Information about chapel/prayer rooms located in Polish airports is compiled in Table 1. These spaces are divided into those that refer to one religion by their architecture, design, and decor, as well as those that, according to their name, are perceived as ecumenical rooms.

For research purposes, from the group of 15 airports in Poland, 11 were selected (from the above table, Olsztyn—Mazury, Zielona Góra—Babimost, and Bydgoszcz—Szwedrowo Airports were not selected because of the lack of available information on their official websites, which indicates carelessness in this regard by the administration of those airports. Radom Airport was also not selected because of ongoing construction work). Warsaw—Okęcie Airport could be excluded in the analyzed group as it has two prayer rooms: a chapel and a room for other faiths.

According to the dataset in Table 1, 6 of the 11 selected airports have separate Catholic chapels. Five of the 11 airport rooms set aside for prayers are named "ecumenical chapel," although their architecture clearly refers to one religion (Fig. 4). In total, 12 spaces were arranged (number of spaces: 12, number of airports: 11; the numerical difference appears due to the fact that two faith rooms are allocated in Warsaw—Okęcie Airport, a multi-faith and a Catholic chapel).

Percentage distribution of prayer space at Polish airports by the given name.

Table 1 List of Polish airports along with the prayer spaces arranged in them. For the study, information provided on the official websites of selected airports was used.

L.p.	Main city served by the airport	Name of the airport (city/discrit)	Date of opening a prayer space	Design indicates space as availabe for one religion?
1.	Gdańsk	Rębiechowo	2012	yes
2.	Katowice	Pyrzowice	2009	yes *although the name suggests the ecumenical character of the space
3.	Kraków	Balice	2016	yes
4.	Lublin	Świdnik	2013	yes
5.	Łódź	Lublinek	2012	yes * although the name suggests the ecumenical character of the space
6.	Poznań	Ławica	2001	yes * although the name suggests the ecumenical character of the space
7.	Rzeszów	Jasionka	2012	yes * although the name suggests the ecumenical character of the space
8.	Szczecin	Goleniów	2018	no * the name suggests the ecumenical character of the space
9.	Warszawa	Modlin	2014	yes
10.	Warszawa	Okęcie	2016	yes/no -two separated rooms for differnt religious
11.	Wrocław	Strachowice	2012	yes
12.	Bydgoszcz	Szwederowo	-	-
13.	Olsztyn	Mazury	-	-
14.	Zielona Góra	Babimost	-	-
15.	Radom	Sadków	Construction works are in progress	

By the names given to prayer spaces, half of the Polish airports (Fig. 5) are intended to meet global standards and present an attitude indicating tolerance and comfort of travelers. Nevertheless, their actual state deviates from the adopted names as mostly no correlation exists between the place name and its architectural arrangement.

The actual name is reflected only in two rooms, that is, 17% of all rooms intended for prayers that are offered at Polish airports (Fig. 6).

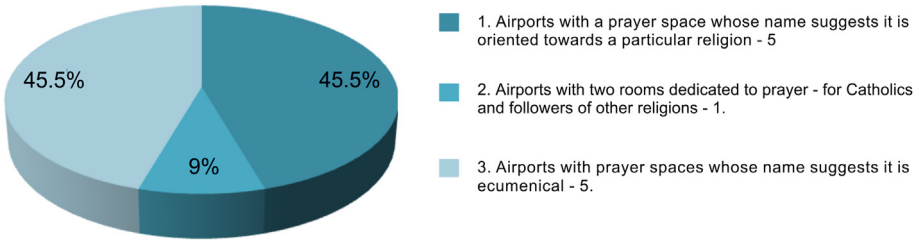

Fig. 5 Diagram showing the percentages of individual prayer spaces at Polish airports. Source: Author's own studies.

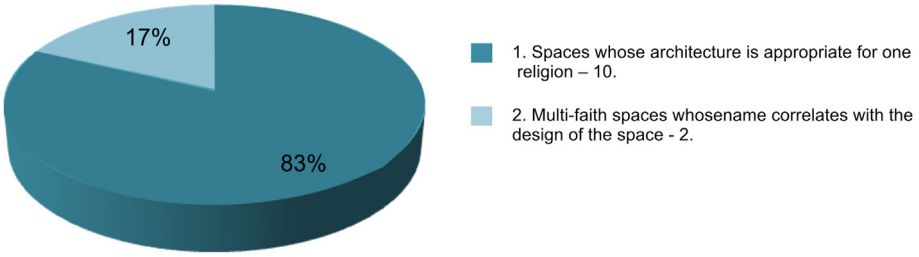

Fig. 6 Diagram showing the percentage of spaces which name and design correlate. Source: Author's own studies.

Percentage of ecumenical spaces which names and functions correlate in relation to all arranged prayer spaces at Polish airports.

5. Multi-faith spaces in public buildings

5.1. Universities

After the turn of the 21st century, existing chapels did not meet the religious needs of different student populations. In this case, cultural diversity, mixed traditions, and religions were mainly associated with popular student exchange programs, which raised the need for designing ecumenical spaces. In this case, multi-faith spaces became a solution. In addition, designed places of worship created opportunities for education and awareness of religious pluralism and spirituality (Johnson and Laurence, 2012). Examples of such universities are University of Nottingham, University of Bristol, Amsterdam Vrije Universiteit, University of Amsterdam, and University of Toronto.

The goal of the architects of the Multi-Faith Center at the University of Toronto (Fig. 7) was to fulfill the needs of different faiths of students and lecturers. The space created within the boundaries of the existing building was intended to become a symbol of pluralism and diversity. An important feature of that space is the expression of light due to the transparent onyx walls and ceiling. This room does not evoke associations with any particular religion, and it speaks to spirituality and arouses a sense of social unity and peace. The project has received many awards: OAA Design Excellence Award; OAA People's Choice Award; Design Exchange Interior Design Award; Illumination Engineering Society; and Illumination Design Award, Outstanding Achievement in Lighting Design (Lomholt, 2019) .

5.2. Shopping centers

The changes that occur in society are also reflected in shopping centers. The multi-faith room in Stratford Westfield City shopping center was designed to provide a quiet and peaceful shelter from the "shopping chaos" for the religious and nonreligious (Fig. 8). The place is available to everyone, customers and employees. The entrance to the room begins with a short corridor with a washing area to the side. The space is divided into two zones: the main

Fig. 7 Multi-Faith Center at University of Toronto—Moriyama and Teshima Architects, Source: (Multi-Faith Center, University of Toronto, Moriyama and Teshima Architects, 2007. https://mtarch.com/).

Fig. 8 Multi-Faith Space in Westfield Stratford City shopping center, London. Source: Multi Faith Space Westfield Stratford City, WAM Design (2011). http://wam.design/.

reconfigurable space that allows for any arrangement and a smaller "side space." The walls are covered by red brick to distinguish this room from the outside retail area and arouse the sense of "domestic finish."

In the main part of the space, attention is focused on the ceiling, which has acoustic impact and aesthetic qualities. The lighting is hidden in a curved design. This area is also equipped with two mobile screens that allow any configuration and adaptation of the space to fit different needs. The side zone is in the shape of an elongated rectangle. The ceiling is made of "fractured" timber panels to discharge light from the openings. In this area, high-back sofas are designed to afford privacy. This multi-faith room does not only serve employees but has also become a tourism magnet and a destination in itself. It receives many positive opinions from people of all faiths (Multi Faith Space Westfield Stratford City, WAM design, 2011; Multi Faith Prayer Room, Services, Westfield Stratford City, 2011; Multifaith Center, Archello, 2011).

5.3. Airports

Global mobility, including business trips, has resulted in the mixing of cultures and tradition and is markedly visible at airports. Daily or long-lasting journeys may provoke travelers

Fig. 9 Islamic, Buddhist, and Christian prayer rooms at Taipei Airport (Taiwan). Source: The Hansindia, Hindu Prayer Room sought at Taiwan Airport, 2019. https://www.thehansindia.com/.

Fig. 10 Airport Chapel and Chaplaincy in Zurich. Source: Zurich Airport, Airport Chaplaincy, 2019. https://www.flughafenkirche.ch/en/.

to seek a quiet place—one that stands in opposition to the hustle and bustle of the main airport hall (Graham, 2009).

The prayer space at Taipei Airport (Taiwan) is located in the departure zone. The vast area of this airport made it possible to arrange several places of prayer, which solved the issue of the varying faiths of its users. Three prayer rooms were designed for followers of different religions: Christianity, Islam, and Buddhism (Fig. 9). However, the area of airports does not always allow for such spatial solutions; at this point, the airport in Zurich is worth paying attention (Fig. 10). At Zurich Airport, a solution was provided by designing a room that provides a sense of comfort for followers of different religions, as well as a separate meditation room (International Association of Civil Aviation Chaplains, 2019; Zurich Airport, Airport Chaplaincy, 2019).

6. Discussion

In the 21st century—a time of global mobility, of widespread mixing, and filter of tradition, culture and religion, the issue related to the designing of neutral places for faith has become an extremely important design problem. The first multi-faith spaces were housed in buildings especially dedicated to one religion. At that time, they were independent structures (Gilliat-ray, 2005; Johnson and Laurence, 2012). Today, spaces separated within public facilities are being used increasingly due to the fact that culture and religion are visible there. Examples of these buildings are airports, universities, and shopping centers (Cadge, 2017; Grubiak and Parker, 2017; Crompton, 2013). At this point, architects are facing a new challenge—the design of a universal, multi-faith space. As discussed in Section 4, the problem of designing such places at Polish airports remains unsolved. In this case, is it possible to design a space that corresponds with the needs of the 21st century society? Could it become a space that is faith-neutral while simultaneously providing facilities that allow various religious groups to quickly and easily adapt to their needs? Could the architecture ensure tolerance and respect for religious differences?

After examining several ecumenical spaces arranged at airports and universities, Crompton (2013) noted that they are "mundane spaces without an aura," which is closely linked to their arrangement. The dominant whiteness and emptiness, as well as the small amount of equipment do not make these rooms orderly, in fact, quite the opposite. In these multi-faith rooms, randomly arranged boxes filled with sacred elements of a given faith can be found, which can cause the rooms to be perceived as chaotic, as if the architecture depends on culture. The impression remains that if cultures are being mixed, then the architectural order is also mixed, or even disappears (Crompton, 2013). The ecumenical spaces at Polish airports (Section 4) examined by the author of this study confirm the above phenomenon. In Poland, these apparently ordered places of prayer might evoke a sense of chaos or create anxiety. This state is aggravated by poor lighting or a complete lack of windows, as well as the lack of a clear axis. Such an arrangement of the rooms does not help in conveying the feeling of unity nor creating a sense of peace. Moreover, they can even hinder concentration and negatively affect the perception of the room. Nevertheless, spaces designed in such a way also have advantages; they are considered to be "safe" because of their neutralization through whiteness, and the maximally reduced number of religious objects reduces the chances of violating someone's privacy in faith, thereby interfering in their religion. Contrasting with this kind of arrangement are the places of worship analyzed in Section 5. The methodology of this study allows to define two types of arrangement of multi-faith rooms.

- Type I: Safe spaces where everything is sparing in form and materials, restrained, and dominated by whiteness and emptiness.
- Type II: Spaces where colors are present, and various building materials are used.

In the literature, the first type of space is defined as negative, and unity is created by exclusion. This type is characterized by the rejection of regional, traditional forms and designed in the spirit of modernism. Such actions aim to increase the chances of creating a universal, sacred space. Nevertheless, from a religious point of view, minimalism may seem to be more Protestant than Catholic (Crompton, 2013).

The second type, where unity occurs through merging is defined as positive. Religions and cultures are mixed and intertwined. Here, an interference occurs. Such a way of design may be likened to eclecticism in architecture—the free compilation of motifs (Crompton, 2013). In positive spaces, various materials and forms can be found, whereas the deprivation of iconography or characteristic elements of a given faith in these spaces do not have to lead to the place being perceived as empty, cold, and secular. Attempts to create the genius loci in this case might become the key to success in designing a multi-faith space (Norberg-Schulz, 2000).

As discussed above, designing in such a way that a sense of unity is achieved through intertwinement (Type II) is possible, Crompton (2013) stated that designing a space common to Christianity and Muslims without bias may be difficult because "there is no core of common truth on which to build a universal space.". The statement turns out not to be entirely accurate because the core of the faiths—believing in God, the creator of the universe—is shared by both religions (Kałuża, 2019). At this point, broadening one's knowledge and understanding of other faiths become a critically important issue before undertaking the project of designing such a space (Necel Schr, 2017).

Although Johnson and Laurence (2012) mainly referred to multi-faith centers as separate, independent structures, similar to the above researchers, they also focused their search on finding common points, the deep roots of faiths, and proved that this can become the key to success in designing multi-faith spaces. The common element that characterizes religions, perhaps trivial and thus easy to misrepresent, is mystery and admiration. One of the tasks of ecumenical spaces, regardless of religious beliefs, is to move the visitors' mind to a place of worship. It is a fundamental element in building a space of prayer for each religion, at the same time, being a huge challenge (Johnson and Laurence, 2012).

A physical, albeit not less important feature noticeable in the place of prayer is the use of high, lofty ceilings, as evidenced by religious buildings belonging to Christians, Jews, and Muslims. Norberg-Shultz (2000), one of the leading and influential architectural theorists, attempted to explain what sacred spaces are and bridge the gap between philosophical concepts and the design of the physical environment. One of his most important statements in the context of this research is, "The vertical has always been considered the sacred dimension of space." Hence, the aforementioned rooms' height can be associated with the vertical direction and, according to Norberg-Schulz, can symbolize the upward climb toward the light (Norberg-Schulz, 2000; Johnson and Laurence, 2012).

Light most often symbolizes life, as well as the presence of a higher being. The transience of light, as well as various light impressions, can be created due to highly developed, modern technology. Natural light, which may be modified, also has huge potential, for instance by arranging in such a way that it flows through patterned, colored glass, successively reflecting off objects or surfaces. Light might become a focal point in prayer rooms, but it is also worth illuminating other areas as well, which offer opportunities beyond purely utilitarian qualities to build tension and mood. The above steps might become helpful in creating the genius loci of the designed place (Johnson and Laurence, 2012; Kaimakliotis and Lau, 2011).

Another factor influencing the aura of the place created is the building materials used. Although Crompton (2013) saw a reference to paganism in the use of natural materials and textures in places of worship, the use of natural materials and colors can refer to the universal respect for nature, which is common to different religions. Nonetheless, color selection also plays a crucial role (different denominations use different colors for liturgical elements); a neutral color palette can become the appropriate background for religious ceremonies (Crompton, 2013; Johnson and Laurence, 2012).

An equally important aspect in the process of designing ecumenical spaces is to harmonize the furnishings with the needs of the followers. A situation where the worshipper might like to take off their shoes before entering the place where they will pray is worth predicting. Hence, a mobile piece of furniture (in this case, a shoe cabinet) allows the users to move it wherever they need. Moreover, the case of the multi-faith space at Northeastern University in Boston is another example worth mentioning. The design of this place aimed at respecting the individuality of each entity, as well as providing privacy and liberty; however, it is still not suitable for everyone. "Muslim women have screened off a corner for themselves, while Muslim men have moved to another room entirely" (Crompton, 2013). In such events, simple solutions might prove crucial. If religion requires the separation of men and women with a physical element, then, once again, a mobile piece of furniture might prove to be a solution; a movable screen, veil, or drape can achieve such an effect (Johnson and Laurence, 2012).

In view of the issue of storing religious objects (e.g., prayer mats, sculptures, paintings, and musical instruments), they should not be hidden in cabinets or boxes. Their exposure can have far-reaching, positive effects. That is, the display of religious objects can encourage gaining knowledge about other faiths and traditions, awaken cognitive curiosity, and support education. After all, the name multi-faith space, suggests that followers of different religions can be present there; thus, why "hide," in a metaphorical sense, their presence in boxes or cabinets?

A few issues, treated rather as a signal in this study, are worth considering during the design of prayer rooms, but considerable attention should be paid to them when referring to multi-faith, independent structures, where architects have a remarkably larger area to their disposal. These issues relate to acoustics [various religious practices involve diverse forms of worship (e.g., spoken word, music, singing, instrumental music) that requires careful sound analysis] and technical problems, including the use of objects during church services, such as water, fire, or sand (Johnson and Laurence, 2012). The usage of rituals can become a challenge due to maintenance, safety, and security.

Many rituals, religious ceremonies, and their varieties exist. Therefore, defining unequivocally the optimal form or shape for a multi-faith space might be difficult. Nevertheless, after considering the above discussion, versatility appears to be one of the most essential elements. Arranging "safe" empty rooms, which turns out to be universal, may become a reflection of inept attempts to resolve and combine religious, ethnic, and cultural conflicts, as is the case at Polish airports (Table 1 and Figs. 5 and 6).

7. Applications and summary

Despite the decline in the number of the faithful and the growing number of abandoned places of worship in recent years, places, referred to as multi-faith space, place of prayer, or place of focus, are gradually gaining popularity. The design and arrangement of multi-faith spaces is a relatively new issue that has emerged in the 21st century. They are based on multi-faith religious buildings that were single structures built especially for this purpose in the second half of the 20th century. Initially, those uniform structures (chapels) combined inside spaces designed for different faiths.

The 21st century, a time of global mobility, significantly affects the growing religious diversity that has become an important catalyst for social change. Various types of religious pressure on wider society have also influenced architecture (Augé, 2011; Dymnicka, 2011). Particularly, public buildings reflect these ongoing changes. Ecumenical spaces have begun to be separated within existing buildings (for instance, in universities, it is a factor that influences the popularity of student exchange programs), as well as being designed in brand new facilities such as airports and shopping malls. Ongoing social changes require undertaking new actions, and religious facilities should adopt a bold new approach to reflect a multi-religious reality. Therefore, architects face a new challenge—designing spaces that allow dialogue among different religions and foster respect and tolerance.

A lack of literature and the low profile of this subject in the context of architecture has marginalized this topic. Although the analyses conducted showed that almost all Polish airports have separate prayer spaces, most of them might be considered mono-religious. The diagrams (Figs. 5 and 6) indicate a one-way trend in designing prayer rooms. A part of the space function is its name, which is acceptable for various religions. However, a link between the name and the space layout is rare (such a correlation appears only in two cases). Unfortunately, many of them look abandoned and empty, rarely decorated and poorly managed, and tucked into marginal areas of many leading airports (e.g., Szczecin—Goleniów Airport, Fig. 3).

The changes taking place lead to a need to address the diversity and multi-religious nature of the current society, and a new design issue thus emerges. Particularly, the following questions arise: Is it possible to design a neutral and simultaneously multitasking space that fulfills the needs of the 21st century society? Is it possible to ensure tolerance and respect for religious differences by means of architecture? In countries where this issue is more common and has been visible for a long time, finding multi-faith spaces that correlate with their names is possible (Section 5). The examined examples allow the determination of factors that may affect the long-term success of the designed examples of multi-faith prayer rooms.

As this study shows, ecumenical spaces can be divided into two types: negative and positive. Ecumenical spaces arranged in the Type I (negative) clearly break with traditional expressions of holiness, and religious artifacts are kept to a minimum. Unity occurs through exclusion. In spaces arranged in the Type II (positive), various materials and forms are used, and unity occurs through combination.

Arranging "safe" empty rooms, although turning out to be universal, might also become a reflection of inept attempts to resolve and combine ethnic and cultural conflicts, as was in the event of the Polish airports, where no correlation exists between form and function. Conversely, deviating from minimalism and mixing cultures and religions (through the usage and exposure of religious artifacts, works of art, and the application of natural materials as constructional, ornamental, or functional elements, which refer to nature) can also be considered universal. However, being ineptly composed may appear not to be culturally neutral and might even create a pagan atmosphere. Therefore, finding an unambiguous answer to what will work and what will not is difficult. Hence, finding a good balance—the golden mean—is essential.

Nevertheless, the research conducted in this study can become a datum point for the design process. As initially discussed, an attempt to find common features of religions should be made. Equally important is the recognition and adequate use of architectural tools (e.g., light, geometric forms, colors, textures, acoustic properties, and solutions) that can be achieved through modern technology and skillfully used mobile furniture that can be helpful in designing a multi-faith space that aims to fulfill the needs of the 21st century society, as well as being neutral to various faiths. Moreover, these architectural tools might simultaneously provide facilities that allow various religious groups to adapt the place of worship quickly to their needs. Furthermore, exposing religious objects might become a reason for establishing dialogue, increasing the respect for the sanctity of these objects, strengthening cognitive values, and broadening the mind. By means of architecture, tolerance and respect for religious differences can be ensured. This study indicates the direction that should be followed by the architecture of multi-faith rooms and what the crucial elements are in their design, which make them a symbol of pluralism and diversity, thereby encouraging tolerance and respect. Religion often divides, but as the

examined examples show, can also bring society together. By means of architecture, a kindness and understanding among people can be inspired, regardless of faith. Multi-faith rooms can become a place where the barriers among people of different faiths are broken down. Nevertheless, no perfect ecumenical space exists, and creating one can be difficult. Nevertheless, conducting appropriate studies and combining them with this discussion can bring designers significantly closer to achieving all the intended goals simultaneously.

The challenge of designing multi-faith religious spaces is worth paying attention. These places are not only a place of worship but they also teach tolerance and awareness of religious pluralism. These spaces should promote understanding among people, not division. Their arrangement should prevent any person from feeling excluded. The study conducted may serve as a guide for rearranging places that already exist and for those that are only being designed. Drawing on experiences from places where the problem was solved and where a correlation among name, design, and function occurs can be worthwhile. Nondominant, pluralistic rooms decorated in the most neutral way do not mean banality; perhaps that is why it remains the challenge in the 21st century.

Declaration of competing interest

The author declares no conflicts of interest.

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