Revealing the Architectural Quality of Media Architecture

Niels Wouters[1], Koenraad Keignaert[2], Jonathan Huyghe[3], Andrew Vande Moere[1]
[1] Research[x]Design, Department of Architecture, KU Leuven, Belgium
{niels.wouters, andrew.vandemoere}@asro.kuleuven.be
[2] Department of Product Development, Faculty of Design Sciences, University of Antwerp, Belgium
koenraad.keignaert@uantwerpen.be
[3] Meaningful Interactions Lab, KU Leuven – iMinds, Belgium
jonathan.huyghe@soc.kuleuven.be

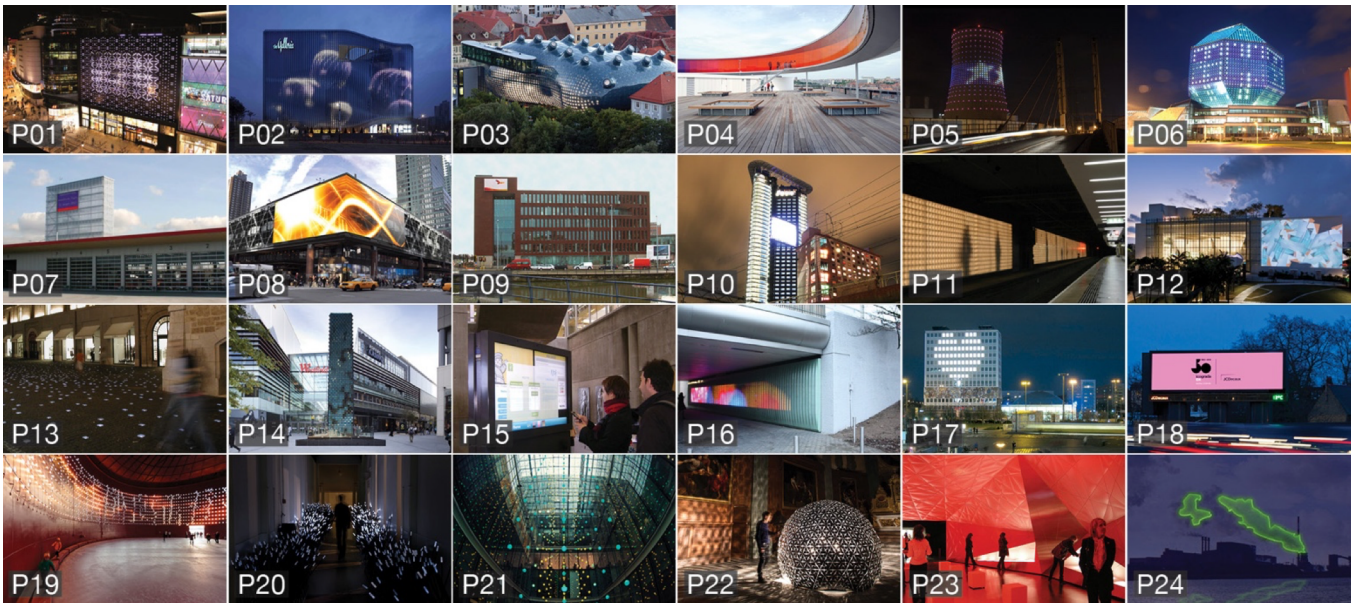

Figure 1: Collage of all 24 media architecture projects that were evaluated by professional architects in a Q survey.

ABSTRACT

Media architecture is becoming an increasingly affordable and ubiquitous element in our built environment. As a result, architecture gains dynamic and interactive opportunities to engage with its surroundings. However, the influence of media architecture on the experience of the built environment raises the need to avoid an architectural disconnect. In this paper, we describe which design qualities support the architectural relevance of media architecture. We report on a Q Methodology survey among 22 architects that aimed to reveal the perceived architectural quality of 24 existing media architecture projects. Our analysis of the specific terminology illustrates how perceived architectural quality of media architecture relates to its ability to 1) coexist with physical characteristics of architecture; 2) augment space; 3) respond to contextual changes; and 4) communicate content that is relevant for the architectural situation.

Conference'10, Month 1–2, 2010, City, State, Country.

DOI: http://dx.doi.org/10.1145/12345.67890

Categories and Subject Descriptors

H.5.m [Information interfaces and presentation]: Miscellaneous.
J.5 [Arts and Humanities]: Architecture.

General Terms

Human Factors, Theory.

Keywords

Media architecture; media façade; public display; architecture; methods; evaluation; Q methodology; user studies; experience.

1. INTRODUCTION

The increasing affordability of display technologies, together with an increasing pressure to communicate with large audiences in groundbreaking dynamic ways, has led to the emergence of media architecture. Here, the experience that architecture creates in its surroundings is augmented by conveying dynamic effects through a range of digital media. Manifestations of media architecture are characterized by, among others, material properties (e.g. scale, resolution), functional characteristics (e.g. technology, interactivity), and the aim to fulfill specific goals. They range from functional goals, such as providing a sense of safety [17], through qualitative goals, such as enlivening public space [6], to strategic goals, such as relaying contextually relevant information [14]. These new dynamic techniques thus allow for architecture to 1) rapidly change its physical appearance [18]; 2) continuously and dynamically influence our experience of public space [13]; and 3) provide novel opportunities for people to engage and interact with each other [12].

Despite the new possibilities, the proliferation of media architecture also raises concerns for responsible design action and avoiding an architectural disconnect [10]. While HCI research on media architecture commonly focuses on the qualities of interaction and technical possibilities, little is known about the architectural quality. In fact, we are still unsure why many architects are skeptical or do not embrace media architecture, or what characteristics make us perceive some media architecture as 'successful' whereas others may seem to be 'added' to architecture. The challenge remains to embed media into existing physical structures and surroundings in meaningful ways [4], which thus raises the need to align the dynamic qualities of digital media with the static qualities of an architectural design rationale [21]. Good architecture seamlessly integrates within its temporal and socio-physical context, and is able to transform the flows, dynamics and habits of the people it hosts. However, it remains unclear how these architectural design qualities are reflected in media architecture; i.e. what qualities support 'good' media architecture that harmonizes with the underlying architectural design rationale.

In order to gain insight into the architectural qualities of media architecture, we have organized a survey among architects that invited them to evaluate media architecture projects and describe perceived architectural qualities. In this paper, we explain the analysis of results and promote the notion of considering media architecture as a form of *architecture*, rather than a form of *media*. As such, media architecture should essentially be conceived and designed to reflect (and amplify) architectural qualities, rather than be considered a part of architecture through its architectural scale and public character.

2. METHODOLOGY

The architectural design of space is motivated by a range of experiential, structural and functional requirements. Social, cultural, economic and aesthetic requirements balance a range of functional needs, such as providing shelter [16]. However, the terminology to describe design qualities of architecture varies across cultures, contexts and individual preferences [20]. As such, there may be a consensus among architects with regards to what is considered *"best practice"* architecture (e.g. level of sustainability), but the terminology they adopt to describe architectural qualities likely differs as a result of experience, training, culture or personal preferences. Consequently, forming an understanding of design qualities involves identifying judgments that are widely shared, or conversely, investigating how weakly or strongly people agree on those judgments [19]. Q Methodology combines both qualitative and quantitative research methods and is used to examine subjective structures, such as opinions, attitudes, preferences and values [2]. The method has been applied in various domains, including new media [7] and advertising [1], and is gradually finding its way in the field of HCI [15]. Typically, participants in Q surveys rank subjective statements according to their personal level of agreement. Factor analysis of results ultimately reveals the subjective structure of the viewpoints that exists towards the various statements.

We invited a total of 10 architectural firms in Belgium and The Netherlands to participate in our survey, from which 22 architects responded positively. All firms were selected to be professionally active for more than ten years. We did not require participating architects to have any prior experience or interest in the domain of media architecture. Participants were given access to a custom website, which guided them through all necessary steps. First, participants were invited to rank 24 still images according to perceived architectural quality. The image set contained examples of permanent and temporary media architecture, ranging from media facades and public displays to spatial media art (see Figure 1, Table 1). Examples were chosen to cover a wide range of scales, content types, and technologies, and encompassed both permanent and temporary installations. Ranking occurred by dragging images onto a forced normal distribution 2-3-4-6-4-3-2, with value judgments ranging from -3 (n=2, perceived low architectural quality), over 0 (n=6, indifference) to +3 (n=2, perceived high architectural quality). Forcing participants to sort images in a normal distribution is a key characteristic of the Q Methodology. It requires them to valuate their opinions carefully, and seek balance in their subjectivity. Images were shown in a random order, and contained no information about the designer, location or intent. Subsequently, participants were required to provide qualitative feedback on the highest and lowest ranked media architecture images. Finally, they were invited to share general comments on their perception of the current and future potential of media architecture. Some participants were later invited via email to elaborate on some of their comments, if these were considered unclear or ambiguous.

Table 1: Overview of media architecture projects shown during the survey, and the respective factor loadings.

#		Project Name	Location		*F1*	*F2*
P01		Zeilgalerie	*Frankfurt*	*DE*	*1*	*0*
P02	*	Galleria CenterCity	*Seoul*	*SK*	*2*	*0*
P03	*	Kunsthaus	*Graz*	*AT*	*1*	*-1*
P04		Rainbow Panorama	*Aarhus*	*DK*	*3*	*2*
P05	*	Cooling Tower	*Drogenbos*	*BE*	*0*	*1*
P06	*	National Library	*Minsk*	*BR*	*-3*	*0*
P07	*	Fire Station	*Puurs*	*BE*	*-2*	*-3*
P08	*	Port Authority	*New York*	*US*	*0*	*-1*
P09		AB Inbev	*Leuven*	*BE*	*-2*	*-2*
P10	*	Beeld van den Haag	*The Hague*	*NL*	*-3*	*-1*
P11	*	Nexus	*London*	*UK*	*1*	*3*
P12		New World Center	*Miami*	*US*	*-1*	*-1*
P13	*	Place du Molard	*Geneva*	*CH*	*0*	*3*
P14		Digital Fountain	*London*	*UK*	*-1*	*-2*
P15	*	UBI Hotspot	*Oulu*	*FI*	*-1*	*-2*
P16		Moodwall	*Amsterdam*	*NL*	*0*	*1*
P17	*	Blinkenlights	*Berlin*	*DE*	*-1*	*0*
P18		JcDecaux Gateway	*London*	*UK*	*-2*	*-3*
P19		Silo 468	*Helsinki*	*FI*	*2*	*1*
P20	*	Dune 4.0	*London*	*UK*	*2*	*1*
P21		LED Pixel Cloud	*London*	*UK*	*0*	*0*
P22	*	Lotus Dome	*Lille*	*FR*	*3*	*0*
P23		Swarovski Pavilion	*Basel*	*CH*	*1*	*2*
P24	*	Green Cloud	*Helsinki*	*FI*	*0*	*2*

** denotes $p \leq 0.01$ for distinguishing statements between F1 and F2*

We analyzed the survey results by calculating factor scores and difference scores [2]. The qualitative feedback that participants provided was explored through a combination of summative content analysis and open coding [9], to identify major themes and specific examples of architectural terminology.

3. RESULTS

The centroid factor analysis of survey responses revealed the existence of two distinct discourses F1 (focus on physical integration, n=13) and F2 (focus on spatial and communicative experience, n=8), i.e. two general shared sentiments through which participants evaluated media architecture. We observed a shared consensus on 10 still images, either a perceived high architectural quality (P04, P19, P23), low architectural quality (P09, P14, P18) or indifference (P01, P12, P16, P21). The remaining 14 images significantly distinguished discourse F1 from F2. For participants loading on F1, architectural quality was perceived to be high in P02,

P03, P20 and P22, and low in P06, P10 and P17. In contrast, F2 distinguishes through its high score for P05, P11, P13 and P24, and a low score for P07, P08 and P15.

4. QUALITY OF MEDIA ARCHITECTURE

In this section, we further discuss the qualitative feedback according to the shared sentiments of discourses F1 and F2.

4.1 Physical Quality

For F1, the quality of media architecture is captured through its physical integration within architecture. For example, positively ranked projects such as P02 and P03 were identified to be conceived as a whole and to align with the architectural design rationale. On the other hand, we observed more critical views towards architecture that is retrofitted with display media. This is illustrated in P07, P09 and P10 where participants perceived the addition of media to existing infrastructure as "*agnostic of design rationale and context*".

The absence of architectural quality is described through terms such as "*disproportionate*" (n=5), "*bombastic*" (n=3) and "*disconnected*" (n=2). Such terminology typically related to regular public displays, such as P07, P08, P09, P18. Displays are often referred to as "*generic*" elements (n=4), both in terms of design characteristics (e.g. "*The generic screen makes it look like an additional layer to the architecture*", P09) and placement (e.g. "The *placement could have been less generic, and [could] have embraced the formal language of the building*", P10). However, media facades were also critically analyzed in terms of their integration within the architectural design rationale of a building. In particular, P06 was described as "*invalidat[ing] a volume*" (n=5) and "*mundane*" (n=1); a description that was later clarified to reflect the "*inelegant addition of lighting that destroys an otherwise interesting architecture*". Conversely, the visual appearance of some architecture may invoke strong sentiments in itself, which can be emphasized by adding digital media (e.g. "*It's a fat bulky shape that becomes even more invasive with the added lighting*", P06).

We identified more positive attitudes when rhythm and repetition are carried through in media architecture (e.g. "*Modularity of the building served as reference for the display*", P08), or when media accentuated a formal language (e.g. "*The lights embedded in the building skin can help to demonstrate the organic architecture*", P03). Media architecture is seen as a new building block that has the potential to complement architecture (e.g. "*delivering a new materiality*", P23) and to blend in with the design rationale (e.g. "*the media IS the architecture*", P11; "*media interacts with the architecture*", P22).

Architectural quality. *Media architecture is described by way of its ability to coexist with the physical characteristics of architecture in four ways: 1) how it volumetrically aligns with the architecture that supports it; 2) how its dimensionality mirrors architectural proportions; 3) how modularity extends architectural rhythm and repetitiveness; and 4) how media architecture as a new materiality blends in with the architectural expression.*

4.2 Experiential Quality

The human experience of architecture is defined by a wide range of intangible parameters, such as distinct appreciations of spaciousness, contemporary character and harmony versus contrast [3]. Architectural design involves creating spaces that invoke experiences, which is reflected in the positive evaluation of F2. From the analysis of qualitative feedback, two perspectives onto experiential quality were identified: the atmosphere that media architecture creates, and the ability to respond to the environment.

4.2.1 Atmosphere

Our analysis revealed that media architecture is commonly described as a medium that creates an "*experience*" (n=10) and an "*atmosphere*" (n=6), able to "*turn non-places into places*" (e.g. P11) and even "*alter the identity of a place*". This is not limited to the aesthetic experience of light effects (e.g. "*Small and subtle light units have a calming effect*", P20), but includes the perceptual experience of media architecture that affects both the indoor and outdoor environment (e.g. "*The effect is visible both from outside and inside. It results in compelling experiences in and around the building, which provides something for everyone*", P04).

Media architecture is able to convey "*poetic*" visual effects (n=5), to create an interesting "*scenography*" in an environment (n=3, P22), and to make a "*gesture*" towards engaging in a dialogue with its surroundings (n=2). Some of the visual effects "*inspired the imagination*" of architects (n=2). While none of the responses involved descriptions of the outdoor context, this was however considered a criterion in indoor environments (e.g. "*It's a novel kind of stained glass to amplify spatial experiences*", P22; "*Light binds the large, round space into one warm atmosphere*", P24).

Architectural quality. *Media architecture is recognized to provide an opportunity to dynamically enrich architectural space in three ways: 1) establishing a mood for a theatrical presentation; 2) supporting and promoting place-making; and 3) bridging individual differences while offering collective experiences.*

4.2.2 Responsiveness

Studies on interaction with media architecture have revealed the aesthetic and engaging qualities of real-time manipulation (e.g. [5]). Our analysis shows that perceived dynamic qualities extend to responding to the time of day (e.g. "*Façade can show particular information for daytime visitors, and support sense of safety at night*", P01) and the content that is shown (e.g. "*It might entertain people, but also provide travel information*", P11). Response to P11 and P13 captures many of the dynamic qualities of media architecture, such as "*the pavement becomes a decorative part of the urban environment at night, in contrast to its purely functional purpose during daytime*". In fact, media architecture is valued for its ability to resemble the functionalities that are covered by architecture or the activities that it hosts. While architecture typically only adapts to contextual requirements after decades or centuries, media architecture allows for fast, dynamic response. The latter reveals a possible use for media architecture's dynamic qualities, in changing its function and visual effect in response to quickly changing contextual requirements (e.g. ornamentation during the day, wayfinding during rush hour, and safety at night).

Architectural quality. *The dynamic qualities allow for media architecture to rapidly and dynamically align with the ever-changing activities, requirements and characteristics of its architectural, spatial and social context. We identify three types of dynamics: 1) real-time, such as direct interaction; 2) short-term, such as changes over the course of a day; and 3) long-term, such as changes in building occupancy or societal perception over the course of years and decades.*

4.3 Communicative Quality

Content of media architecture ranges from informative, easy-to-read messages to abstract lighting and projection. Designers continuously seek ways to communicate in novel, creative and artistic ways, even though some content may always require unmistakable and unambiguous forms of communication (e.g. wayfinding, official announcements). This vision reflects the critical stance of F2 towards the reciprocal support of media and

architecture in communicating with their surroundings. For example, public screens are confirmed to be useful when unambiguous communication is sought with a broad group of users (e.g. "*It's the right means to an end*", P15). However, we learned that public displays are also considered to be a source of "*light pollution*" (n=3), "*boring*" (n=3) and "*screaming*" for attention (n=1), and their design characteristics to often be "*uninspiring*" (n=1) and "*unimaginative*" (e.g. P07, P09, P18). On the other hand, media facades are seen as "*soft*", "*well-considered*" (e.g. P02, P03).

Media architecture is seen to provide creative and symbolic opportunities for communicating with its surroundings; and thus potentially extend how architecture in itself communicates with its surroundings [11]. This is exemplified in P17, a retrofit project that is commonly referenced in literature on media architecture because of its pioneering role and interactive capabilities (e.g. [8]). Three participants ranked the project on the most negative end of the normal distribution, and validated their choice by pointing at the representation of a "*silly image*", an "*unrefined*" form of communication and the "*tacky*" feel of the media concept. The latter was clarified to refer to a contrast between the playfulness of depicting a love heart and the corporate feel of the architecture.

Architectural quality. *Architecture is instrumental in influencing the perception of the message that media architecture communicates. Hence, communicating by way of media architecture requires a consideration of 1) what message is shown; 2) how the message is shown; and 3) how the interpretation of the message becomes contextualized in the physical architecture itself.*

5. CONCLUSION

Our analysis indicates that architects recognize various qualities in media architecture, but require reciprocal support between the media and the architecture. More specifically, architects have revealed that media architecture should aim to 1) amplify the overall architectural design rationale; 2) augment experiences in the surroundings; 3) enable dynamic adaptations to these surroundings; and 4) seek a balance with the message of architecture. In this research, we have identified many and diverse architectural qualities. Some were known and actively exploited and researched (e.g. experience, communication, place-making), though some were not known and have never been investigated before, such as materiality, modularity, scenography and architectural contextualization. We believe that the further consideration of these qualities and terminology will support the integration of media architecture within the built environment and its increased adoption as an architectural building block. Media architecture will thus not solely rely on electricity and the actuation of LEDs to become a part of architecture, but exist in symbiosis, by being better aligned with the intended architectural goals and complementing the visual appearance of architecture.

While architecture is meant to exist for several decades, if not centuries, the technology that drives media architecture evolves rapidly. This raises the question what ageing of media architecture means. However, our survey did not reveal any concerns with regards to the long-term sustainability of media architecture. As a result, the question how media architecture should respond to long-term architectural, societal and technical evolutions remains unanswered. Future research may further investigate these concerns, seek involvement from additional stakeholders such as urban planners, interaction designers, artists, advertisers and operators, and analyze cultural differences. Additionally, we believe that our image set encompasses most typologies of media architecture, but more objective ways of developing the image set to be fully representative for all stakeholders can be considered.

ACKNOWLEDGMENTS

We thank the participating architectural firms and architects for their active involvement in this study.

REFERENCES

[1] Brouwer, M. Q is Accounting for Taste. *Advertising Research* 39, 2 (1999), 35-39.

[2] Brown, S. A Primer on Q Methodology. *The International Journal of Q Methodology* 16, 3/4 (1993), 91-138.

[3] Carlson, A. *Aesthetics and the Environment: Appreciation of Nature, Art and Architecture*. Routledge (London), 2000.

[4] Dalsgaard, P. and Halskov, K. 2010. Designing Urban Media Façades: Cases and Challenges. In *Proc. CHI '10*. ACM, 2277-2286. http://doi.acm.org/10.1145/1753326.1753670

[5] Fischer, P. and Hornecker, E. 2012. Urban HCI: Spatial Aspects in the Design of Shared Encounters for Media Facades. In *Proc. CHI '12*. ACM, 307-316. http://dx.doi.org/10.1145/2207676.2207719

[6] Fortin, C., Neustaedter, C. and Hennessy, K. 2014. The Appropriation of a Digital Speakers Corner. In *Proc. DIS '14*. ACM, 955-964. http://dx.doi.org/10.1145/2598510.2598534

[7] Freberg, K., Graham, K., McGaughey, K. and Freberg, L. A Study of Public Perceptions of Personality. *Public Relations Review* 37, 1 (2011), 90-92. http://dx.doi.org/10.1016/j.pubrev.2010.11.001

[8] Haeusler, H. *Media Facades: History, Technology and Content*. Avedition (Ludwigsburg), 2009.

[9] Hsieh, H. and Shannon, S. Three Approaches to Qualitative Content Analysis. *Qualitative Health Research* 15, 9 (2005), 1277-1288.

[10] LaFrance, A. Colorful Lights Are Turning Skyscrapers into Tacky Billboards. 2016. Retrieved January 27, 2016 from http://www.theatlantic.com/technology/archive/2016/01/all-of-the-lights/423561/

[11] Leach, N. *Rethinking Architecture: A Reader in Cultural Theory*. Routledge, 1997.

[12] McCullough, M. *Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing*. MIT Press (Cambridge), 2004.

[13] McQuire, S. The Politics of Public Space in the Media City. *First Monday* (2006). http://dx.doi.org/10.5210/fm.v0i0.1544

[14] Memarovic, N., Elhart, I. and Langheinrich, M. 2010. First Experiences with Autopoiesic Content. In *Proc. MUM '10*. ACM, 175-184. http://dx.doi.org/10.1145/2107596.2107619

[15] O'Leary, K., Wobbrock, J. and Riskin, E. 2013. Q-Methodology as a Research and Design Tool for HCI. In *Proc. CHI '13*. ACM, 1941-1950. http://dx.doi.org/10.1145/2470654.2466256

[16] Pevsner, N. *An Outline of European Architecture*. Penguin Books (Harmondsworth), 1943.

[17] Poulsen, E., Andersen, H., Jensen, O., Gade, R., Thyrrestrup, T. and Moeslund, T. 2012. Controlling Urban Lighting by Human Motion Patterns. In *Proc. MM '12*. ACM, 339-348. http://dx.doi.org/10.1145/2393347.2393398

[18] Riley, T. *Light Construction*. Museum of Modern Art (New York), 1995.

[19] Scheer, B. and Preiser, W. *Design Review: Challenging Urban Aesthetic Control*. Springer (Dordrecht, NL), 1994. http://dx.doi.org/10.1007/978-1-4615-2658-2

[20] Stamps, A. *Psychology and the Aesthetics of the Built Environment*. Springer (New York), 2013.

[21] Vande Moere, A. and Wouters, N. 2012. The Role of Context in Media Architecture. In *Proc. PerDis '12*. ACM, Article No. 12. http://dx.doi.org/10.1145/2307798.2307810