



cutting through complexity

A Blueprint for Successful Stadium Development

KPMG SPORTS ADVISORY



von Gerkan, Marg and Partners
Architects

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Dear Reader,

While the basic rules of football have not changed for more than 100 years, the way spectators consume the match experience in a modern football stadium has changed significantly in recent years and will change even faster in the next decade.

The increased use of technology means that stadium operators now have to compete with broadcasters who provide groundbreaking 3D experiences and state-of-the-art media platforms, capable of engaging fans from their own living rooms or through various communications devices. For stadium managers the challenge is how to bring the 'living room' experience into the venue in order to retain and grow a supporter base which is increasingly technologically minded.

Understanding the spectators' changing needs and requirements is of paramount importance for developing a venue capable of maximising fan engagement, the commercial opportunities deriving from a modern stadium and, consequently, the project stakeholders' return.

More often stadiums are built as iconic landmarks, defining city skylines with innovative design. Especially when integrated in mixed-use developments, they can play a key role in urban regeneration and the trend of stadiums returning to inner city areas is one that we might expect to see more of in the future.

Stadiums can be key revenue generating assets for football clubs, valuable assets on clubs' balance sheets and play a central role in achieving financially sustainable long-term success. However, they are highly capital intensive, as even a relatively small facility with 15,000-20,000 seats may cost well over EUR 20 million. Stadium development is a complex process that can span several years. Strict planning of the interlinked activities is required to make the development efficient and effective and to ensure maximisation of opportunities is achieved.

Due to the high complexity and technicalities involved in a project such as a stadium, it is critical to engage – at the right time and at different stages of development – various technical specialists and experienced personnel. A well-managed process not only will allow the timely implementation of the development phases within budget and according to set standards and project objectives, but will also support the long-term sustainability of the new venue.

Following on from the *European Stadium Insight* thought leadership published in 2011, KPMG's Sports Advisory practice has teamed up with gmp Architects – a global leader in stadium architecture – to compile this new publication: *A Blueprint for Successful Stadium Development*.

We hope you will find this report informative and that our conclusions will provide valuable insights to owners, clubs, operators, developers and public authorities concerning the stadium development process and the key aspects trending in the market.

If you would like to receive further information or to discuss the findings of this study, please contact us.

Yours sincerely,
Andrea Sartori and Hubert Nienhoff

Introduction to the development process

Background

When considering a new stadium development, or a major reconstruction, understanding the logical process of development from start to finish is crucial to the successful realisation of the project. Ideally the process should allow for the varied requirements of stakeholders to be factored into the development from the beginning. Moving forward without such a process can leave stadium owners with multiple problems, during development and, even more importantly when the facility becomes operational. Numerous project developers have been guilty of not selecting the right site, not considering and researching the local market, building too large a stadium or not having sufficient premium seating, hospitality and retail facilities, and thereby missing revenue earning opportunities. These

are all factors that are avoidable if the appropriate expertise is involved at the right time, and in the right order. The objective of this publication is to provide an outline stadium development blueprint for developers, clubs, associations and public authorities. Throughout the document are case studies relating to topical issues currently trending in the industry, supported by industry benchmarks. Outlined overleaf are the key phases and milestones in the planning, feasibility assessment, design, construction and operation of a new stadium. We recognise that no two projects are the same; however the sequential steps and the need to understand the interlinking relationship between different phases and expertise involved are similar for the majority of projects.



The current landscape of stadiums throughout the EMEA region

There are some 330 football stadiums in Europe with a capacity of 20,000 or more: United Kingdom with 54 venues, Germany with 47, Italy 35 and Spain 29 lead the rankings. In Europe, countries with no stadiums of 20,000 seats or more are typically small and with a less competitive domestic football product. The UEFA rankings of these markets range from 30th to 49th. Further afield in the Middle East and Africa, there is a high volume of stadiums in the largest countries or countries with a strong sport tradition.

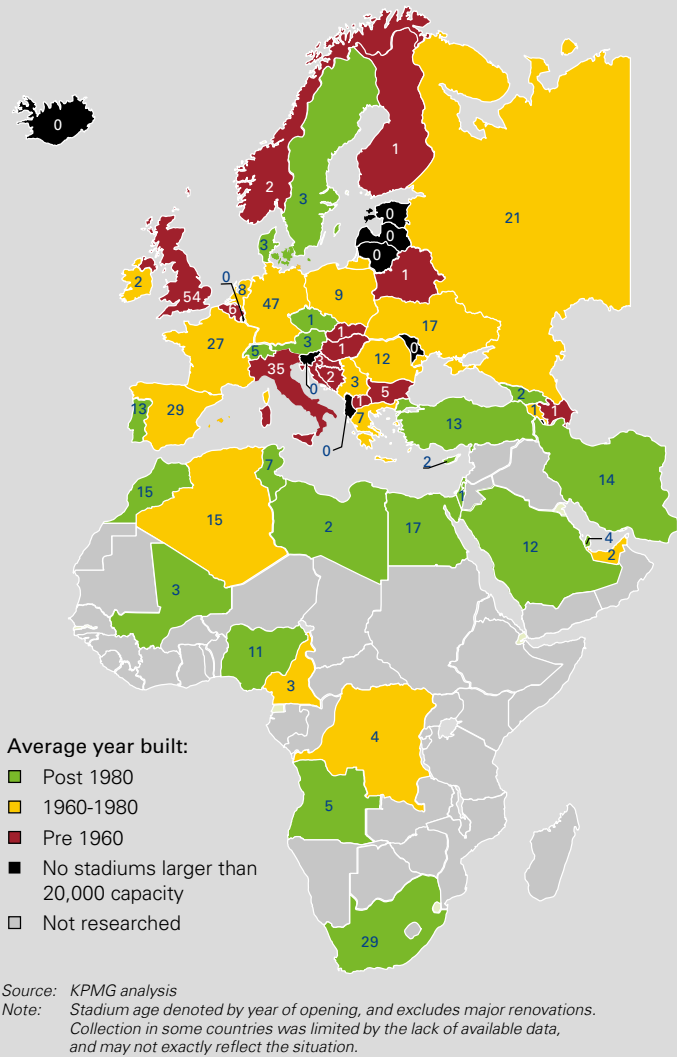
An estimated 90% of European stadiums with a capacity over 20,000 (60% including the selected African and Middle Eastern countries) are more than 30 years old and may require major renovation or upgrade to stay ‘in sync’ with the expectations of the fan of today. Many of these have already been upgraded, such as Old Trafford in the UK, which is listed as being over 100 years old and on which many recent renovations have been carried out to make it one of the most modern football venues in the world. Likewise in Germany, where almost all of the FIFA World Cup 2006 stadiums were renovated, rather than built new. A similar situation is apparent in France, where only three of the proposed venues for the EURO 2016 are new builds, with the remained undergoing renovation.

Most of those countries with recently built stadiums of a capacity of 20,000+, have been the host of a major tournament in the last 20 years, such as Portugal, Austria, Switzerland and South Africa. Countries such as Turkey have seen, and are continuing to see, a large investment in club stadiums in the last few years, with 12 stadiums over 20,000 capacity being less than 35 years old.

There is a rich culture of football in Africa, which has been growing over the past few decades. A number of African countries have had several stadiums built in the last 30 years. In many cases this is due to the African Cup of Nations being held every 2 years in a different country, providing the opportunity to invest in newer football venues.

There are a number of popular football countries, such as Italy and the UK, where a significant number of venues are in need of replacement or renovation. The hurdles to realising this are often substantial; however, with the right concept and business plan, innovative stadium design and the right team in place, these hurdles can be overcome.

Average age and distribution of 20,000+ capacity stadiums throughout EMEA



Understanding the development process

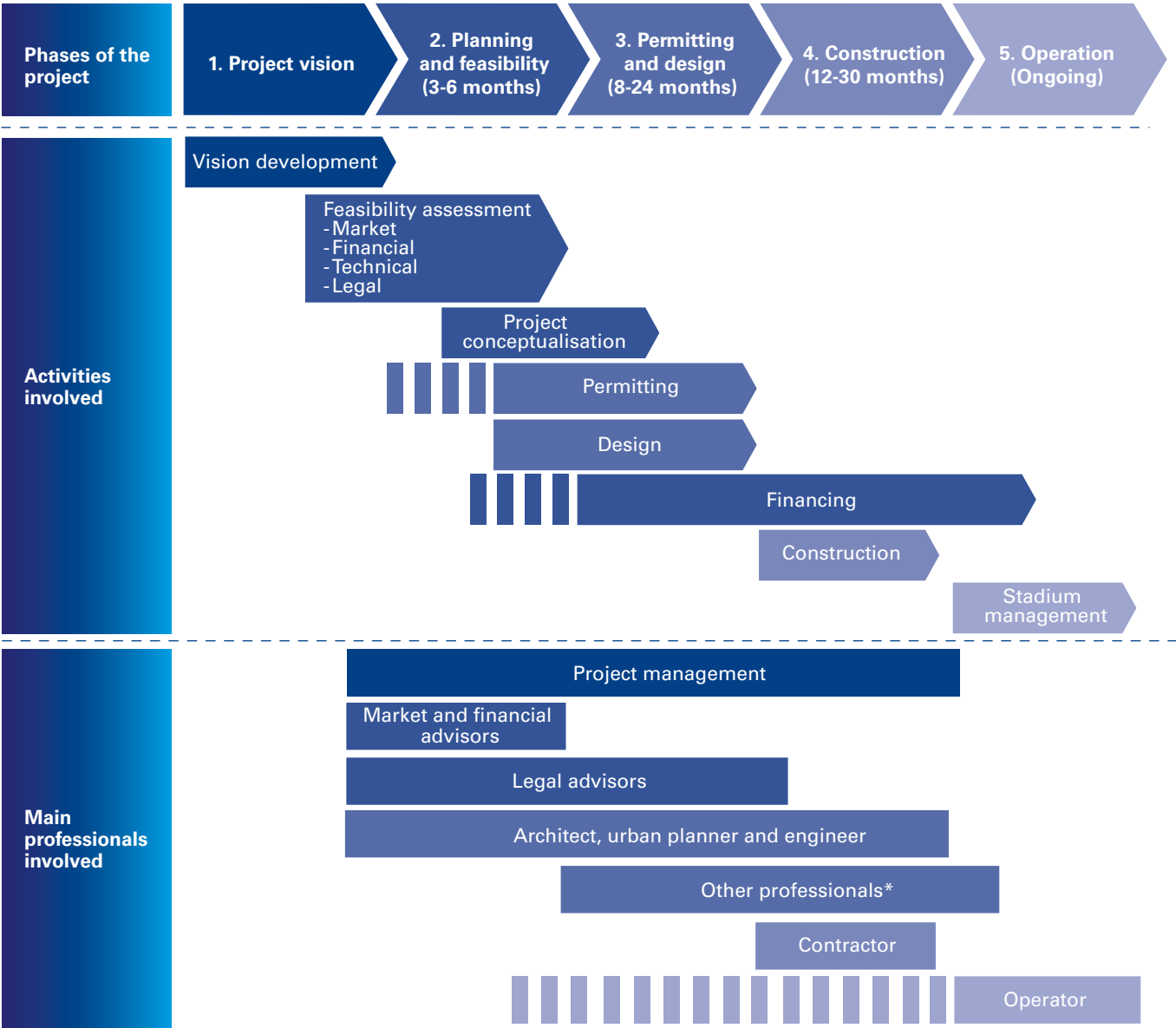
Stadium development is a complex process that can be broken down from initial vision to the grand opening of the facility and subsequent operation. Progressing from one phase to another may only be possible if previous phases have concluded with positive results, and commitment on behalf of all stakeholders has been made to go forward.

Depending on the complexity of the project, its size, the legal and administrative framework in which the project is taking place, the entire development process can span several years. Strict planning of the interlinked activities is required to make the development efficient and effective, and to ensure maximisation of opportunities is achieved. This process depends on the efficiency of the permitting phase, project

management capabilities, continuous flow of financing and complexity of the construction.

Numerous parties are involved in the development of a project as intricate as a stadium. Due to the high complexity and the breadth of technical skills required, it is of paramount importance to engage specialist and experienced personnel and consultants during the various phases of a project. This will support the timely implementation of the process phases within budget and according to set standards and project objectives. This document is structured into five chapters, each one corresponding to a phase in the development process.

Key phases, milestones, timings and the main professionals involved in the development process



Source: KPMG

*Other professionals can include: landscape consultants, security/fire safety consultants, access consultants, pitch consultants, computational fluid dynamics consultants, lighting and acoustic consultants, waste management consultants, marketing and PR specialists

Where stadiums began

In Antiquity, sports were not only an entertainment for the people, but more a way to gain political support and pay homage to the Gods. At this early stage of civilisation, man sought for an arena to perform in, a place where crowds could gather and become a part of something bigger than themselves. Hence the first stadiums were born.

The events held in these early stadiums were either of a sporting nature or gladiator ‘shows’, where slaves and free men battled each other in front of tens of thousands of spectators. One of the most iconic early arenas used for sports was, of course, the Coliseum in Rome.

The Coliseum is one of the most recognised ancient stadiums in the world, and has been the building block for future stadiums. Even in 80 AD, with a capacity of 50,000 in three tiers, 80 entrances and exits were key to the safety of all spectators. There was a strict class system employed in the Coliseum, with the more important and influential citizens seated in the front rows, with the lower class and poor housed in the top rows, echoing to a degree today’s ticketing system and corporate hospitality offerings.

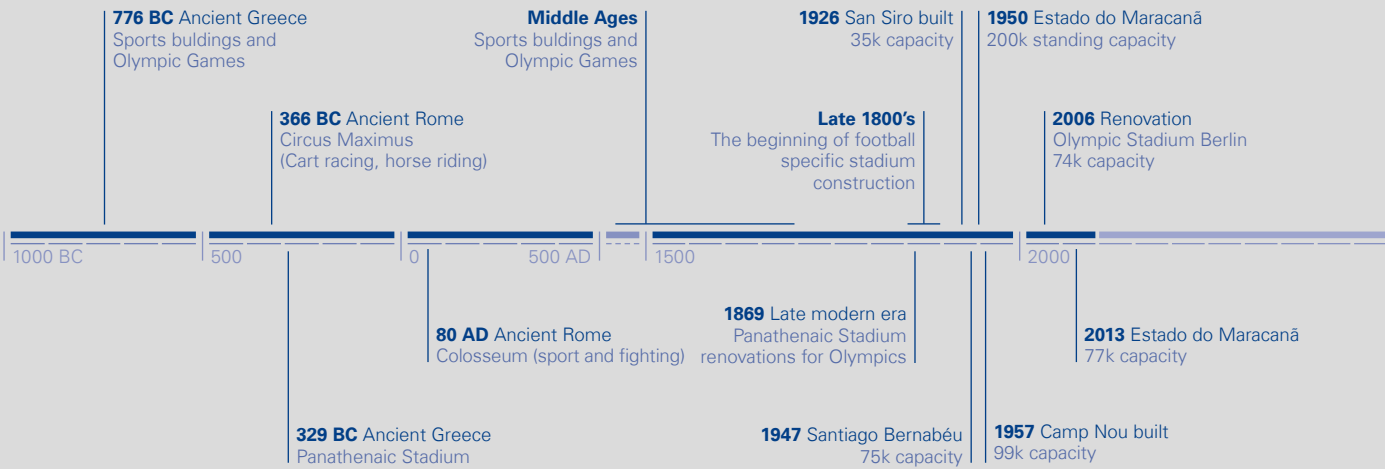
There are a number of characteristics from Antiquity, which are still used in stadium design today – notably the bowl concept, roof concept and the circulation around the venue.

Other periods of time contributed to conceptualising modern stadiums; for example, during the Renaissance, horseback competitions required the construction of temporary stands specifically built for these events, much like mega events of today.

The first stadiums of the modern era started emerging in the late 19th century, such as the excavated and restored Panathenaic Stadium in Athens ready for the Olympic Games in 1870 and 1875 and the first Modern Olympic Games in 1896. Hampden Park, in Scotland, was conceived in the 1860’s for football club Queen’s Park. The club moved to its current site in 1903, and built the largest and most advanced stadium of its time, with a capacity of over 100,000 seated and standing.

Crowds in ancient Greece and Rome embraced the entertainment factor within an event, be it sport or fighting, as spectators spent days, if not weeks, travelling to and watching these sporting events. Today, stadiums and arenas should no longer be places to spend 90 minutes watching a favourite football team and then leaving the ground. They have become places of (family) entertainment, providing entertainment to keep visitors engaged for longer periods of time, before and after the event.

Timeline of stadium development



1. Development of a project vision

Establish a vision

Establishing a project vision for a football stadium is typically initiated by one party, most usually a football club or a public institution (e.g., municipality, regional or national governing body). Reasons for developing a new stadium may include club expansion, a venue for a mega event or the ambition to have a national stadium. Each of these scenarios will encompass a varied, and at times, undefined timeline for the project vision phase of the process. Typically efforts related to the development of stadiums to be built for mega events such as FIFA World Cup, UEFA European Championship and CAF African Cup of Nations for example, have been driven by governing bodies in conjunction with the national football association, often leading to publicly-owned facilities. On

the other hand, privately-owned stadiums are generally developed by football clubs themselves, with the ultimate goal of gaining more control of their venue, a key revenue generating asset. However, there are some exceptions.

The distribution of stadium ownership of first league clubs in Europe can be seen overleaf.

As also stated in the publication *'UEFA Guide to Quality Stadiums'* – in the preliminary phase of the development process of a new stadium, there are three questions that project initiators should answer...



What do we WANT?

This emotive question tends to be the starting point for any development project. However, when project initiators are excessively focused on a 'dream stadium', this question may give rise to idealistic and unattainable intentions. Although a very ambitious idea may be a key driver to initiate a project, the initial vision must be promptly supported by a more realistic analysis which leads to a second question...

What do we really NEED?

Understanding the market requirements will lead to the rationalisation of the needs of the project which, however, cannot be viewed in isolation from the answer to the next question...

What can we AFFORD?

In order to guarantee the long-term sustainability of the project, it is fundamental to gain an understanding of what funds are available for implementing the project vision.

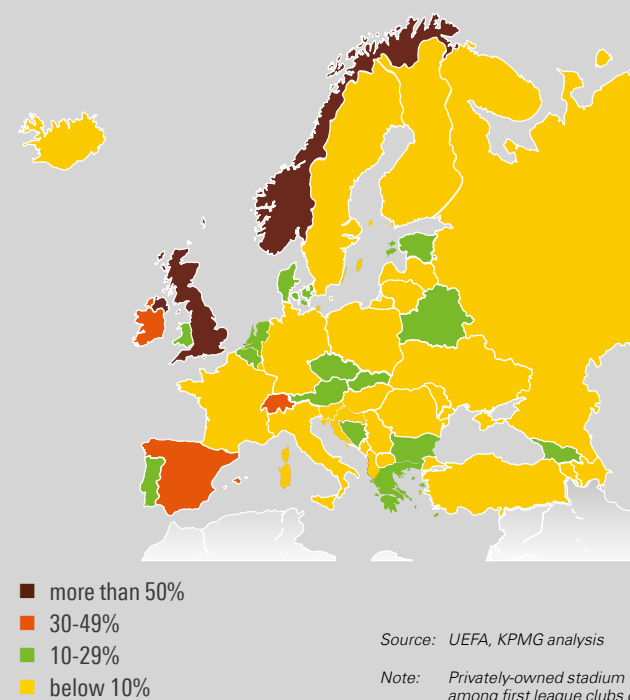
Based on the answers given to these preliminary questions, it is possible to conclude if there are the minimum conditions in place to proceed with the development opportunity and engage in a more sophisticated analysis.

As the following chapter of this report will illustrate, further considerations about the site, the market, the administrative process, the conceptualisation as well as the financing structure will allow the preliminary vision to be refined into an optimal concept and consequently define a preliminary investment plan.

The majority of stadiums in Europe are publically owned – this is changing...

In looking at the ownership of stadiums in the top leagues, it is clear that the majority in Europe are publicly owned. In recent years there has been a trend of larger clubs increasing the amount of ownership control they have over their stadium, and subsequently the revenues it creates. Above all, this can be seen in the English Premier League where 18/20 teams of the 2012/13 season own their stadium, with Manchester City and Swansea City being the exceptions. This can be seen with Bayern Munich, who now fully own the Allianz Arena after acquiring the 50% share from co tenant TSV 1860 Munich. In Italy, Juventus are the only club to own their stadium after a successful new development was completed in 2011. However the example of the Juventus Stadium has stimulated the interest of many clubs in Serie A and Serie B in developing their own venue.

Private ownership map of stadium in Europe



Source: UEFA, KPMG analysis

Note: Privately-owned stadium among first league clubs of each country as of 2010

Identifying the key stakeholders

At the start of any development process, it is important to identify all of the key project stakeholders. Each stakeholder will have their own vision and objectives. They will also have their own level of involvement, interest and investment in the project, and it is critical to manage these inputs through regular meetings and appropriate documentation.

The requirements of the stadium may be apparent before preliminary consultancy begins, however, once the stakeholders have been fully involved and preliminary talks are underway, the direction of the project may shift significantly, requiring a 'back to the drawing board' approach.

Numerous documents will be produced at this point; early sketches and renderings to support preliminary negotiations, as well as fan surveys and technical studies.

Together with the project initiator and the other key stakeholders, a project vision is determined, and briefed to the market and financial advisors.

The role of the advisors will be to refine and sculpt this into a concept for a sustainable stadium, through detailed analysis and business planning, as set out in the next chapter.

Developing a project vision



* Typically football club or public institution
Source: KPMG

2. Planning and feasibility

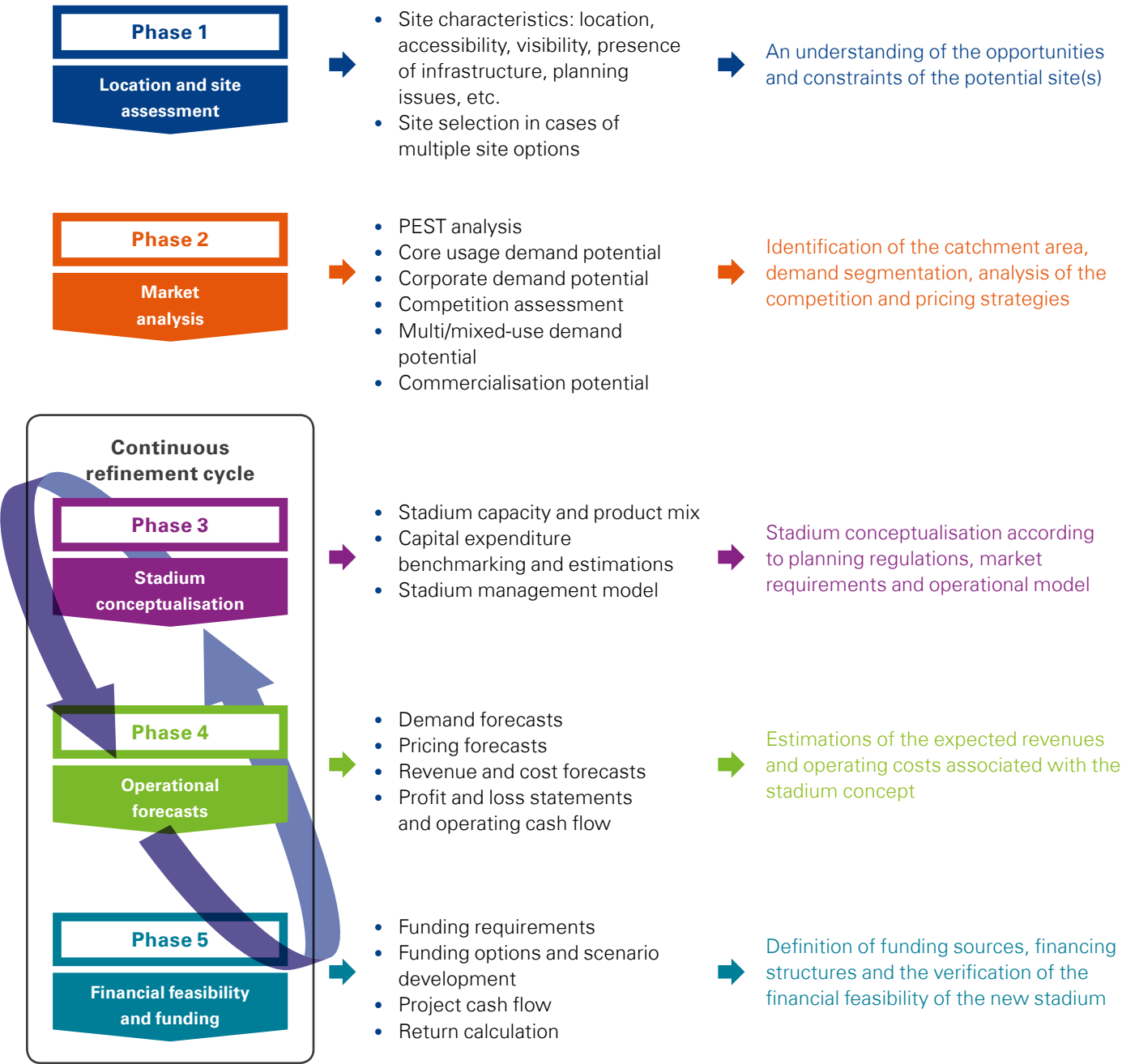
Introduction

The planning and feasibility phase is a crucial element to the development process of a new stadium. With careful research, analysis and planning a stadium concept can be successfully developed and transferred into the design, construction and operation phases. The market and financial feasibility study is the most important step in the initial planning phase of the development process. This document, the main objective of which is to demonstrate the feasibility of a new stadium, will provide reference material for the entire project and can form the basis for the identification of:

- Market based concepts;
- Capital expenditure estimations;
- Revenue streams and operating costs; and
- Funding requirements and sources.

Although the market and financial feasibility study can be structured in a way to best meet the project requirements, it is typically subdivided into five phases. Each phase is described in more detail in the following pages together with some key trends and case studies.

Phases of the market and financial feasibility study



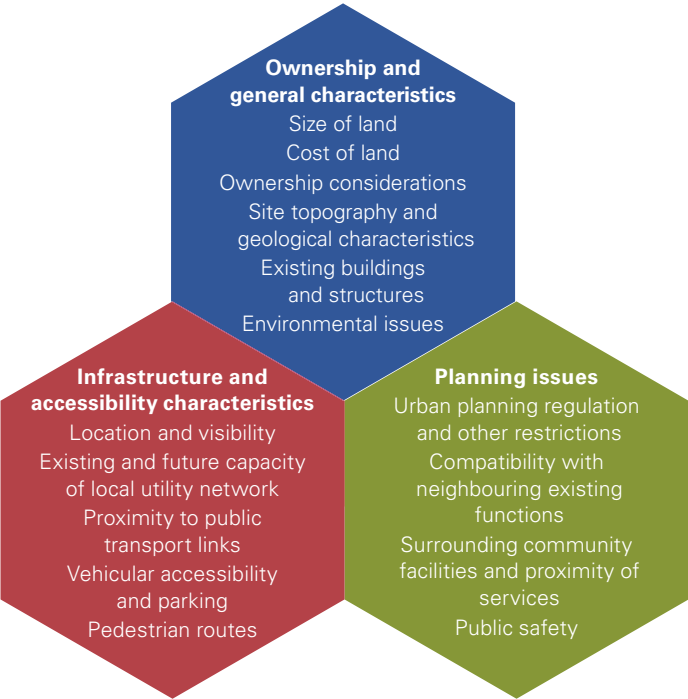
Source: KPMG

Phase 1 – location and site assessment

Each project is unique and each site will have different characteristics. There will be criteria that the site will have to meet in order for the project objectives to be met, whether from a minimum land size, land cost, design, construction, safety and security or operational perspective. At this stage of the process, more contact with the public authorities and other stakeholders involved in site procurement or land ownership will enable more transparent discussions, increasing the efficiency of the planning process relating to the selected site.

- There are four main questions which first need to be answered:
- What physical characteristics does the site need to have in terms of size, location and visibility?
 - Do urban planning/zoning regulations of the site allow for a stadium development?
 - How good are the transport links (air, rail, car and public transport)?
 - What are the availability and/or costs of bringing infrastructure and utilities to the site?

Key site characteristics



Source: KPMG

The importance of the project manager

In a complex project like a stadium development, and especially in the case of large venues such as multi purpose, and/or mixed-use developments, a rigorous project planning capability is required to ensure effective and efficient execution. The overall development requires project management skills to pull together the market, legal, financing, architectural, construction and operational experts into a single project plan. This planning must start at an early stage and is best done by a project manager who maintains an overall control of project progress. The project plan is prepared by the project manager whose main role, which could last for the entire duration of the project, is to ensure that:

- Activities are performed in the right sequence;
- Various experts are involved at the right time;
- Communication is facilitated between different project stakeholders; and
- Individual activities and the project as a whole are delivered within the set timeframe, budget and quality standard.

Average footprint required for a stadium development

The required size of a site will vary dramatically depending on the nature of the project. However, there are minimum size requirements depending on the capacity of the stadium. Shown here are ranges relating to the average footprint of a football stadium. These benchmarks do not include any provisions for parking or other ancillary facilities.

Stadium size (seats)	Average required footprint (sqm)
Mega (60-80,000)	55,000 – 60,000
Large (40-60,000)	45,000 – 50,000
Medium (20-40,000)	35,000 – 40,000

Source: gmp



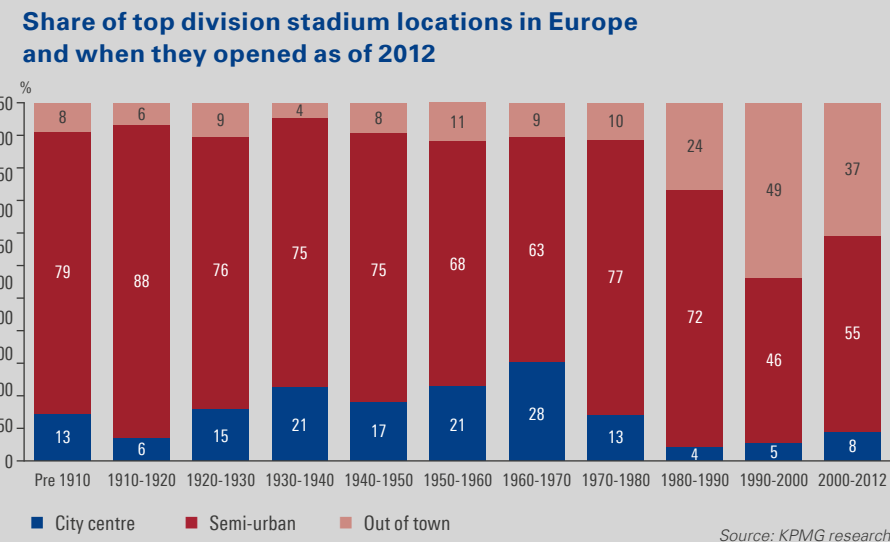
Are stadiums beginning to move back to city centre locations?

The majority (67%) of all football stadiums used in the top divisions across Europe are located in semi-urban areas. This is not surprising as many stadiums were built in the mid 20th century, when town and city centres were already built up, with little space for large sports facilities. More than 50% of stadiums built out of town are less than 15 years old, a clear indication of the trend that new stadiums are now typically established further away from town or city centres.

Conversely, looking ahead, there are indications from 1980 of a gradual increase in the share of football stadiums being built in city centre locations across Europe. Possibly, with numerous urban regeneration projects (specifically for mega events such as the FIFA World Cup 2010 and UEFA

European Championships 2012, where venues like the Cape Town Stadium and Donbass Arena in Donetsk have been built in central locations), this will continue to increase in the future.

The chart below depicts the locations of stadiums built in each decade from football clubs currently in the top division of each country.



Phase 2 – market analysis

Introduction

Market analysis is arguably the most important aspect driving the project conceptualisation and feasibility assessment process. It is crucial to understand the market in which the stadium will operate and the expected demand and supply trends.

A closer look at the key elements within the market will fundamentally shape the preliminary stadium concept.

Fan surveys, focus groups and interviews all contribute to an overall understanding of the supporter base and their behavioural patterns. This analysis can range from general admission surveys through to corporate interviews and provide an assessment of buyer preferences and evaluation of supporter reaction to new product offerings and facility amenities.

Factors influencing the market context



Source: KPMG

PEST, core usage demand and competition analysis

The general socio-economic and political context of the proposed project will naturally determine the opportunities of any future stadium development. The size and cultural aspects of the population, growth and purchasing power of potential spectators and the government support for football infrastructure, within a respective country, are factors to consider when profiling the services of a new football stadium.

One crucial decision when designing a new stadium is its seating capacity. Comparative analysis of stadium utilisation rates in Europe highlights how often stadiums have been built without carefully assessing specific demand characteristics, and considering peak demand rather than average demand. As a consequence, up-front capital costs and annual operational costs are often too high, whilst stadiums are underutilised on the majority of match days. Furthermore, creating excess supply of seating undermines

efforts to securitise revenue streams via annual or multiyear ticket sales, as fans can always buy match-day tickets at the gate for peak matches instead of buying season tickets in advance. The atmosphere of a game played in a half-empty stadium is also less attractive for supporters, which in turn may impact how the match is viewed on television and the subsequent broadcast rights.

An analysis of ticket prices across all potential product offerings, based on historical trends and comparable venues to the proposed one, will provide key benchmark figures to be used in pricing strategies.

The ability to identify, analyse and evaluate the supply of competing venues will steer a new stadium concept either away or towards the possibility of developing a multi-use (i.e. other events such as rugby and concerts) venue.

The inclusion of fan surveys and focus groups are key factors when determining the pricing and demand of certain functions. Involving the fans may also benefit the stakeholders in avoiding future disputes and any negative publicity that may arise.

Corporate functions

The corporate market varies in importance to the majority of professional football clubs, depending on the size, maturity and type of market in which they operate. In many markets corporate hospitality can be a large revenue stream for the stadium – charging a premium price in return for providing upgraded seat and facilities for companies to entertain their business partners in a more sophisticated environment.

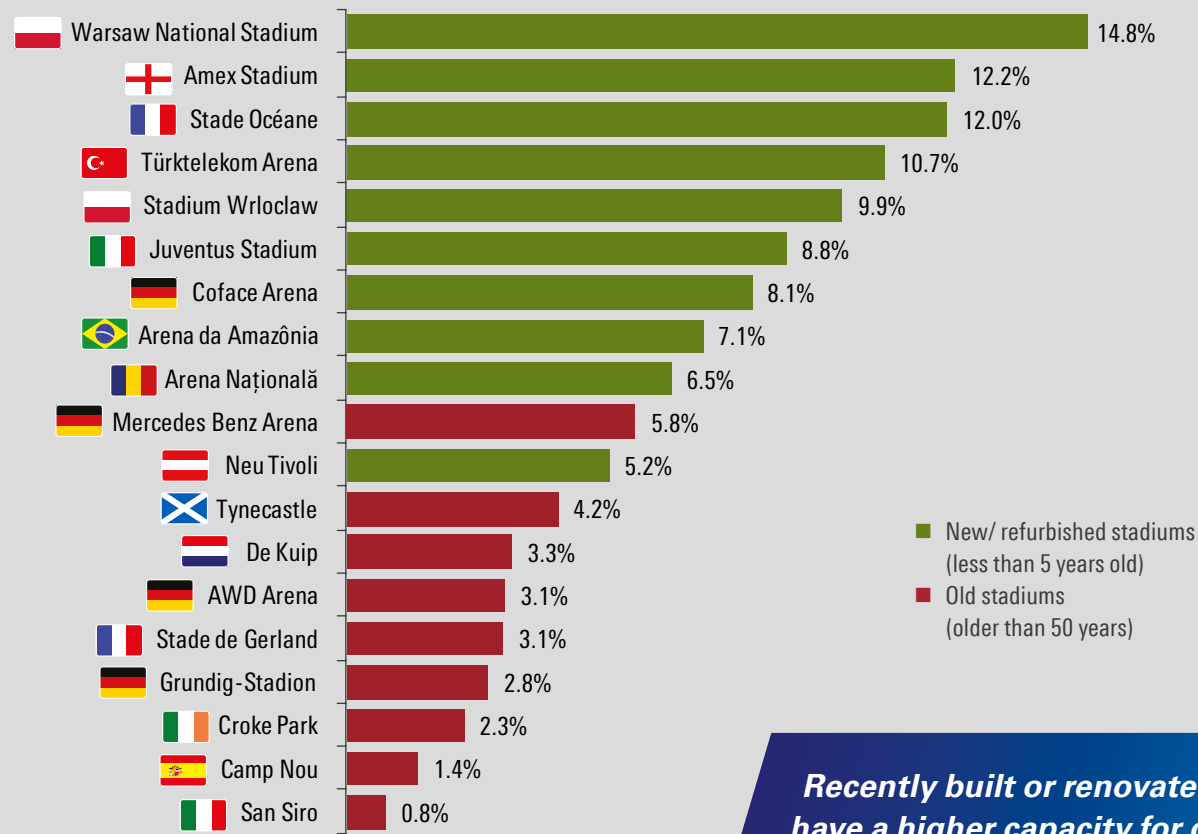
Hospitality offerings vary from club to club, and are based on the facilities provided by the stadium. Often, the older the stadium, the fewer high quality premium seating offerings are available (although there are exceptions to this). Newer stadiums, or stadiums which have undergone extensive refurbishment, are able to build facilities to suit current corporate demand, in turn optimising revenue generation.

The hospitality offering should not be a carbon copy from one successful stadium to another, but should be uniquely modelled on the specific requirements of the local corporate market.

The keys to operating successful corporate hospitality are to be aware of the market from a socio-economical and corporate demand perspective. Often in mature and developed markets, stadium operators will aim to provide top of the range hospitality suites and a wide variety of F&B offerings, to satisfy corporate demand. However, in less developed markets, with much lower stadium utilisation and disposable incomes, as well as a limited number of large and mid-size corporations, maximising revenues in the hospitality function can be challenging.

For mega events, increasingly, operators are outsourcing the hospitality function so as to ensure optimal revenues can be captured in the small window of high utilisation and attention that these events attract.

Quantity of premium and box seating as a percentage of total stadium capacity at selected stadiums



Recently built or renovated stadiums have a higher capacity for corporate guests, than older stadiums.

Source: KPMG analysis, gmp & clubs’ websites

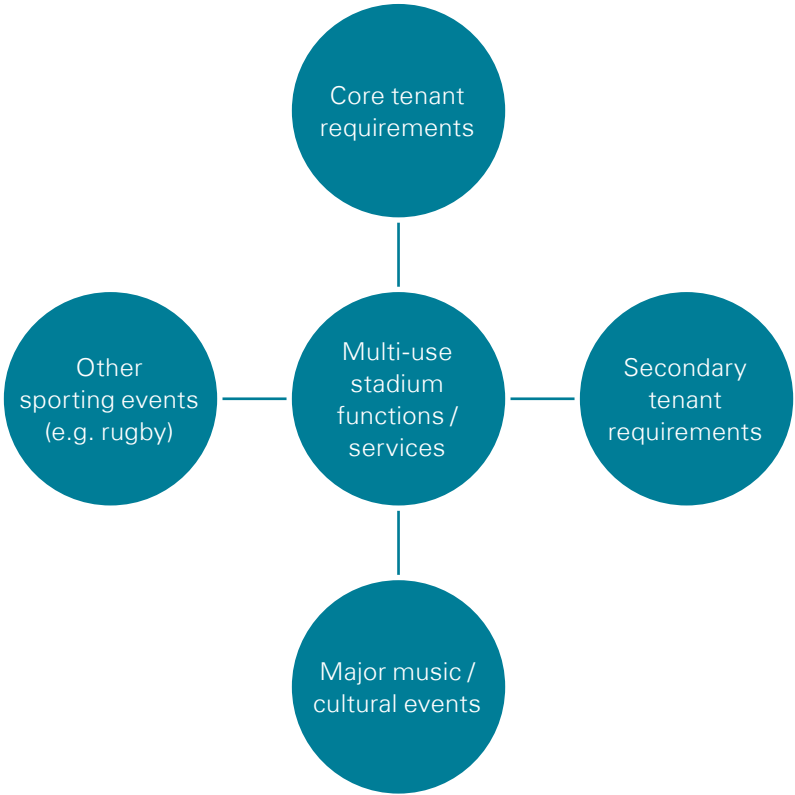
Analysis of multi-use potential

Football stadiums used for multiple purposes have become more and more popular. Ground sharing options, and the addition of non football events (such as other sporting events or concerts), can drive additional revenues. However, though the delivery of multiple uses within a football stadium has become more extensive, event promoters tend to capture a substantial share of additional revenues brought in by non-football events. To this end, mid-size market analysis is paramount if the project stakeholders wish to pursue this route, as the development of multi-use stadiums can lead to higher capital costs, for example to accommodate removable seating, additional storage, access for large vehicles and removable or retractable pitches.

A key factor, especially for higher profile clubs, is scheduling. A short ‘off-season’ combined with pitch re-laying and planning for the coming season limits dates on which stadiums can host other events to a window of perhaps just a few weeks. Where regulations allow, solutions for this may start with changing the type of turf used, as synthetic turf will allow for more events to take place without jeopardising the pitch conditions for football purposes.

Ultimately the decision to include any multi-use functions in a stadium development, as well as the option of a retractable roof (a highly capital intensive solution), should be based on a thorough cost/benefit analysis. This analysis requires detailed research into market demand trends and an understanding of the competition from other venues.

Types of multi-use stadium functions



Source: KPMG

Did you know?
In 2015, 8 out of the 13 Rugby World Cup venues will be football stadiums.

Multi-use functionality at Veltins Arena, Germany

Veltins Arena in Gelsenkirchen, Germany, is owned and operated by FC Schalke 04. This multi-use venue includes state-of-the-art technologies which enable the club to host a wide range of sports events (e.g. football, biathlon, ice hockey, boxing, American football, handball, motorsports), concerts, trade shows, corporate conferences and private events. Every year the stadium hosts 25-30 major international events and attracts more than 1.5 million people, accounting for over 20 million people since its opening in 2001.

FC Schalke 04 Arena Management GmbH, wholly owned by FC Schalke 04, manages 32 refreshment outlets and three kitchens which serve the entire stadium, including four hospitality areas.

Retractable roof

The structure of the retractable roof consists of twin sections that can be opened or closed in less than 30 minutes. When the roof is closed, a 60 centimetre gap remains that allows air to circulate but no rain to penetrate. Furthermore, two thin membrane layers stretching across the steel frame allows the interior of the stadium to receive plenty of natural light.

Roll-out pitch

The pitch sits in a concrete tray 118m long and 79 metre wide, weighing 11,000 tonnes. It takes 6-8 hours to slide it in or out of the stadium. Depending on the time of day, each operation costs between EUR 8,000 and EUR 13,000.

Info box:	
Opening year: 2001	
Construction cost: EUR 191 million	
Capacities	
78,996	Maximum capacity for concerts with centre stage
61,673	Maximum capacity for Bundesliga matches (seating and standing)
54,142	Maximum capacity for international matches
4,936	Business seats
14,500	Parking spaces split among 20 car parks

Mobile stand

The lower tier at the southern end of the stadium contains a hinged section allowing it to be pushed back 16 metres underneath the upper tier in less than 16 minutes. The space gained allows as many as 5,000 additional spectators to enter the Arena. The stand itself is a bridge with an 85m span under which the pitch is moved in and out of the stadium.

Other key facts:

- **Through way:** for the setup and teardown of events, trucks drive through a tunnel straight into the activity area and then back out again through the tunnel opposite, thus eliminating tailbacks and time-consuming manoeuvring. These

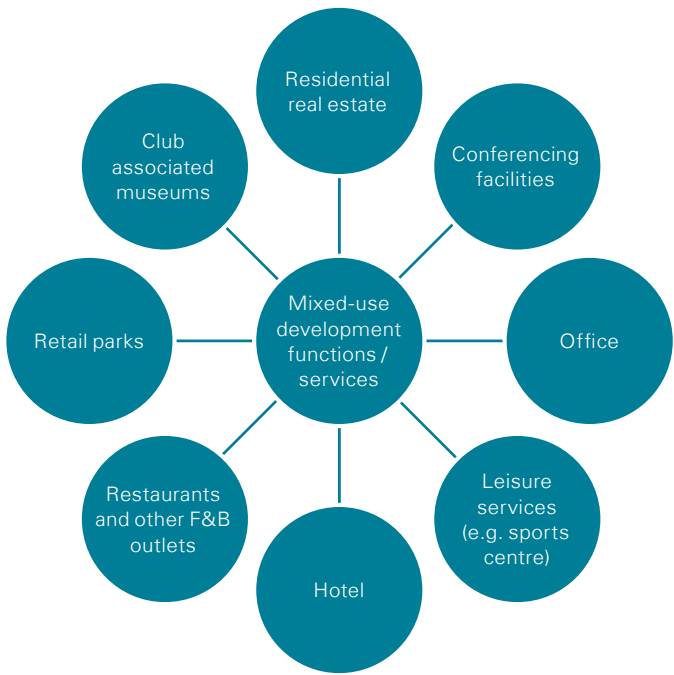
tunnels also provide wide escape routes in the event of an emergency.

- **Video cube and TV screens:** suspended on eight steel cables 25.81 metres above the centre circle, the video cube weighs 29 tonnes and incorporates four LED screens measuring 35 square metres each with a 160 degree viewing angle. An additional 367 TV screens have also been installed throughout the Arena.
- **Cashless payment system:** the arena includes a cashless payment system. The debit card can be purchased in 55 outlets inside the stadium.
- **Floodlights:** 212 floodlights are installed around the pitch area providing a maximum lighting level of 2,100 lux.



Picture: Club website

Types of mixed-use development functions



Source: KPMG

Analysis of mixed-use development potential

Mixed-use developments are becoming more prevalent as adjacent land uses are able to enjoy broader utilisation on non match days, in contrast to a stadium, which remains empty outside of event days. Increasingly stadiums are being built within mixed-use developments, often as part of urban regeneration schemes, benefitting the wider area.

The high level of awareness and footfall generated by a football stadium and other facilities within a mixed-use development may be of benefit to other development functions such as office space (with cross sale of corporate hospitality opportunities), retail (benefitting from the footfall) and even residential (with a lifestyle dimension attracting young professionals).

Stadiums alone may not be an attractive investment for private or public sponsors. Therefore the potentially higher returns secured from commercial, residential or other traditional land uses, whose revenues may be more predictable and secure, can assist in financing the capital costs associated with the stadium by diluting the risk of the project between the different components.

Although the idea of a mixed-use development may be dictated by the stakeholder's vision, the feasibility study will assess its potential and the types of functions that might be considered within the overall development project.

Annual utilisation of natural grass and synthetic turf

Technological advances in manufacturing synthetic turf has led to a rise in the number of football clubs bringing what is a popular training ground surface into the stadium, in a bid to increase the utilisation of the pitch.

Although it is clear that synthetic turf allows a higher utilisation compared to natural grass in most cases, a change away from natural turf is dependent on the regulations of the specific league. The amount a football club will utilise their synthetic pitch will generally depend on the profile of the team and the commercial ambition of the club.

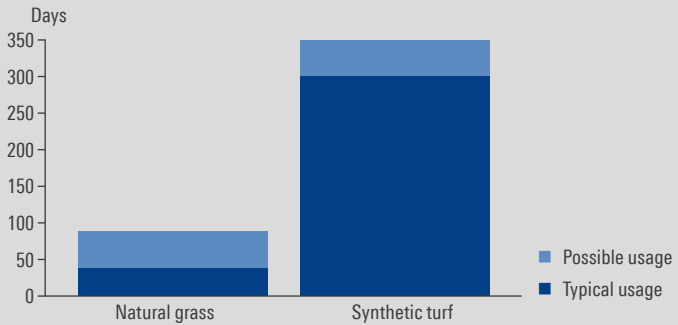
There is a common understanding that synthetic turf is typically used in regions where climatic conditions do not allow the efficient usage and maintenance of natural grass fields. However, our research demonstrates that there are synthetic pitches in stadiums of professional teams playing in countries with less severe weather conditions such as Netherlands, Ireland, France and Italy.

Whilst the capital cost of developing a new synthetic pitch may represent a large investment for a football club, the returns generated from the increased utilisation and lower

maintenance cost can provide the basis for a sustainable business case. The cost of investment can range from EUR 300,000 to EUR 1 million, depending on quality standards.

Maintenance for synthetic turf is just as important as for natural grass; however, the processes are completely different. For more information concerning this topic please refer to KPMG's study on synthetic turf.

Annual utilisation of natural grass and synthetic turf



Source: KPMG's European Synthetic Turf Study 2012
Note: Data collected from football clubs of various levels across Europe.

Food and beverage in a stadium*

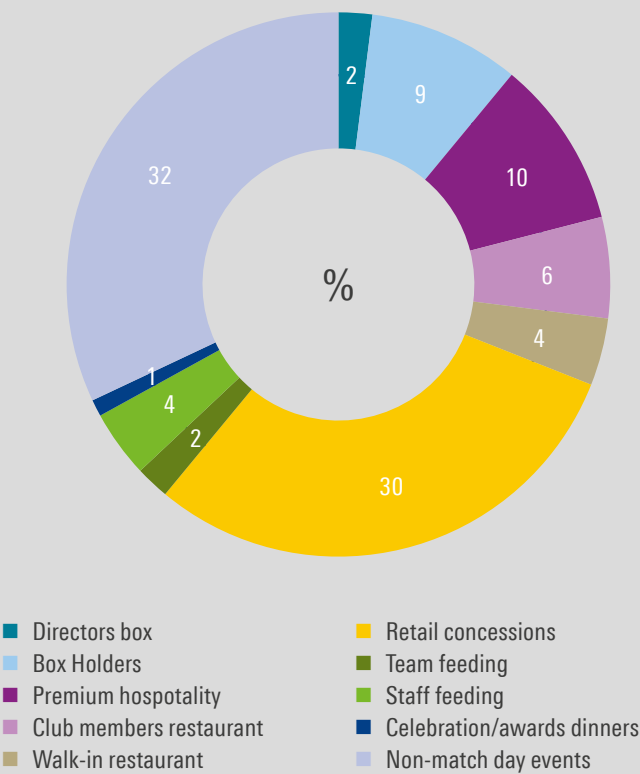
Stadium owners and operators are placing more and more importance on the maximisation of the fan and guest experience. Delivering an engaging environment for all supporter segments is crucial in driving the performance of a stadium. Food & Beverage (F&B) is a key element of this.

F&B is at the heart of the (off-field) match and non-match day experience. It is not just the food product itself, but the F&B experience as a whole which is of paramount importance. The serving staff have a large level of exposure to the customers in the stadium, and in this, become the ‘face’ of the football club across numerous areas of the ground.

The premise that F&B is an integral element to the fan experience must be embraced in an early stage of the planning process, to ensure revenue maximisation as well as efficiency of operation within the F&B function. It is therefore important to ensure that the best resources or partner(s) are involved at the initial planning stages of a new stadium development. Successfully delivering F&B is a highly complex task, where not only is there a need to understand different customer demands to be met, but also to align the infrastructure and guest spaces with the requirements of the customer. This is critical when deploying hundreds, sometimes thousands, of temporary staff on an event day. At times, and in some markets more than others, one of the major challenges can be the part-time staff who work for a relatively low wage will be serving people who have often paid high prices for their tickets and who expect professional service.



Share of F&B sales at a typical football stadium



Source: Compass Group

While some of the many aspects in the F&B function in a stadium may be small in revenue terms, such as the Directors Box and Team Feeding, they often have a disproportionately large influence and so must be a focus of excellence.

A successful F&B operation can be a key driver of success for a stadium, not just in terms of revenues generated but also in terms of the quality perception of the stadium users. Throughout different leagues and regions there is a wide range in operational performance, however, in the UK, F&B can turn over up to, and in some cases exceed, EUR 10 million per annum.

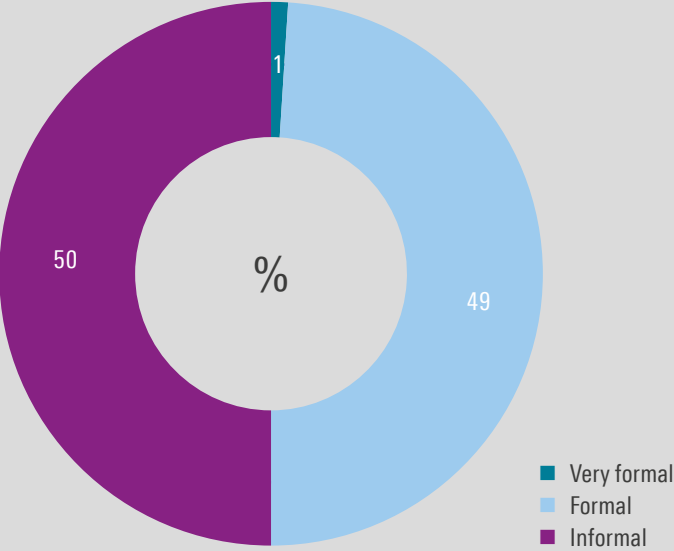
The involvement of specialists at the design and planning stages will enable the right spaces to be allocated for the F&B function to maximise customer flows, and the efficiency of the logistical aspects within the stadium.

* contributed by Compass Group

The main issues include:

- Customer understanding leading to segmentation and tiering (as this drives space usage and design), for both match day and non-match day attendees;
- Creating the right customer journeys for each group of customers;
- Central kitchen and distribution infrastructure aligned to customer segmentation;
- Building in space flexibility – there is a clear trend towards informal versus formal hospitality and entertaining, leading to more flexible/open space rather than fixed boxes. This also helps with the delivery of non-match day business;
- Allowing for the right amount of counter space - this differs by country, however benchmarks suggest that 10 metres per thousand persons is adequate for a new stadium; and
- Creating the right space for the F&B staff to check-in, change and leave their personal belongings.

What is the preferred type of hospitality?



Source: Keith Prowse Survey of Corporate Hospitality Bookers & Compass Group

What are the trends?

- Today's customers have more experience of eating out with an expectation of higher service.
- Customers are more discerning, especially in a challenging economy, and demand value for money.
- At premium levels customers increasingly prefer informal to formal hospitality.

- Attendance at football matches can often be expensive compared to other leisure pursuits, thereby elevating expectation, especially in relation to F&B.
- Treating fans as captive customers is no longer acceptable.
- At the general admission and concession levels people expect a higher quality ‘dining’ experience, following market trends such as ‘gourmet’ street food vendors who are now leading the way.

Past and future

In the past the F&B service has been focused on delivering volume based on speed and efficiency:

- Hold hot ovens instead of real char-grills;
- Cheaper ingredients; and
- Minimal labour.

In the future, trends suggest the F&B experience should deliver volume through experience and quality:

- Food cooked in front of customer (smaller central kitchen, but more equipment around stadium), with chefs on show;
- Differentiated and varied offers;
- Bars designed to increase customer flows; and
- Better use of technology to increase speed of service such as remote ordering and cashless systems. A debit card where fans buy credit before entering the ground can serve as their ticket and way of purchasing food and beverage products quicker and easier, which in turn can lead to more sales.

The customer's F&B experience is critical to the overall perception of the quality of a stadium. Optimising this requires solid relationships with the right partners with the right expertise. If this is achieved and the ‘guest experience’ and ‘space flexibility’ is planned from the outset, then satisfied customers, both on match and non-match days, will drive the F&B business forward.

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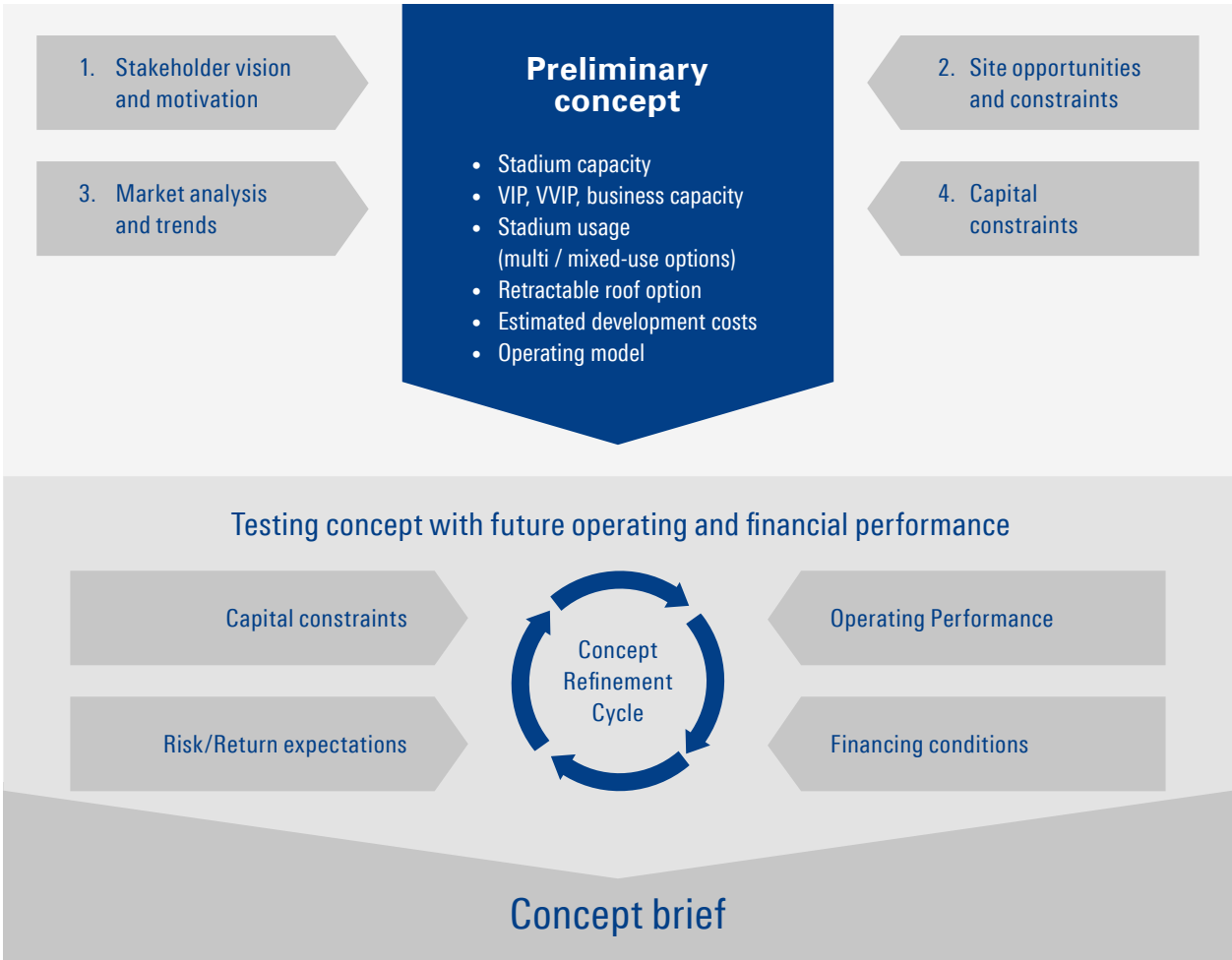
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Phase 3 – stadium conceptualisation

Key inputs into the conceptualisation of a stadium development project



Source: KPMG

Overview

In addition to the stakeholders' vision, the preliminary concept for a stadium development should be derived from the characteristics of the site and its location as well as input provided by the market analysis. One of the most important aspects of creating a feasible project is maintaining flexibility in conceptualisation, as the site analysis, market assessment and capital availability will impact the size, quality standard and ultimately the development cost of the stadium.

When the concept is challenged by the financial forecasts there is often a requirement for adaption and refinement of the concept to allow the project to meet the expectations of various stakeholders involved (e.g. football club, financing institutions, public authorities or other providers of capital).

The four factors impacting the preliminary concept should all be considered through a 'concept refinement' cycle. The task is to test the concept through financial analysis. Throughout this analysis, it may be necessary to further refine the concept, possibly amending inputs such as the stadium capacity, quality standards, product and service mix and ultimately the capital expenditures.

For any mixed-use development, a thorough site and market analysis as well as concept development for each potential function (e.g., office, retail space, residential development, hotel and congress centre) should be carried out in parallel with the overall conceptualisation of the project.

Capital expenditure benchmarking

At this stage of the process it is important to have an understanding of the stadium development costs, and how these align to the stakeholders’ vision, and looking further forward to how these will impact the financial viability of the project. Benchmarking in this way provides the project stakeholders with a capital expenditure per seat estimate, allowing a balance between cost and capacity to be achieved. Although development costs vary significantly depending on stadium size, location, quality and surrounding infrastructure, there is a general trend that larger stadiums cost more per seat. This is mainly due to a wider roof, higher cost of supporting structures required for larger upper tiers as well as the costs of increased staircases, lifts and parking spaces. Furthermore, in order to be better commercialised, larger stadiums require a more extensive premium seating offering, which in turn requires increased costs to maintain a high quality corporate tier.

Conversely, as the stadium size increases, average ticket prices will tend to decrease, as the additional seats are built further away from the pitch. This, coupled with the increased construction costs for adding capacity, should be carefully thought through if any stakeholders are adamant on building a mega stadium.

Development cost per seat of recently built football stadiums

Name	City	Stadium capacity (# seats)	Development cost (EUR/m)	Opening year	Development cost per seat (EUR)
Wembley Stadium	London	90,000	912	2007	10,137
Emirates Stadium	London	60,335	440	2006	7,292
Grand Stade Lille Métropole	Lille	50,157	324	2012	6,460
Melbourne Rectangular Stadium	Melbourne	30,050	186	2010	6,179
Arena Lviv	Lviv	34,915	211	2011	6,043
Friends Arena	Stockholm	50,000	300	2012	6,000
Donbass Arena	Donetsk	51,504	294	2009	5,706
Allianz Arena	Munich	69,901	340	2005	4,864
Astana Arena	Astana	30,000	136	2009	4,524
Nelson Mandela Bay Stadium	Port Elizabeth	48,459	214	2010	4,416
PGE Arena Gdańsk	Gdansk	43,615	185	2011	4,260
National Stadium	Bucharest	55,600	234	2011	4,209
MMArena	Le Mans	25,000	102	2011	4,080
Stade Océane	Le Havre	25,178	101	2012	4,011
Arena do Grêmio	Porto Alegre	60,540	239	2012	3,955
Forsyth Barr Stadium	Dunedin	30,748	113	2011	3,666
BBVA Compass Stadium	Houston	22,039	77	2012	3,472
Amex Community Stadium	Brighton	22,500	76	2011	3,380
Juventus Stadium	Turin	41,000	125	2011	3,049
Türk Telekom Arena	Istanbul	52,650	160	2011	3,039
Stožice Stadium	Ljubljana	16,038	43	2010	2,681
AFAS Stadion	Alkmaar	17,023	38	2006	2,232
Hypo Arena	Klagenfurt	31,957	67	2007	2,097
Grand Stade de Tanger	Tanger	45,000	80	2011	1,778
Estadi Cornellà El Prat	Barcelona	40,500	62	2009	1,531
New Tivoli	Aachen	32,900	50	2009	1,520
Impuls Arena	Augsburg	49,000	65	2009	1,327
Coface Arena	Mainz	33,500	44	2011	1,313

Development cost per seat is ... Source: KPMG research
■ ... higher than EUR 6,000 ■ ... between EUR 3,000 and EUR 6,000 ■ ... lower than EUR 3,000

Some key questions that will be answered in this phase are:

- What is the ideal spectator capacity of the stadium?
 - What is the premium seating/ corporate hospitality capacity?
 - What is the best product mix, corresponding to market demand and location characteristics?
 - What are the capital constraints, if any, of the stakeholders?
- Is there merit in considering the development of a multi-use facility (with retractable roof option), and what are the cost/benefits of such an option?
 - Do the market characteristics allow for the development of a mixed-use project to the benefit of the stadium and project stakeholders?
- Who will be responsible for managing the stadium and under which management/operating model?
 - Which VIP packages and pricing strategies will drive the highest revenues?

Phase 4 – analysis of the operating performance

Once the market feasibility of the stadium has been analysed and a preliminary operating model of the venue has been identified, it is possible to move forward by carrying out further analysis concerning the operational, sustainability and financial feasibility of the proposed project.

Based on the estimated demand levels and the key economic drivers identified previously in the market analysis, for each event type in the proposed stadium (e.g. football matches, other sport events and concerts) it is necessary to forecast the number of expected spectators and the average spend per person for every product/service offered in the stadium. Functions present in a mixed-use development should be subject to a similar analysis.

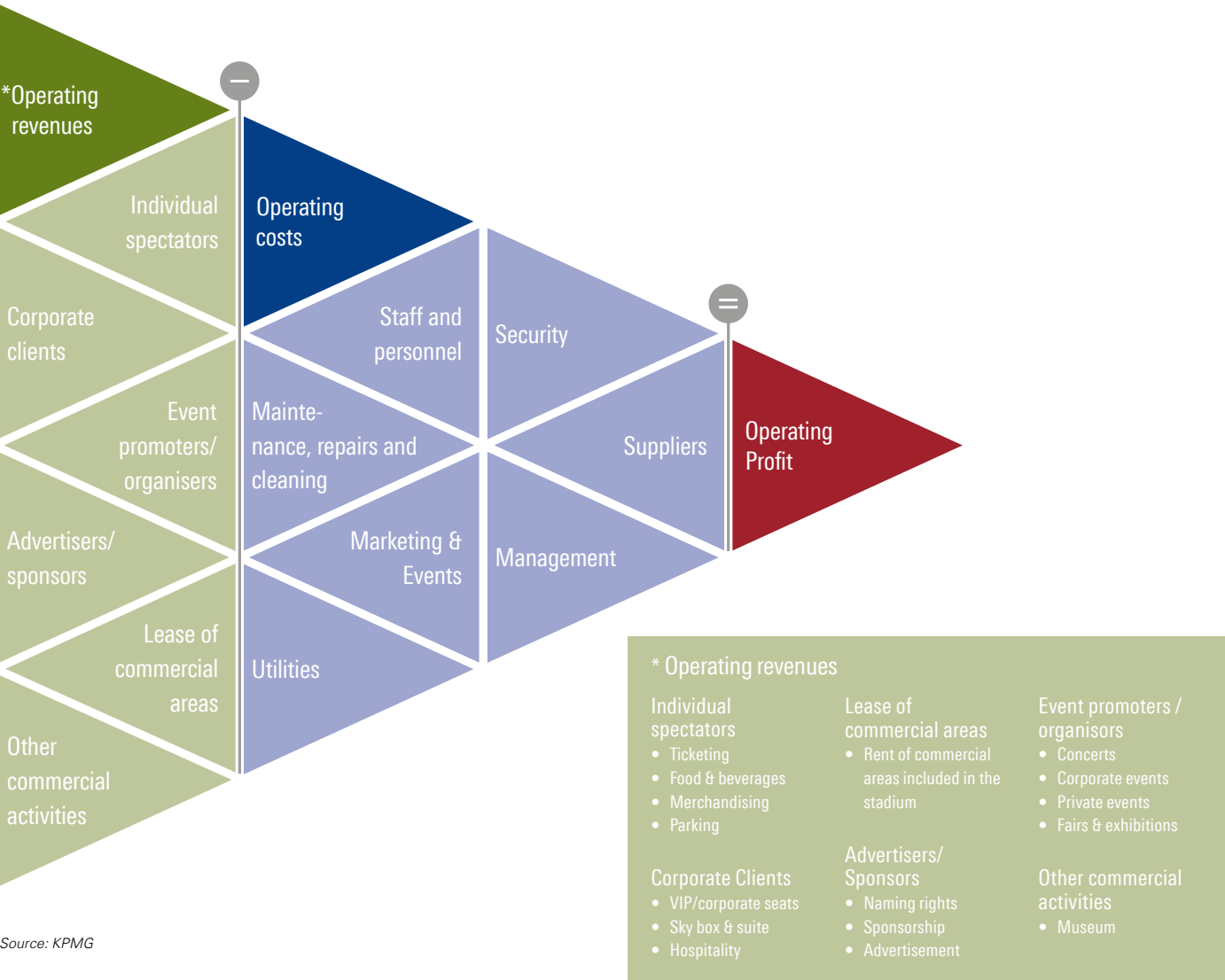
Through this process, **operating revenues** generated by each main business line, such as ticketing, F&B outlets, hospitality areas, non-sport events, sponsorships, parking, etc., can be estimated.

It is of paramount importance to underline that the on-the-field performance of teams naturally varies over time and impacts attendance and ticket pricing. This makes presenting stable cash flow streams for a new stadium, which include ticket revenue forecasts, an extremely difficult and subjective exercise.

While assessing the operational performance of the proposed stadium, it is necessary to estimate the **operating costs** required to guarantee the efficient operation of the venue: staff and personnel, cost of sales, safety and security, maintenance and repair, cleaning services, marketing, utilities as well as the fees required by a professional management company, if any.

This analysis leads to a forecast of the **Profit and Loss Statement** and **operating cash flows** for the early years of operation. Through sensitivity analysis, it is possible to assess the **profitability** of the overall project under different operating scenarios such as on-field performance, ticket pricing, etc. The chart below represents the most typical operating revenues and operating costs related to a stadium.

Operating performance of a stadium



Phase 5 – funding and financial performance analysis

Financing stadium developments

Once the analysis of the operating performance is completed, the development process can move forward through the financial feasibility assessment phase. The objective of this process is to evaluate the financial performance of the project, its ability to source funding and meet ‘return’ expectations of capital providers.

In all stadium developments, arranging the financing structure for the development is a challenging task.

The foundation of any financing effort is a robust business plan. As stated earlier, stadium owners and operators need to think ahead and identify the expected revenues and costs of operation over their planning horizon. This exercise will result in understanding the financing needs and its varying structure over time. **Contract-backed revenues** may also serve as a source of development financing. The success factors of raising finance are a large and loyal fan base, strong, real and predictable revenue streams, a positive operating budget and a stable cash flow position.

Although each case will be different, the methods for funding stadium development usually involve a combination of private and public sources, including equity (cash injections, assets such as land contribution, supply of equipments, licenses and patents), debt and other special arrangements.

One form of **equity financing** is through issuing shares: going public with an initial public offering (IPO) or, if already quoted on the stock exchange, the issue of additional shares. The initial enthusiasm of markets regarding IPOs has decreased in recent years, and the current trend is to de-list football clubs’ shares from stock exchanges.

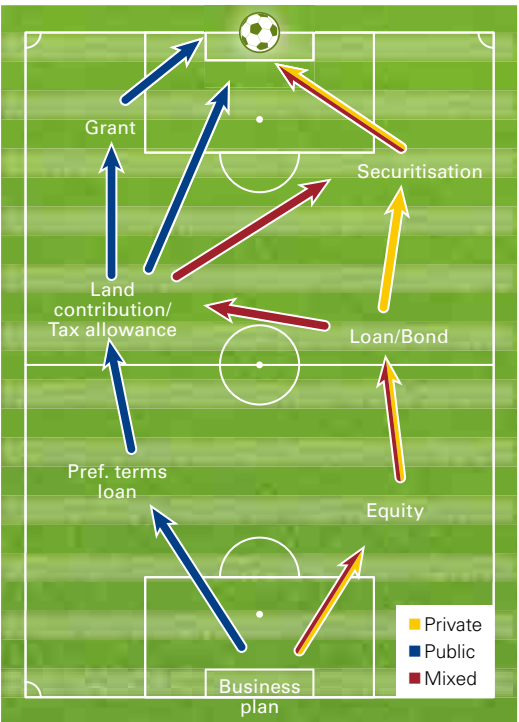
Debt financing usually takes the form of bank loans or a bond issue. For example, half of the cost of Juventus’ new stadium development was financed by two commercial loan contracts signed and guaranteed by a mortgage. However, when securing a commercial mortgage against the property value of a stadium, the realisable value of the facilities should be carefully assessed. This is influenced by the fact that the revenues generated in stadiums largely depend on the variable sport success of the team and there are usually few alternative options for venue use.

Another option to raise financing is a bond issue. This instrument was chosen by Arsenal in 2006, when the club issued the first publicly-marketed, asset-backed bonds to refinance the bank debt used for the development of the new Emirates Stadium.

In recent years **securitisation** has increased in popularity as clubs pre-sell part of their future revenues, thereby raising financing for stadium developments. Typical subjects of securitisation are revenues from TV rights, naming rights, shirt sponsorship, catering facilities, premium seat licenses (PSLs) and, more recently, season ticket sales. For example, apart from the naming rights, the agreement between Arsenal and Emirates included an 8-year shirt sponsorship as a financing instrument of the new stadium. Delaware North also contributed to the capital costs of Emirates Stadium, signing a 20-year exclusive contract to run the stadium’s catering operation.

Public authorities may choose to be involved in the development of stadiums for wider socio-economic reasons. Public participation in financing stadium developments includes various forms of allowances and grants provided by governments, local municipalities and other public bodies. Tax allowances can also be used. Authorities can also contribute to financing through the provision of land at favourable terms, building access roads and upgrading adjacent public infrastructure.

Alternative financing structures of stadium developments



Source: KPMG

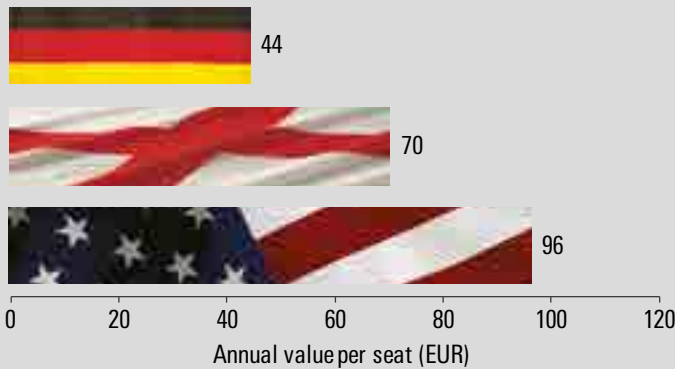
Approximately a third of football stadiums built in Europe in the last 5 years and with a capacity of over 20,000 currently have a naming right deal.



A glance at the European naming rights market

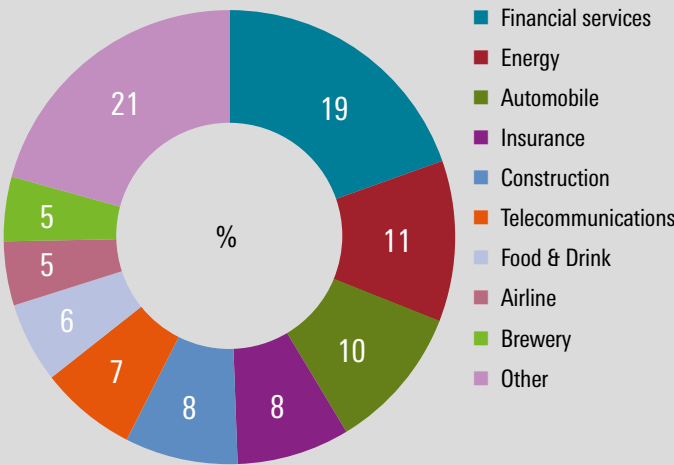
The trend in selling the rights to name a sporting arena started in the United States in 1926, when a baseball field took the name Wrigley Field. In Europe, in the late 90's, more naming right deals started appearing. By the mid 2000's the trend had grasped the German market with 24 naming right deals attached to stadiums in the top two divisions. Smaller, Scandinavian countries followed, along with some stadiums in England. The USA remains a stronger proposition in the naming rights market in the context of average annual value per seat, at more than double that of Germany and close to 40% more than England. There are currently high profile rights deals in England which have boosted the average value to 60% more than Germany, notably the Emirates and Etihad stadium deals. Additionally, the average length of contract in England and Germany is 8 years, while typical contracts in the USA have an average contract length of 14 years.

Average annual value per seat



Source: KPMG research
Note: Sample taken from top two football leagues in each country as of 2012. USA represents the Major League Soccer stadiums only.

Share of naming right deals by industry across Europe



Source: KPMG research
Note: Sample taken from top two football leagues in each European country

From the data available, 19% of currently signed naming right deals are from the financial services sector, with a further 11% from the energy sector. Further analysis shows that the airline industry are heavily invested in the naming right market, notably through two very high profile and high value deals in England, the Emirates Stadium in London and the Etihad Stadium in Manchester.

Commercialisation at the Türk Telekom Arena, Turkey

City: Istanbul, Turkey
Team: Galatasaray S.K.
Opening year: 2011
Stadium capacity: 52,650
Owned and operated by Galatasaray S.K.

The new stadium's main revenue sources include match day general admission ticketing, hospitality packages, non-match day events and sponsorships. Türk Telekom, Turkey's largest telecommunications company, agreed to purchase the naming rights of the stadium for EUR 7.7 million per year over a 10 year period.

Besides the naming rights of the stadium, the naming rights to individual tribunes were also sold. Local food company Ulker purchased the naming right of the second floor of the stadium's east tribune for EUR 1.5 million per year.

The Türk Telekom Arena highlights the increasing importance and opportunities behind stadium sponsorship deals. Further to this, a commercial strategy does not necessarily have to stop with the naming right of the entire stadium, but the selling of naming rights to individual stands and sections of the stadium can be explored.



Financing the Juventus Stadium, Italy

In 2003 Juventus bought the Delle Alpi Stadium from the municipality of Turin for close to EUR 25 million. Construction started in 2008 to develop what was the first new stadium in the country to be privately owned by a football club.

The financing of the new stadium, which required a total investment of EUR 125 million, was complex:

- The main finance structure consisted of two loan agreements accounting for approximately half the development costs. The 12-year loans are guaranteed by a mortgage and have been underwritten by the *Istituto per il Credito Sportivo*, the Italian national bank dedicated to support the financing of sport-related infrastructure.
- Another source of financing comes from the sale of a commercial land plot to be developed adjacent to the stadium. The club and a leading food retailer in Italy entered into an agreement by which the retailer, *Nordiconad Group*, would build an innovative and modern commercial centre, integrated into the stadium and surrounding area. The contract is worth EUR 20.25 million to Juventus, with Nordiconad also paying all infrastructure costs to the municipality of Turin.

- Furthermore, Sportfive Italia S.r.l. also signed a long-term partnership with Juventus involving regular payments to the club in return for an exclusive right to sell the stadium naming rights and part of the premium seating capacity. This solution exemplifies how much the financing may actually be linked to the future revenue generating potential of a modern stadium.

Since the opening of the stadium, Juventus have won the Serie A league both in the 2011/12 and 2012/13 seasons. The increased capacity and higher quality on-pitch performances have given the club a ‘new stadium effect’ uplift in attendances of over 60% while increasing the utilisation from 78% in 2011 to 88% 2013.

Quick facts

Development cost: EUR 125 million
Capacity: 41,000
Loan agreement: EUR 60 million
Commercial centre sales: EUR 20.25 million
Sportfive agreement: EUR 75 million (of which EUR 35 million paid up front)

Attendance patterns over the last five years

	Season 08/09	Season 09/10	Season 10/11	Season 11/12	Season 12/13
Stadium (capacity)	Stadio Olimpico (28,140)	Stadio Olimpico (28,140)	Stadio Olimpico (28,140)	Juventus Arena (41,000)	Juventus Arena (41,000)
League position	2	7	7	1	1
Average attendance (Serie A only)	23,118	23,214	21,966	35,755	35,973
Average utilisation	82%	82%	78%	87%	88%

Source: Serie A, KPMG analysis



Conclusion

While there is an impressive range of successful financing solutions applied by flagship stadium developments across Europe, a careful analysis and planning of the appropriate financing structure needs to be made for any stadium project. Each case is individual and there are no quick-fix solutions, nor is there a single best way of financing.

Once a realistic financing structure has been identified, it is possible to estimate the cash flows of the overall development and to analyse the financial performance of the project as a whole.

In case the estimated return on investment does not match the equity stakeholders’ expectations, the concept, its related development cost and funding structure should be reconsidered to eventually arrive to a feasible development proposition.

The results of the Market and Financial Feasibility Study and Business Planning process should ultimately lead to the creation of a bankable document capable of demonstrating that the proposed stadium development can meet the expectations of all capital providers, most typically football clubs, banks and public authorities.

Four key drivers of a financial feasibility analysis



Source: KPMG

Socio-economic impact assessment

The positive socio-economic benefits of a new stadium (measured in terms of revenues, tax and employment contribution) versus the cost impact on the local community is often a driving force behind the motivation for public sector involvement. The direct and indirect effects, as well as the wider and often immeasurable benefits related to a new stadium development, may in fact be extensive.

Therefore, the commissioning of an economic impact assessment can be a crucial supplement to a feasibility study. It may be used by stakeholders to demonstrate to public authorities the benefits of their involvement with regard to contribution of public funds, tax relief, facilitation of administrative procedures or other types of public support.

With funding requirements for projects of the scale of a new stadium, ‘support’ from the public sector is often inevitable. As engagement of the local community and businesses is vital for the success of a new stadium initiative, an economic impact study can help secure their support.

Risk analysis

An important aspect of the analysis of any project is the assessment of potential risks that might impact on the success of the new stadium development. For all stakeholders an understanding of the areas of risk is critical; equally important is the process of planning the management of risk so that actions can be planned to reduce the possibility of the project being exposed to such risks.

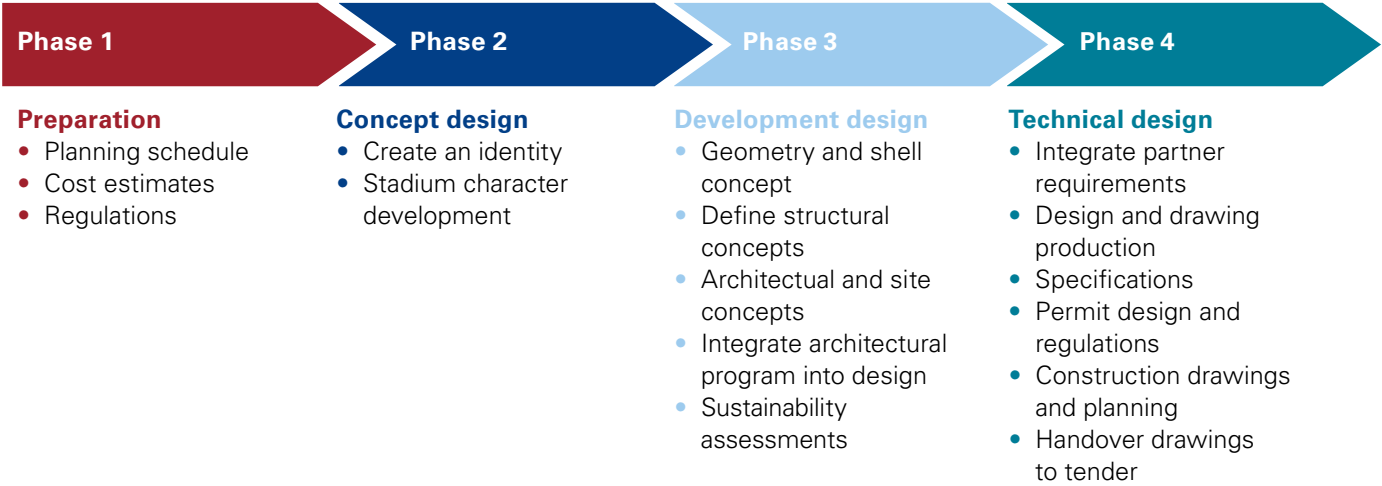
Typical project risks that can threaten the sustainability of the development include:

- Unpredictability of a team’s performance and sport success;
- Identification and retention of new target markets;
- Financial stability of the investors in the stadium/football club acting as main tenant;
- Violent behavior of the fans;
- Negative macro-economic scenarios;
- Unexpected increase of direct and indirect competition.

3. Permitting and design

Overview of the permitting and design process

Projects will vary according to the needs of specific stakeholders, the location, the site and the market requirements. The preliminary planning and feasibility phase will provide a basis for the concept brief and the starting point for the design process. The design process is typically subdivided into the following four phases.



Source: gmp

Phase 1 – preparation

Determine a planning schedule

The planning schedule for a stadium is often dependent on several factors. Many football stadiums are built for events that have precise deadlines, such as the FIFA World Cup or UEFA European Championships. The time until the event will establish the planning schedule. However, in the case of a stadium that is being designed and built for a football club, the deadline may not be as demanding and there may be some flexibility in the schedule. When presented with a renovation, advance planning is essential, far before construction planning.

Cost estimates

The final concept brief including the financial feasibility and business plan will establish the financial parameters, budgets and funding sources. These will form the basis of the design team cost estimations.

The inclusion of additional functions, after a cost estimate assessment is determined can be problematic. New function requirements, both large and small, from the stakeholders can delay planning and construction, and can lead to the concept requiring refinement, at additional cost.

Regulations

Early recognition of the minimum requirements to be used in a stadium design makes for a smoother design process. The requirements of FIFA, UEFA and regional sports authorities can vary significantly. These can greatly impact the design of a stadium. Local planning codes and requirements, which will vary from region to region, can also have a significant impact on a stadium design.

Renovate or Build New? Olympic Stadium Berlin, Germany

The integration of new functions into an existing stadium is a different challenge to the conceptualisation of a new stadium. Standards and regulations in stadium design are constantly changing and being reevaluated. Adapting an existing stadium to meet current standards can be extremely complex.

In addition the facilities of existing stadiums are often out of date and/or do not meet expectations of fans, corporate clients, the football club/core user, owners, etc.

The decision on whether or not to demolish and build entirely new can be very difficult and can be influenced by many different factors – these may include the historical ‘value’ of the stadium; the current ‘functionality’ of the stadium; capital costs relating to renovation or demolition; and factors relating to waste and sustainability.

Owner: State Berlin
Operator: Olympiastadion Berlin GmbH
Start of construction: 1934
Opening: 1936
Renovation: 2000 – 2004
Renovation cost: EUR 242 million
Architect: Werner March (building); gmp · von Gerkan, Marg und Partner · Architects (renovation)
Capacity: 74,244

The Olympic Stadium in Berlin is an excellent example of a renovated stadium. The ‘new’ stadium includes modern functions and technologies whilst at the same time the important heritage of the past is preserved. The stadium required new functional spaces and architectural features, which were not included in the old design. In terms of new

spaces, the stadium now has 113 new VIP boxes, associated reception and restaurant areas as well as new concession outlets, restaurants and merchandise stores in the spectator areas. An underground parking garage was added to the stadium. The most significant addition was a roof covering almost all seats.

In the case of renovations, an important issue is the historic value that the stadium holds within the local culture. The Berlin stadium was built in 1934 for the 1936 Olympic Games and is seen as an iconic structure. The size and neoclassical style of the stadium is a clear symbol of the image that the country wanted to project at that time. The stadium is a historically preserved building on the German Register; it escaped major damage in the Second World War.

Although many dramatic changes were made to the Olympic Stadium in Berlin, careful consideration had to be given as to how as much of the building could be preserved, including some of the old underground spaces. The most noticeable exterior change was the addition of a roof. The design is most notable for the gap in the roof at the western end of the stadium over the location of the Olympic flame.

One of the most fundamental issues on a stadium renovation project is the use of the stadium during construction. As a result of extensive construction planning it was possible to maintain a continuous calendar of events throughout the renovation, with a spectator capacity of 55,000 – 70,000 during the whole period.

Berlin’s Olympic Stadium was renovated for the 2006 World Cup and on 9 July 2006 hosted the final match between Italy and France.

Phase 2 – concept design

Create an identity

The unique qualities of a new stadium are contained within its identity. Creating an identity is a careful design process in which the designers and stakeholders must communicate to find a design solution which accommodates the requirements of the parties involved. The key questions that the design team should be asking include:

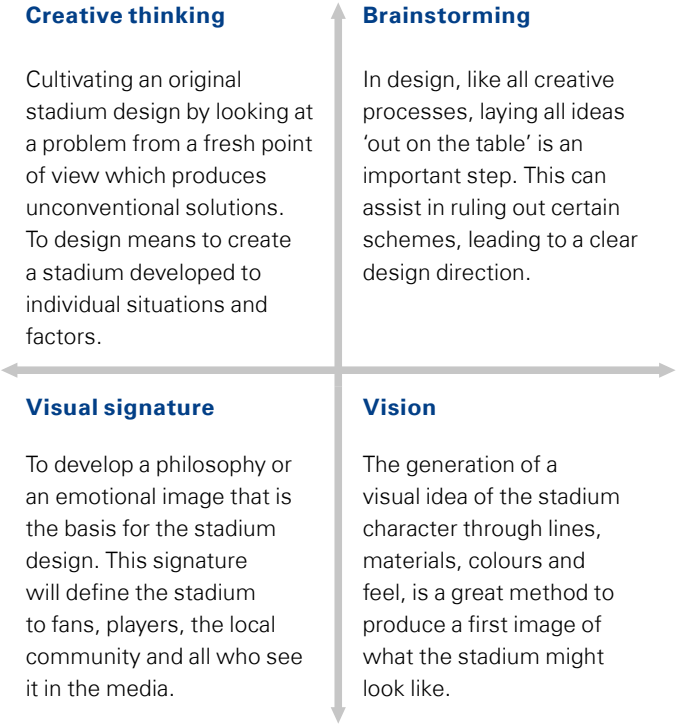
- Should the stadium become a landmark?
- How should the stadium represent the local culture?
- Do the stakeholders have preliminary ideas with regard to the aesthetical qualities of the proposed stadium?
- Is there a local club, which will utilise the stadium?

Several recent stadium projects have not only become landmarks, but have also become symbols through which their respective cities are identified. An example would be the Moses Mabhida Stadium in Durban, South Africa.

Stadium character development

The goal of this design stage is to produce drawings and visualisations which illustrate the character of the stadium. Turning a vision into a possible concept is not necessarily a difficult process; however, determining which concept fits best to each situation and solves specific problems can be challenging. The character develops through the overall form and exterior appearance of the stadium and is generally based on aesthetical qualities and structural feasibility. The consultants involved at this stage of the project mainly consist of architects and structural engineers.

Concept design elements



Source: gmp

Olympic Stadium Berlin, Germany
View from Olympischer Platz
Picture: Heiner Leiska



Colour and material concept at Belo Horizonte Stadium, Brazil

Colours and materials can be used to represent a culture or sports team. They also create an atmosphere unique to each venue, giving an identity that reflects on the fans, city or culture where the stadium is located. In the case of the Belo Horizonte Stadium, the architect chose these aspects of the design with a strong regard to local values and culture.

There were additional factors which added to the importance of the choice of materials and fittings available in the local market. These included:

- Cost – local material reduced shipping costs and potential import duties; and
- Local support – inclusion of local materials and products supported the local economy.



Stadium identity at the Moses Mabhida Stadium, South Africa

Owner: South African Football Association
Capacity: 55,000 (permanent)
increased to 85,000 (Olympic mode)
Opened: November 2009
Architect: gmp · von Gerkan, Marg und Partner · Architects
Construction cost: EUR 350 million

The key stakeholder in this project, the Durban City Administration, envisaged a stadium that would become a significant ‘landmark’ for the city. Through the stadium development, the city administration was hoping to achieve a ‘Sydney Opera House effect’, whereby the city will be recognised by an iconic structure. The expansive arch, clearly discernible in the city’s skyline, was the solution to this requirement. The arch, as the main structural element, provides support for the suspension cable roof structure over which the translucent membrane is hung.

The process of designing the exact shape and form of the arch was extensive. A series of structural and interpretive

Quick facts

Cost of arch: EUR 28 million
Weight of arch: 1,250 tonnes
Length of arch: 340 m
Highest poin: 105 m
Material: Steel
Other use: Cable car to a Skydeck used as tourist attraction. Adventure walk to the top.

models and drawings were produced to find the perfect contour, which not only resulted in an appropriate stadium roof, but also provided a striking addition to the cityscape.

The multi-use stadium had to accommodate not only football and rugby matches, but also track and field events. Furthermore, it had to be designed with the flexibility to increase the seating capacity to 85,000 for large events such as Commonwealth or Olympic Games.

Moses Mabhida Stadium, Durban, South Africa
Picture: Marcus Bredt



Phase 3 – development design



Cologne, Germany – Square



Durban, South Africa – Oval



Port Elizabeth, South Africa – Form Fitted, 3 radii

Pictures: Marcus Bredt, Heiner Leiska

Define geometry and building shell concept

A stadium shell is dictated by the geometry of the stands and the structural concept. The shell (facade and roof), the geometry and the structure of a stadium are, in most cases, developed simultaneously. The facade and roof generally display the vision determined in the previous activity. However, the facade is also dictated by the characteristics of the structure.

The facade structure itself often comprises of either steel or concrete, depending on the concept. In most cases the structure and the geometry of the stands are created from concrete. Regardless of the material, the entire structural concept must be fully integrated.

The type of events to be held at the stadium as well as the capacity of the stadium will define which geometry is most appropriate and therefore the shape and form of the stands. The following are the most common geometries:

- **Square:** In the square design corner seats do not provide a good viewing experience and are often excluded from the design. Therefore, while this type of geometry allows fans to be closer to the pitch, increasing the atmosphere in the stadium, capacity, however, is reduced.
- **Oval:** The oval design of a stadium allows not only football but offers the potential for hosting a wider range of sports such as athletics and cricket. This geometry is often used in stadiums, which will host (or have the intention to host) athletics events. The Olympic Stadium in Berlin and the stadium in Durban are examples of the oval stand shape.
- **Form Fitted – 3 radii:** The form fitted design has rounded corners and is attractive owing to its continuous seamless shape, which provides good spectator distance to the pitch and better quality views from the corners.

The traditional ‘English style’ square design is becoming less common, as this geometry restricts the options of hosting events other than football.

The C Value

The geometry of a stadium can be defined by the sightlines of the spectators. Sightlines are defined by a ‘C Value’, which is a measurement of the distance a spectator can see over the head of the spectator below at an angle to the nearest point of focus. In football stadiums this ‘point of focus’ refers to the side-lines. A high ratio between the C Value and the overall mass of the stadium impacts not only the cost of the stadium, but also the comfort of the spectator.

Demanding a high C Value can benefit spectators sitting in the lower tiers, who will have an excellent viewing experience; however, it may create an uncomfortable feeling

of vertigo for fans in the upper tiers as the stands become very steep. It is important to proceed with caution and to choose an appropriate C Value for all spectators. A FIFA event requires a minimum C Value of 60mm.

C Value at the Warsaw National Stadium, Poland

The stakeholders of the Warsaw National Stadium requested that the new stadium would allow a great viewing experience. In the new Warsaw National Stadium none of the seats have a C Value below 90mm and many seats have a sightline evaluation between 100mm and 150mm.

A higher C Value in a stadium design will lead to a higher construction cost.

This image displays the C Value for each seat of the Warsaw National Stadium, which is represented by a colour. The warmer colours display lower values, while the cooler colours have higher C Values. As in most stadiums the corners of the stands will have slightly lower C Values than other sections of the stadium.



Each colour represents the C Value height in mm for the Warsaw National Stadium in Warsaw, Poland

- | | |
|---------|---------|
| ■ 90mm | ■ 120mm |
| ■ 100mm | ■ 130mm |
| ■ 110mm | ■ 140mm |
| | ■ 150mm |

Source: gmp picture archive



National Stadium Warsaw, Poland
Picture: Marcus Bredt

Define structural concepts

The structural concept of a stadium consists of two main portions – the interior (the stands) and the exterior (the facade and roof construction). In most stadiums, the structures of the stands and tiers are relatively similar and are generally used to support the interior of the stadium. The exterior, the facade and roof are unique to each stadium. The structure for the facade and roof is always developed with a team of structural engineers and architects.

The question of whether a retractable roof can be justified will be determined within the market and financial feasibility study. The extra cost of a retractable roof compared to the potential benefits can, in some cases, make this option unfeasible.

Define architectural and site concepts

The development from a concept to a full stadium design is generally referred to as the schematic design. After the main aspects of the design have been decided upon (the facade and geometry) the rest of the stadium design will begin to materialise.

One of the most important parts of the architectural concept is circulation. Circulations to a stadium, within a stadium and on the tiers to a spectator’s seat are the three major components. These are reversed in an emergency situation to evacuate spectators from the stadium. Regulations on these matters will be heavily dictated by local planning codes.

Stadium functions will naturally begin to fit into a stadium design once the circulation has been determined. Areas for fans, such as restrooms and kiosks, are generally located along main concourses. Sports, media, VIP and service areas tend to be contained in one section of a stadium. After a basic layout of stadium functions exists, intensive planning coordination with other engineering partners may begin.

Retractable roof design at the Warsaw National Stadium, Poland

Owner: NCS – Narodowe Centrum Sportu
Capacity: 58,145
Opened: January 2012
Architect: gmp · von Gerkan, Marg und Partner · Architects, local: JSK
Construction cost: EUR 465 million

The roof construction of the Warsaw National stadium consists of five structural, functional and architectural elements:

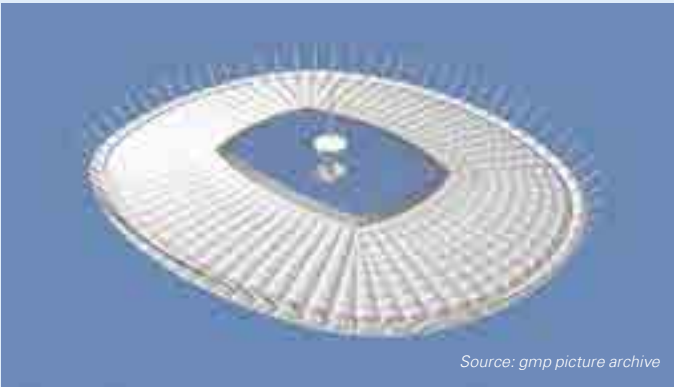
- 1. Outer roof;
- 2. Main roof;
- 3. Glass roof/catwalk;
- 4. Inner, retractable roof; and
- 5. Central video cube/roof garage.

The roof of the Warsaw National Stadium exhibits its technical solution through its potential architectural ‘feasibility’. The lightweight roof construction can bear heavy snow loads, even when closed in the winter. Daylight shines through the translucent roof membrane almost unobstructed onto the stands. The inner roof, also made out of a membrane textile, can open or close in 15 minutes.

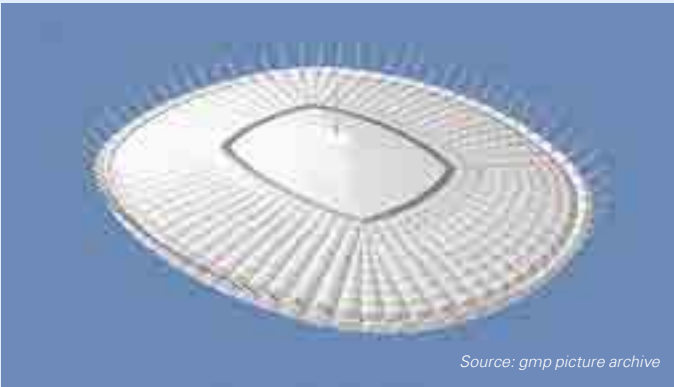
A cable-supported membrane structure carried by radial girders spans in between a circumferential steel structure. The supporting steel structure consists of one tubular compression ring which is supported by a series of steel columns. From the compression ring a diagonal strut spans to the connection point of the upper radial cable. The cable structure carries downward loads (e.g. snow) through the increase and decrease of stress in the upper and lower radial cables.

Quick facts

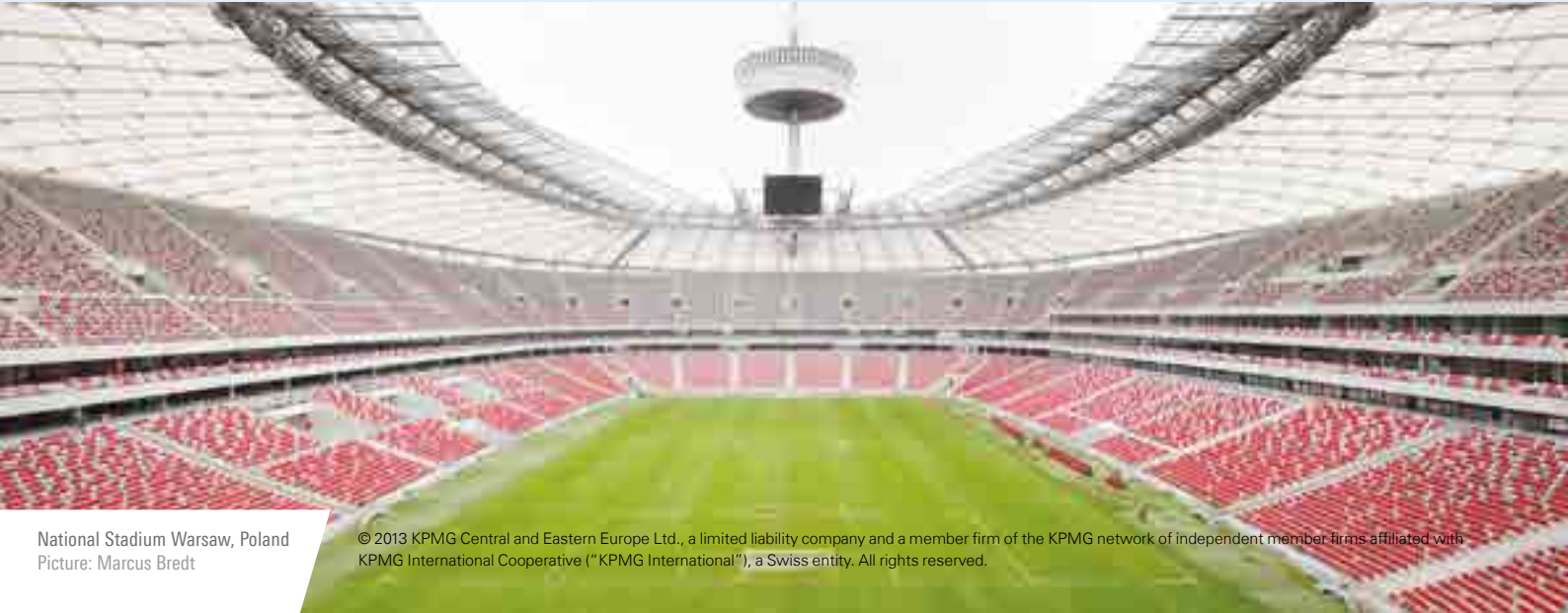
Cost of roof: EUR 85-95 million
Weight of roof: 14,500 tonnes
Material: Steel cable and steel pipes, membrane cover
Time to close inner roof: 15 minutes



Source: gmp picture archive



Source: gmp picture archive



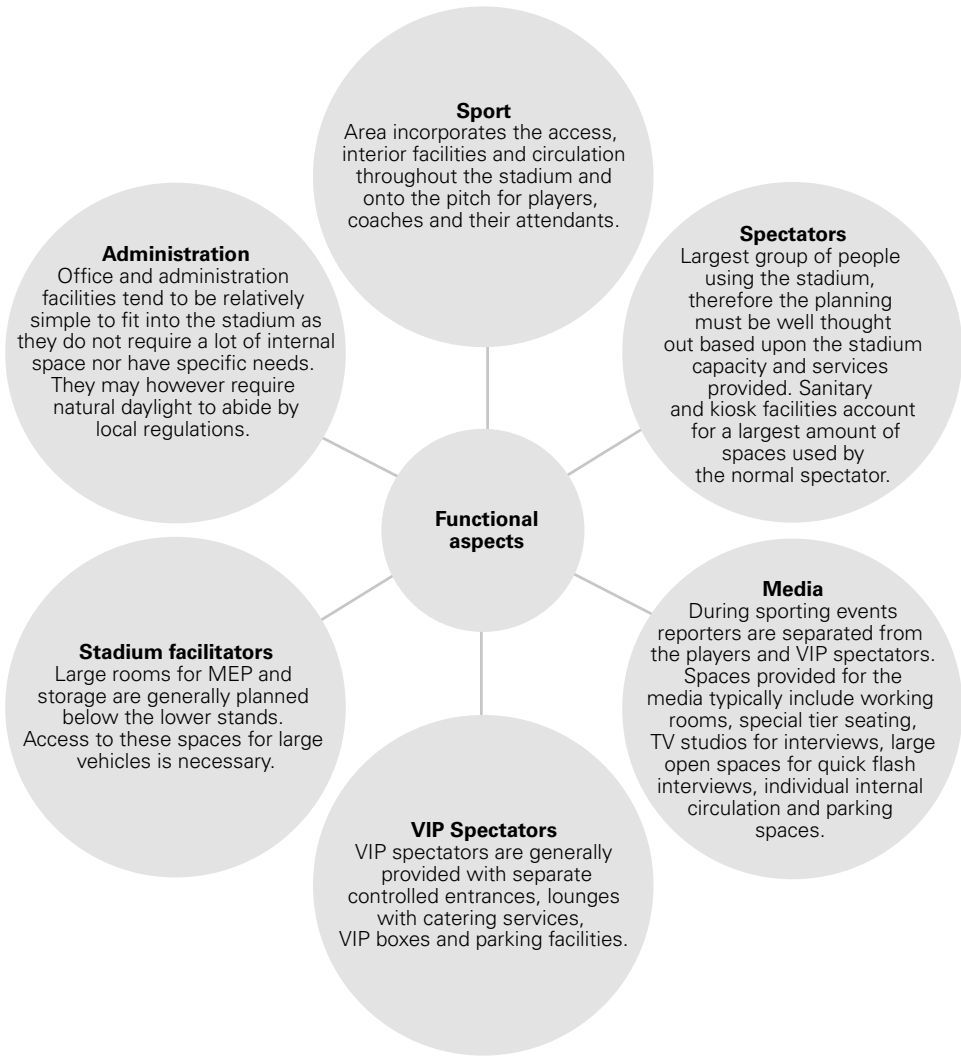
National Stadium Warsaw, Poland
Picture: Marcus Bredt

Integrate architectural programme into design

The architectural programme refers to the functional aspects which need to be incorporated into a stadium. These functions include the interior and exterior spaces that are standard in all modern stadiums. Many of these functions are regulated by local planning codes, and in order to host different grades of professional football matches. Interior spaces can be generalised into the categories shown in the diagram.

The finishing of VIP areas and other lounges such as shown below are crucial to the overall impression of the facility, and the revenue generation potential of the hospitality operation. Lounge spaces are fitted with bars and buffet stations and are often located on the outer perimeter of the section, providing a common space for VIP guests to congregate.

Functional aspects of design



*Mechanical, Electrical and Plumbing
Source: gmp

Undertake sustainability assessments

Sustainability is not only a key industry trend, but also a virtuous principle to be considered in the design of a stadium.

Often, it is very easy for designers to plan and conceptualise sustainable concepts for buildings, but to fully integrate and build these design aspects requires determination on the part of the stakeholders and designers.

The FIFA World Cup Stadium in Manaus, Brazil is currently under construction and is planned to have LEED* Certification. The following aspects of sustainability will be implemented:

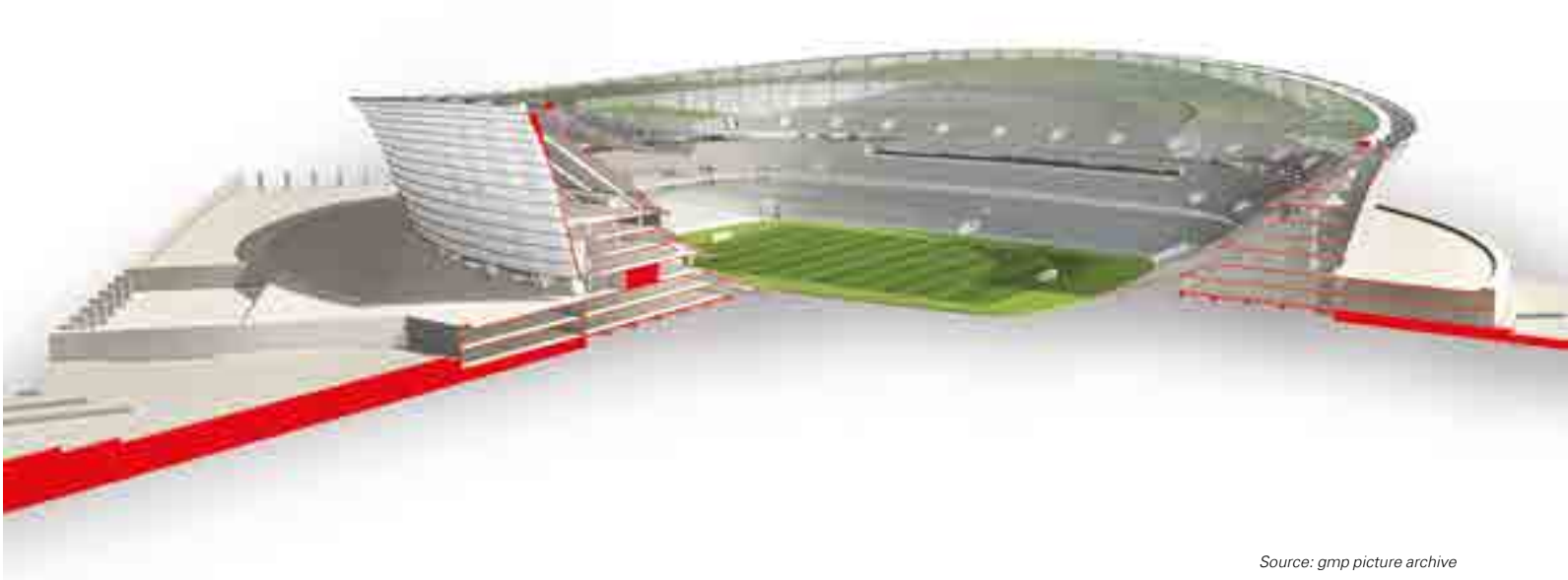
- A sustainable site through the reuse of the previous stadium site;
- The reduction of potable water use through the reuse of collected rain water to flush water closets and urinals. Rain water will be collected and stored prior to the FIFA World Cup in 2014, so that enough water is available for use throughout the entire event;
- Utilisation of local materials and resources;
- The stadium is easily accessible via public transportation; spectators arriving in low-emission and fuel-efficient vehicles will be entitled to discounted parking; and
- 100% of parking spaces are covered either by the stadium or by shaded trees therefore reducing the ‘Heat Island Effect’.

**Leadership in Energy and Environmental Design*

Key attributes for sustainable design



Source: gmp



Source: gmp picture archive

Phase 4 – technical design

Integrate design and engineering partners’ requirements

The organisation of large building projects is complex. A clear definition of tasks among planning partners is necessary to maintain a planning schedule. All planning partners should be included in the design phase at this point. Although each project varies, below is a general list of consultants involved.

Specialist partners involved at this phase

- Architectural designers;
- Structural engineers;
- Traffic planners;
- Landscape architects;
- Interior designers;
- MEP (Mechanical, Electrical, Plumbing) engineers;
- Lighting engineers;
- Sound engineers;
- Catering planners.

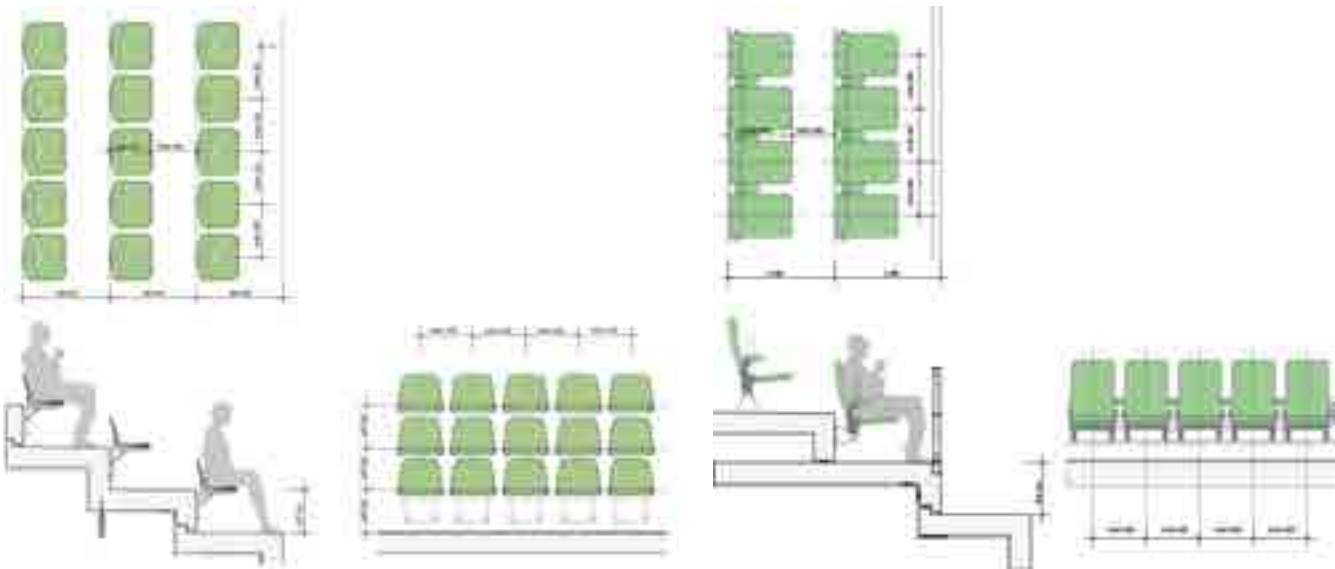
Permit design and regulations

Each country, region and city has specific regulations and codes which must be applied to any building. A stadium design must be adapted to fit these regulations. Packages of drawings are developed to be submitted to the local authorities. After the design is ready to be submitted, a process of approval will be completed by local planning authorities. Changes may be necessary, but codes and regulations are always considered in the design. Once a permit to build is granted, further detailed design can begin.

Intensified design and drawing production

The production of drawings from all planners should begin in the design development phase. Generally, the architect must first produce a set of general working drawings as a basis for all other designers. Each designer has specific requirements to fulfill in terms of plans, sections and other detailed drawings. The production of 3-dimensional drawings and models will often be provided by the architectural and structural engineers.

Numerous drawings are presented to the project stakeholders on a regular basis as part of the process.



Source: gmp picture archive

Specifications

The selection of detailed materials, designs and products for a stadium incorporates all elements ranging from a door handle to a video screen, for example.

Effective building design will encompass all elements, therefore ensuring that there is a consistency of materials and general aesthetics throughout the stadium. All planning partners will be generally requested to submit a package

of specifications which will be included in the tender documentation submitted to the contractor.

A key part of the specifications for stadiums is the choice of seating, typically chosen by the design partner in collaboration with the stakeholders. Often football organisations such as FIFA and UEFA require seats with backs, folding or fixed.

Construction drawings

A set of construction drawings are always submitted as the basis for the contractor to plan and begin the physical building process. Not surprisingly, a set of construction drawings for a stadium is usually very extensive, however, as many elements in a stadium are repeated, many of the drawings can be mirrored. Some of the typical architectural details, which are always included in a stadium, are stairways, seating, concourse and ceiling plans.

In this phase of the design process, a major challenge is to retain as much of the original concept and to fulfill as many of the stakeholder requests as possible.

Construction planning

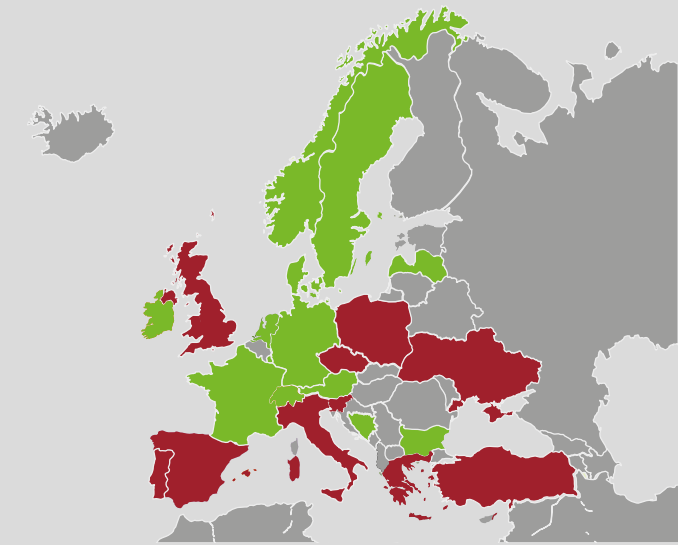
The planning of the construction of a stadium requires the experience of both the designers and the contractors. Projects are often built in phases. These phases are generally considered early in the project, so that all designers can accommodate the requirements of the core user.

Handover of completed drawings for tender

Preparing documents and drawings to hand over for the tender is an intense and highly organised process. A designer must have specific tender package skills and a capable team who can systematically produce a set of documents. Each element in a drawing will need to be numbered, calculated, arranged, labeled and finally presented in a legible form. After the contractor receives the construction documents, the team will begin to produce 'workshop drawings', which will be used on site for actual construction.

Hot Topic – will standing return to football across Europe?

Standing regulations in Europe

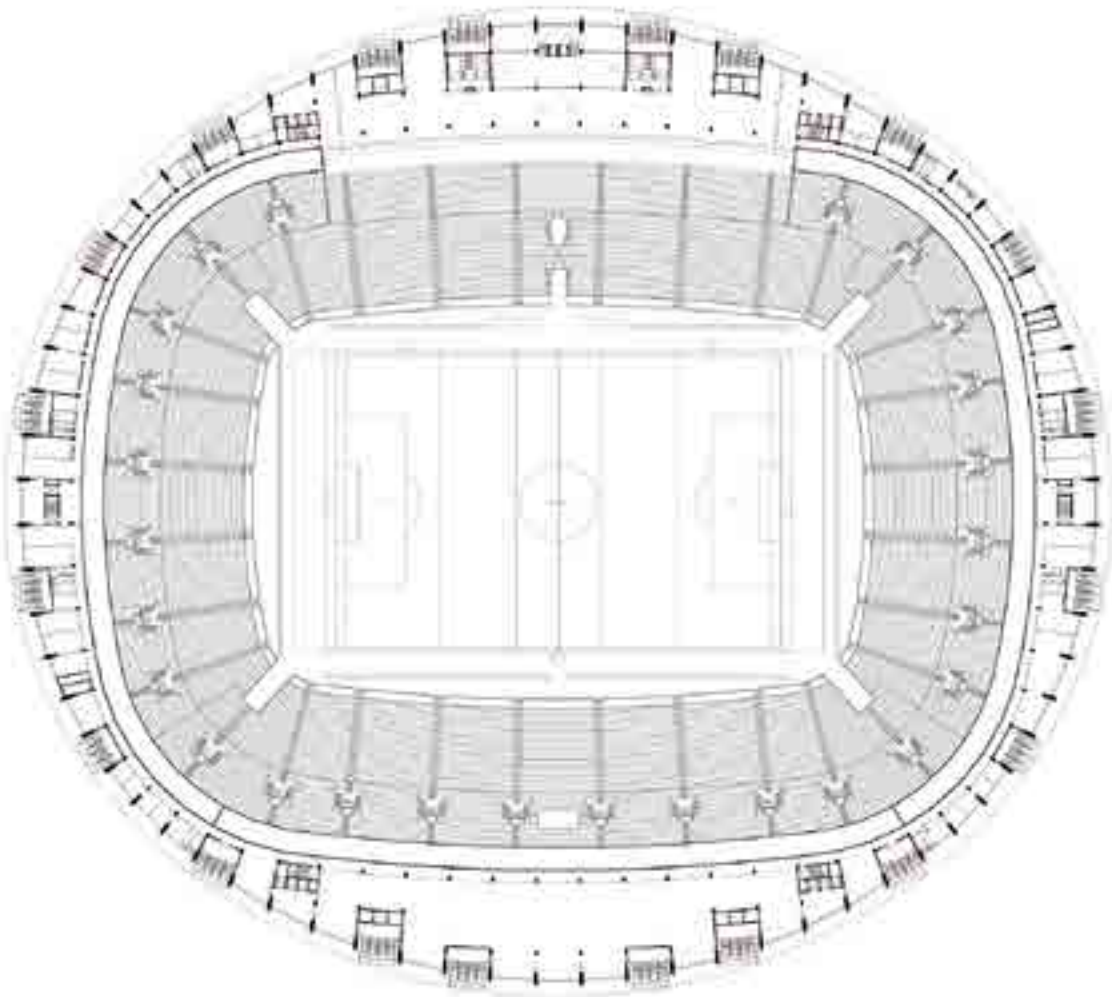


- Standing not allowed in top divisions
- Standing allowed in top divisions
- Undefined

Source: Football Supporters Federation and KPMG analysis

Safe standing continues to be a hot topic. As a result of tragic incidents of the past, standing at football matches has been a taboo subject. It is a subject not willingly approached by many clubs, governing bodies and politicians. However this subject is being impacted by design. New innovative terracing designs have led to a few countries implementing safe standing in a number of stadiums across Europe. In general, this has been met with positive feedback from fans, operators and law enforcement. Germany is a leading example of this – great match day atmospheres result from the ability of fans to stand at matches.

In addition to providing a more vibrant and exciting atmosphere at games, there is certainly a commercial case for safe standing – less cost, increased capacity leading to the potential of increased match day revenues; the question is whether this will be enough to gather support for the reintroduction of standing. This would undoubtedly be a long and time-consuming process.



Floorplan Level 4 Cape Town Stadium
Source: gmp picture archive

4. Construction

Overview

The decision on which procurement route to use depends on a number of different factors, including the complexity/uniqueness of the proposed facility; how much control the client would like to retain over the design; the procurement routes commonly used in the country where the facility is to be built; and the client's ability to retain risks that it can control.

External stakeholders also have a significant influence on the route chosen i.e. for projects where one of the stakeholders is a public institution, or where there is an element of external funding. In these cases, it is often a requirement that the client organisation pass as much project implementation risk as possible to the constructor.

The client's experience in delivering projects also plays a significant role in deciding which procurement route to follow. More experienced clients, being more aware of the risks associated with construction, are better placed to understand the implications of holding those risks over which it can exercise control.

The experienced client, acknowledging that a competent constructor will include a premium in its tender price to cover risks transferred to it, recognises that retaining control of appropriate risks may save costs if those risks do not materialise.

From a client's perspective construction risks can occur in three key areas:

- **Cost Risk**, i.e. the risk that the final outturn cost exceeds the original budget;
- **Schedule Risk**, i.e. the risk that the project will be delivered later than planned; and
- **Quality Risk**, i.e. the risk that the outputs from the project will not meet requirements.

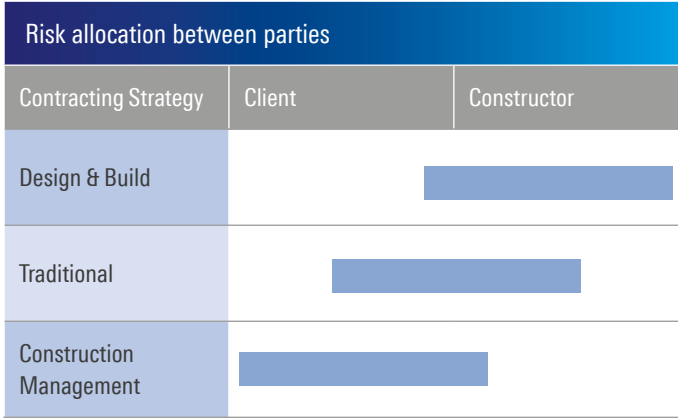
The most effective procurement strategy will be the one which most closely matches the client's priorities in these three areas whilst recognising the interdependencies between them.

Examples of these risks and their interdependencies for a number of commonly used contracting options are summarised hereafter.

Contracting Strategies

There are many different contracting strategies available, all of which allocate the risks between the parties differently. Three of the more common strategies are Traditional, Design and Build and Construction Management.

Each of these strategies allocates risk differently between the client and the constructor. An indicative diagram comparing risk allocation across the three strategies can be found below.



Source: KPMG

Design & Build

This strategy is delivered in a number of forms each with its own specific allocation of risk between the client and the constructor. Common across each is that the client contracts with a single entity to both design and construct the facility. The constructor takes full responsibility, with its associated risks, for the design and the delivery/sequencing of the work.

This strategy has a number of advantages, including:

- A single point of responsibility for the project;
- A high level of price certainty and risk transfer to the constructor can be achieved;
- The project can be delivered more quickly if the constructor takes advantage of his ability to overlap design and construction activities; and
- A more economical solution can be provided by taking advantage of the constructor’s “buildability” expertise.

This strategy also has a number of potential disadvantages, including:

- The client has less control over quality once the contract is in place; and
- If the project is not properly specified pre-contract, later changes to the scope of work can be expensive.

Traditional

As its name suggests this strategy is one of the older methods for procuring and delivering a construction project. The client contracts separately with the design team and constructor. The client retains design responsibility whilst the constructor is responsible for on-site delivery/sequencing of the work.

This strategy has a number of advantages, including:

- The client can retain a high degree of control over quality by producing a sufficiently detailed design pre-tender; and
- A high level of price certainty and risk transfer to the constructor can be achieved, subject to there being no post contract change in the design requirements.

This strategy also has a number of potential disadvantages, including:

- The design and construction phases are carried out sequentially and as such the overall duration for the project is extended; and
- Poor quality design and/or late changes can lead to significant claims for delay and disruption from the constructor.

Construction Management

This strategy requires the client to appoint a construction management organisation to manage the project for a fee. Separate contracts are put in place by the client with the construction manager and the individual work package contractors. Using this strategy the client retains a significant level of control over the design and construction of the project.

This strategy has a number of advantages including:

- The duration of the overall schedule for the project can be minimised by overlapping design and construction activities for the individual work packages; and
- The client has more flexibility to change the scope of works during the project, particularly for the un-let packages.

This strategy also has a number of disadvantages, including:

- The final cost of the project is not fixed until the last package is procured and delivered;
- The client retains the interface risk between the work package contractors and as such must implement a robust set of controls to monitor performance and control change; and
- The client must put in place a large team of experienced professionals to monitor and control both the overall project and the individual work package contractors.

Risk allocation across each tender process



Source: KPMG

Strategy Selection

The appropriateness of each strategy will be largely dependent on whether it meets the underlying objectives of the client and/or other key stakeholders.

A number of the more common objectives are listed on the right along with an indication as to the suitability of each strategy:

Objective	Design & Build	Traditional	Construction Management
Price certainty as early as possible	Yes	Yes	No
Short timescales. Fast track construction required	Yes	No	Yes
Requirement to retain design / quality control	No	Yes	Yes
Ability to instruct changes whilst minimising the cost impact	No	No	Yes
Requirement to transfer the complete risk	Yes	No	No
Single point of contact / control for the client	Yes	No	No

Source: KPMG

The Construction Process

Generally speaking the construction of most stadiums will follow a similar process.

Preparatory infrastructure construction	• This requires further detailed site analysis. • Road access, water, electricity, storm and sewer water systems and other transportation may need to be built (may be ongoing throughout the stadium construction period).
Foundation work	• A pile system will be placed into the soil to provide the deep soil support for the foundations. • Foundations will be poured onto the pile system to transfer the loads of the stadium from the columns through the foundations to the piles.
Concrete	• Shell and core of the building - foundations, columns, raker beams, floor slabs, elevator shafts and the stairs make up much of the actual stadium. • The concrete construction of a stadium is the core which gives the general shape of the stadium.
Prefabricated elements	• The largest of the many prefabricated elements in a stadium will be the tiers of the stands. • After the columns and raker beams are installed, the prefabricated tier elements are put in place • The lower tier is assembled first. • Simultaneously, the structure of the stadium will continue to be built. • Once the columns and raker beams are assembled in the upper levels of the stadium, the upper tier or tiers can be installed.
Mechanical, electrical & plumbing installations (MEP)	• Co-ordination of the individual design of MEP is challenging. • The work of all engineers and designers must be coordinated throughout end-design phases and construction.
Mock-ups	• A mock-up of the stadium facade can be created on or off site to test planned materials. • Mock-ups can generate interest for stakeholders and the general public.
Roof construction & facade	• Roof and facade construction requires the construction of vertical supporting elements. • Steel columns (in most cases) are used to support both the facade and roof. • The radial roof elements, whether they be cables or steel truss elements, will be constructed on the vertical supports. • Once the main parts of the structure are complete, the cladding elements for both the facade and roof can be applied.
Furnishings, fixtures & equipment	• Furnishing, fixtures and equipment will normally be added towards the end of the construction. • In comparison to other buildings stadiums have a mass of furnishings required; for example the large number of seats; the number of restroom furnishings, etc.





Modular, temporary and stadium extensions*

The recent trend in developing ‘modular’ or ‘temporary’ stadiums has been brought about by the ever-changing nature of stadium demand.

Within this context there are three types of stadium design and construction available to stakeholders: modular, temporary and extension.

Modular stadiums are completely different from conventional stadiums. The planning and construction of these types of stadiums allow shorter timeframes and, subsequently, lower programming costs. Essentially like in a ‘kit concept’, the individual modules are combined to form turnkey solutions without any compromises in terms of safety, comfort, and flexibility. Because of this, modular stadiums are able to comply with the most stringent regulations set by FIFA. These are built for permanent use and can last up to 25 years.

The typical build time for a modular stadium can be from 6 to 15 months. A stadium with a capacity for up to 25,000 spectators can be key-ready within just 12 months – from the initial design to its final handover. A very important aspect here are the very short procurement times for construction elements, and the significantly shorter planning and installation phases. Significant time savings are an important factor, and will also allow the fast and simple addition of further capacities in the off-season. The key advantages of the modular stadium concept lies in its adaptability – the modules are easily retrofitted to accommodate additional space requirements, e.g. Baku Crystal Hall.

Temporary stadiums, such as the Empire Fields Stadium in Canada, are built with a view to last between 12 and 24 months, but also longer. A temporary stadium is mainly based on scaffolding, which limits the design scope. Integrating VIP areas for instance is still possible but there are some constraints when it comes to commercial peripheral use. The typical build time for a temporary stadium can be from 2 to 6 months. This approach is especially

tailored towards projects that come with a very tight schedule or where short-term solutions need to be put in place (e.g. due to regulations).

With the current issues of stadium legacy at the forefront of mega event organising, the need to avoid ‘white elephants’ in a host city are paramount. The solutions that temporary stadiums provide are adaptable from mega events to then cater for local, domestic football. The implementation times for these changes are fast, and can have minimal impact on the operation of the facility.

Temporary stadiums are regularly used as multi-use stadiums, owing to the swift and flexibly nature in which they can be expanded and contracted to suit particular events

Extensions to permanent stadiums have become an important part of legacy strategy. The ability to construct temporary seating within a venue for the purposes of a mega event, or for example the promotion of a football club to a higher league, can be a key driver in successfully conceptualising a stadium in the first place. Stadium extensions are not limited to additional grandstand capacity only but VIP boxes, roof systems or ancillary structures are possible as well, while always complying with strict safety standards. These kinds of extensions are available for rental or outright purchase. Other options include hire-purchase or leasing models.

**Contributed by Nüssli*



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Modular stadium at Baku Crystal Hall, Azerbaijan

In the 8 months set aside for planning and construction, a multi-functional arena was created in Baku, which will serve the city as a prime venue for a variety of events for many years to come. In order to facilitate the implementation of the highly complex structure in just 8 months, the building was designed in three main elements: the modular stadium, an interior roofing structure, and a sophisticated outer shell. The building was designed entirely as a steel structure.

Baku Crystal Hall offers space for 25,000 spectators and complies with the most stringent international standards and requirements for the hosting of major cultural, football and athletic events.



Temporary stadium at Empire Fields, Canada

The temporary stadium Empire Fields which was built for the 2010 CFL season matched the quality of a permanently built stadium in many respects. The construction of the temporary football and soccer stadium took only 3 months. Capacity was 27,500 seats, including two roofed main grandstands; 20,500 seats were equipped with seat shells, 7,000 with bench seating.

The construction of the stadium itself, as well as the VIP zone with turnkey suites, media and press rooms, had to meet Canadian building standards and regulations. The timeframe for construction of this stadium is unprecedented in the history of modular construction in North America.

Stadium extension at Cape Town Stadium, South Africa

On the occasion of the FIFA World Cup 2010 in South Africa, the host city of Cape Town built a new stadium, on the site of the existing Green Point Stadium, with a permanent capacity of 52,000 seats. The inclusion of modular grandstands in the design allowed the capacity to increase to 65,000 seats, complying with the high safety standards of FIFA. The seats are removable and therefore allow capacity flexibility.



5. Operation

Stadium management models

A sustainable and commercial operating model is crucial to the successful implementation of a business plan independent of:

- a) the **ownership structure** of a football stadium (i.e., who owns the asset, be it a football club and/or a public institution and/or other third parties); and
- b) the **financing model** of the development.

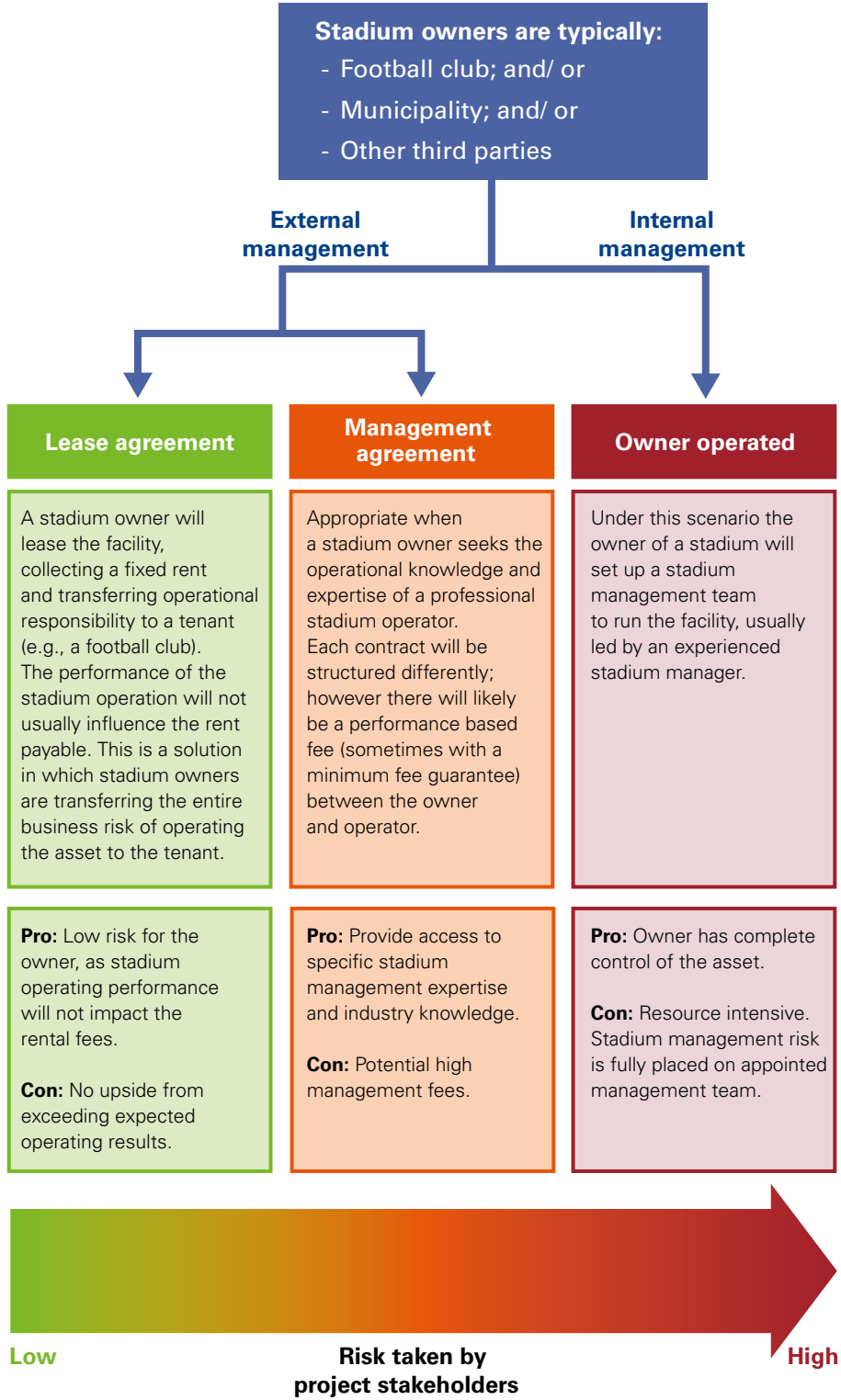
It is fundamentally important to think at an early stage of development which stadium management model and agreement fits the capabilities and risk taking profile of the stadium owner. There are many ways to structure the operating agreements of stadiums, which have different levels of business risk. A hybrid of the three main models described on the right is often developed.

Who will operate the stadium?

This is a question that should be addressed at an initial stage of planning. If a stadium's owners decide to appoint a stadium management company to operate their venue, then the selection process of an appropriate service provider at an early stage of development is advantageous in order to enable the operator to influence the design and thereby maximise the efficiency and revenue generation opportunities.

Through management contracts, stadium owners seek to reduce their business risk. This usually requires professional operators to enter into long term agreements. The extent of risk and profit sharing along the timeframe of the contract needs to be examined and discussed at an early stage.

Risk allocation across each tender process



Source: KPMG

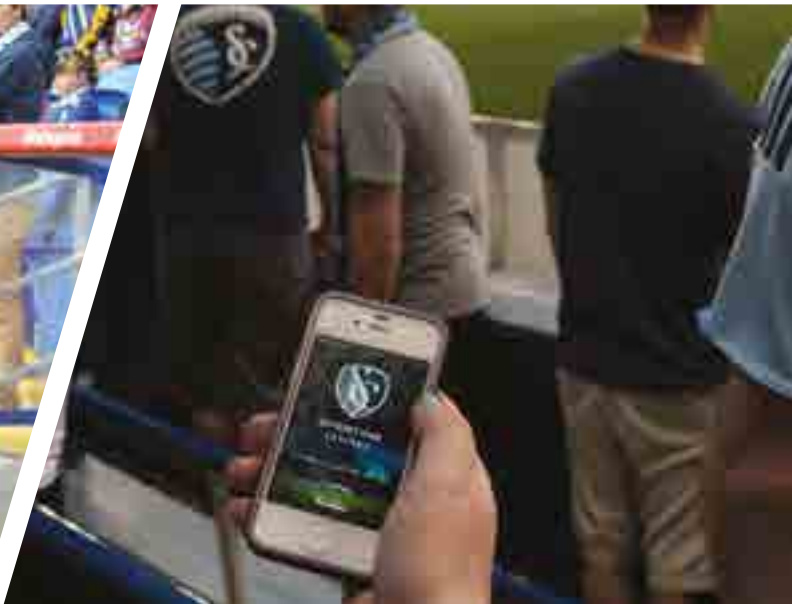
Advantages and disadvantages of outsourcing

Owners and operators have the option to outsource certain functions and activities to third party providers – this can be done to bring in specific expertise which they do not possess, or to improve profitability. Typical functions which might be outsourced include catering, corporate sales and ticketing. There are advantages and disadvantages to each route, however, there are no ‘common themes’ or trends in what functions are outsourced, as these vary considerably based on in house-management expertise and from market to market. Each decision should be made on a case-by-case basis.

Advantages	Disadvantages
True expertise in running a certain activity or function	The service provider may at times be unable to follow the vision of the stadium owner throughout operations
Function specific sales and marketing expertise and benefitting from existing relationships with corporate customers, sponsors, etc.	When a certain function is outsourced, the owner loses control over that function
Preferred supplier rates may be available through industry contacts and bulk purchasing	The owner could lose touch with the costs and benefits of the service level
Access to database of international network of operated stadiums, benefitting from useful operational benchmarks and initiatives	Service provider charges may be relatively high and not justified by the benefits of the provided service level
Long-term fixed price contracts	Difficult to exploit synergies with and between outsourced functions; potentially impacting profitability and customer experience
Flexibility of resources upon demand such as ticketing, security, cleaning services, and repairs and maintenance, etc.	Risk of confidential information handled by ‘outsiders’



Picture: Cardiff City Football Club



Picture: Sporting Kansas City

Dynamic ticket pricing at Cardiff City Football Club, UK

Venue: Cardiff City Stadium
Team: Cardiff City FC
Opened: 2009
Capacity: 26,828
Average utilisation 2011/12 season: 82%
Dynamic ticket pricing is fundamentally a yield management process, whereby the ticket price the game is determined based on various factors including potential and actual demand and time of sale.

Introduction of dynamic ticketing policy:
2011/12 season

Key outcomes as of Q1 2013

- Attendance has not dramatically changed since the implementation, which is not necessarily a primary concern at this stage.
- Match day revenues have increased by approximately 20% since the start of the 2013 season.
- Tickets for games are being sold as early as possible for each game.
- Fans have more money available on match day to spend on F&B and merchandising due to not having to budget for a match ticket the week or month of the game.
- Event operating costs are being controlled, with greater knowledge of anticipated capacities.
- The system has resulted in the club introducing a season ticket limit of 20,000 for the first time in history, to take advantage of the dynamic match day ticketing.
- The majority of fan feedback has been positive.

Technology revolutionises the fan experience at Sporting Kansas City, USA

Venue: Sporting Park
Team: Sporting Kansas City
Opened: 2011
Capacity: 18,467 (football), 24,000 (concerts)

Vision

- Create the most compelling professional sports experience in the Midwest (USA);
- Utilise technology to enhance the overall attraction of attending Sporting KC matches;
- Appeal to the target demographic of 18-34.

Key outcomes as of Q1 2013

- 3000% growth in season ticket sales due to rebrand (club was formerly known as the Kansas City Wizards), opening of Sporting Park (featuring new fan experience amenities) and tremendous growth of the fan base.
- Vast majority of fans check in for every match and 90% of smart phone users engage for at least 60 minutes per match.
- 176,000 members (from 18 countries) regularly follow, tweet, blog, transact with the club.
- Sporting Park’s digital platforms, featuring 350+ high-definition StadiumVision displays, has led to a 150% increase in corporate partnership revenues.
- 100% increase in revenue per fan and ascension to 2nd overall in merchandise sales; outcome has been heavily influenced by activation through digital menu boards, targeted promotions and consolidated fan data views via CRM.



Picture: Borussia Dortmund

Eleven technology trends for integrated stadium management

The operating functions of a stadium can be categorised into two main categories: **income generating functions** (e.g., ticketing, advertisement and catering services) and **facility management functions** (e.g., safety and security, maintenance and cleaning).

The role of technology in stadiums is growing at a considerable pace. Amongst others, technology can be used for operational and asset management, fan engagement, and ultimately to improve the bottom line. The increased use of technology has emerged from stadium operators competing with broadcasters providing state-of-the-art media platforms, engaging fans from

their own living rooms or through their communications device. For stadium managers the challenge is now to bring the 'living room' experience into the venue in order to retain and grow an increasingly technologically minded supporter base.

The introduction of management software into football stadiums has led to a more streamlined operation. Intricate functions such as safety and security, ticketing, broadcasting and video can all be integrated into a centralised system, allowing the operation team to control and monitor each function and activity taking place before, during and after an event.



Source: KPMG

1. Safety and security

There are many aspects to the security operation of a stadium, however, using state-of-the-art technology can make this job easier. Security robots, for example, which can be used for surveillance, crowd control, etc., are being implemented at the World Cup and the Olympic Games in Brazil, in 2014 and 2016 respectively. Through the use of HD screens and possibly mobile applications, the security function are able to interact with the supporters by relaying circulation information, along with stadium directions.

2. Cashless stadiums

The development of payment systems is gathering pace, as more arenas are adopting cashless technology. A debit card where fans buy credit before entering the ground can serve as their ticket and way of purchasing merchandising and food and beverage products quicker and easier, which in turn can lead to more sales. In certain venues, clubs have negotiated card holders' use of public transport to and from the stadium. The intelligence collected from this is used by the club for fan profiling, and improving their CRM database, in turn, contributing to more efficient marketing strategies.

3. Environment

Through a centralised monitoring system, energy consumption can be continually monitored and remote controlled, which can have significant cost saving implications. Technologies in renewable energies, such as solar panels and water recycling, are becoming more prevalent in new stadiums.

4. Big screens and video cubes

Big screens are getting larger and are of a higher quality. Besides the revenue generating opportunities they offer through the sale of advertising, these are a platform for football clubs to communicate to the supporters. Video cubes are moving out of arenas and into stadiums, allowing more fans to see the content.

5. HD video

There is a great opportunity to brand HD video screens with a number of different campaigns. Each function of stadium operations can benefit from this, with company branding in hospitality areas, promotions at points of sale such as concessions, merchandising, bars and restaurants.

With a range of different demographic segments around the stadium, having the ability to target specific audiences with specific product promotions can become an attractive proposition for advertisers.

6. LED

The advances in technology have led to pitch side branding through LED boards, along with an integrated design approach, branded areas of the stadium through lighting effects as well as energy saving floodlights.

7. Social media

Social media is one of the driving forces in fan engagement before, during and after an event. The interaction and reach a football club can have to its supporter base through these media platforms can dramatically increase the fan 'buy-in' to the match day experience.

8. Wireless

Wireless internet technology is being implemented across new and old venues with a view to enhancing fan engagement and drive revenues. Wireless technology supports one of the newest trends, mobile applications.

9. Mobile applications

Through the use of mobile applications, operators are able to promote point of sale services, allowing food and drink ordering to be more convenient, and exploit sponsorship and promotions to certain app functions, exposing each fan to targeted branding and even sell seat upgrades where available. The content being pushed through mobile devices also includes instant replays, match statistics, player profiles, etc.

10. Ticketless

Gone are the days when stadiums require paper tickets to enter the ground. Supporters are able to purchase tickets online or through mobile applications and receive the ticket bar code to their phone or tablet.

11. Dynamic ticket pricing

Dynamic ticket pricing is essentially taken to new levels with software able to calibrate the price of match day tickets based on live variables such as number of tickets sold, opposition, league position, perceived importance of the match, with the ultimate goal of maximising event revenue.

Conclusion

Whilst the on-pitch results of a football team and its financial performance are inextricably linked, commercialisation of a modern stadium is a controllable factor that can change the long-term dynamics of a club, and hence support the business in achieving sustainable future success. However, the role of commercialising a stadium as an asset for a club is often not well understood.

Analysis of match day revenues of clubs across Europe paint a picture of dramatic contrasts, reflecting the unrealised business opportunity for football clubs in many countries, for example Italy and France.

Although in the top European football leagues over 120 stadiums have been built since 2000, the current landscape across Europe and further afield shows that the vast majority of stadiums were built more than 35 years ago. These venues are often outdated, and unable to fulfil the expectations of today's supporters, notably the corporate segment.

In particular, the tendency shows privately-owned stadiums outperforming publicly-owned ones. This is mainly due to the fact that publicly-owned stadiums of top European clubs are typically very old, whilst some of the privately-owned stadiums have been recently built with great attention to revenue generating potential. Successful clubs aim to gain more control over their venues, which in turn is a key factor in stadium commercialisation, leading to a positive effect on operational incomes.

The enhancement of traditional sources of operating revenues from new stadium development or the major renovation of an older venue is stimulated by an increase in the sale of season and match day tickets through better views, higher comfort, family stands. Simultaneously, a modern venue allows the exploitation of new and alternative key revenue drivers such as naming rights, hospitality areas, premium seats, catering, corporate events, stadium tours and museums.

Although the financial success of a stadium development relies upon a large and loyal fan base which can guarantee stable cash flows, a robust business plan is a key foundation to a new stadium development or renovation programme.

During the business planning and feasibility assessment phase (besides legal, urban planning and site availability issues), market, financing and operating aspects of the proposed stadium development should be carefully analysed. The ultimate goal of this task is to assess the overall feasibility of the project and to support the activities conducted by other professionals in subsequent phases (e.g. the architects in the stadium design phase).

With the evolution of modern architectural design, stakeholders are able to achieve a venue of higher comfort, integrating innovative solutions such as retractable roof and temporary seating, allowing for multi-use functionality.

The importance to adopt environmental sustainability practices is globally recognised as a key element of stadium development, therefore implementing these practices during construction (e.g. recycled materials, cooling and heating systems and lighting) and in operation (e.g. renewable energy, water and waste management) falls under the responsibility of all stakeholders.

Increasingly, stadiums are being built for mega events in countries and cities with undeveloped or developing domestic football markets, resulting in significant legacy issues with, in some cases, drastically underutilised venues. There is a need to put an end to uncontrolled investments with little, if any, business rationale. The implementation of modular and temporary stadium construction is a way of, at least partially, adapting the stadium capacity to expected demand beyond the respective major event.

Although team performance, market and economic conditions will always remain critical, experience demonstrates that scenarios repeatedly arise in which state-of-the-art new build facilities assist football clubs to discover and activate latent demand. This can create additional revenue generating opportunities and serve as a robust platform for sustainable business growth.

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