



**Project report:**

## **Player development systems in the performance pathway in four world-leading badminton nations**

**A literature review and interviews with experts from Indonesia, Korea, Denmark and Spain**

**Commissioned by:**

**Badminton World Federation**

**Prepared by:**

**Julian North, Sergio Lara-Bercial, AJ Rankin-Wright, Mike Ashford, and Lisa Whitaker**

**Carnegie School of Sport, Leeds Beckett University, United Kingdom**

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# Executive Summary

## The research

The report provides details of a project investigating good practice in player development and coaching systems in badminton in the performance pathway drawing on a review of the research literature, and interviews with experts from badminton federations in Indonesia, Korea, Denmark and Spain.

The purpose of the research is to identify and open-up good practice in terms of models and case studies that can be shared with others.

‘Player development’ refers to the development of individual players beyond the beginner and recreational level, who want to, but have not yet achieved, high performance. Systems concern a complex of resources, people and activities that interrelate and connect to produce outputs – in this case badminton players competing for honours at the highest level.

## Sample selection and method

Indonesia, Korea, Denmark and Spain were selected because of their recent record in world level competition. They represent four of the top six world leading nations according to our calculations (the others are China and Japan) and cover the two most successful badminton playing continents of Asia and Europe.

A multi-method approach was used including literature review, document review, and expert interviews. Nine world level experts were interviewed over 11 occasions generating over 20 hours of discussion.

## Organising framework

The research builds on work already undertaken in football for the English Football Association (North, Morgan, & Rongen, 2012a, 2012b) and Union of European Football Associations (UEFA) on player development systems (North, Lara-Bercial, Morgan, & Rongen, 2014).

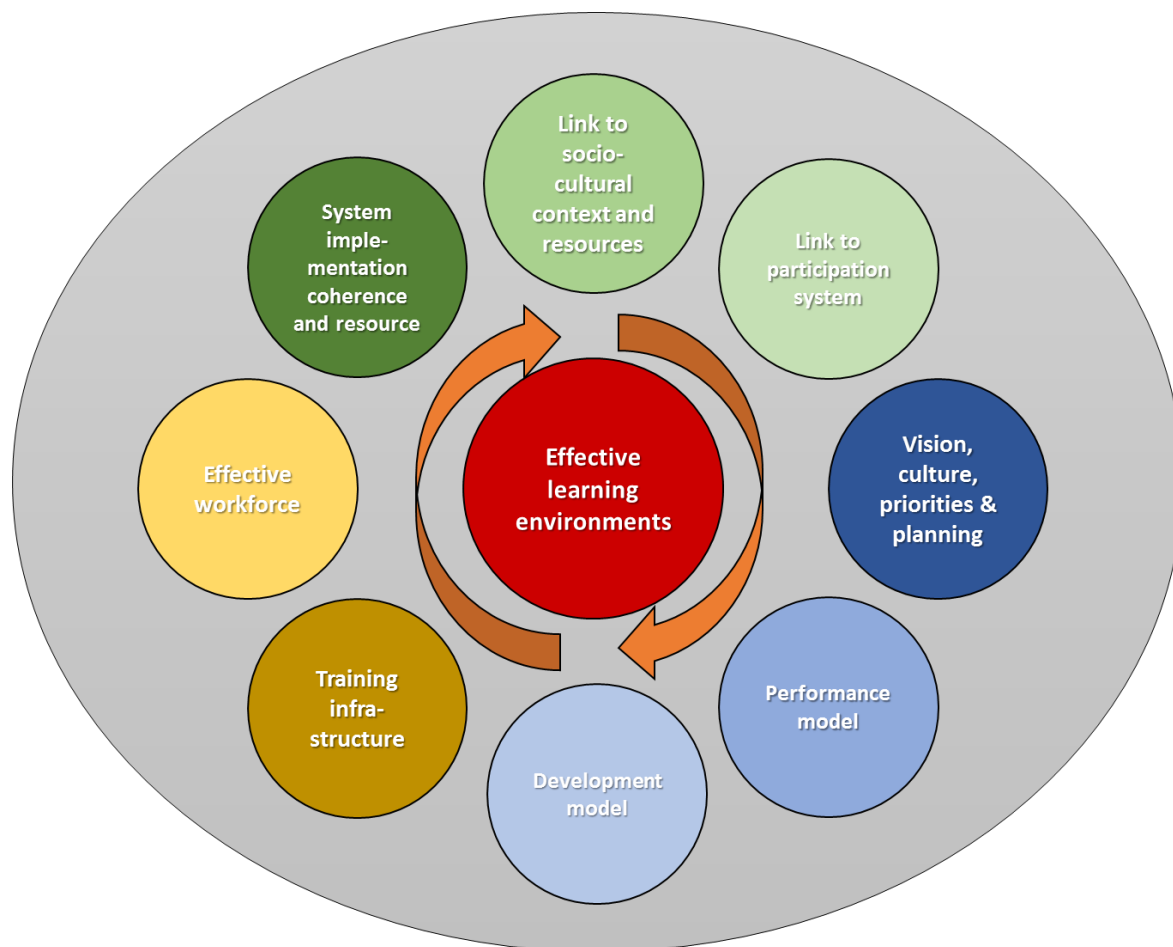
Through this work, which followed the same literature and document review, and expert interview, research design, a set of principles and components of effective player development systems has emerged.

This frame has been used to guide data collection, and organise the analysis and report writing in the current work.

## Components of effective player development systems

Link to socio-cultural context and resources
Link to participation/‘sport for all’ system
Vision, culture priorities and planning
Performance model <ul style="list-style-type: none"><li>• Playing style</li><li>• Elite player characteristics</li></ul>
Development model <ul style="list-style-type: none"><li>• Principles of human development</li><li>• Long-term approach</li><li>• Age-stage differentiation</li><li>• Holistic PPSTT development</li><li>• Careful use of selection strategies</li></ul>
Training infrastructure
Effective workforce
Effective learning environments <ul style="list-style-type: none"><li>• Learning environments are goal focused, individualised and challenging</li><li>• Constructively aligned practice structure</li><li>• Developmentally appropriate competition</li></ul>
System implementation, coherence, and embeddedness

## Components of effective player development systems



A summary of the results for each component against each country is provided on the next page.

The results highlight:

- how each country's system is embedded in its existing and available socio-cultural and wider resources
- That each country has a comprehensive system that makes provision for each of the components identified, for example, each country has a view of performance success; operates a development model that is long term, age-staged, holistic, with sensible use of selection; has appropriate training infrastructure and workforce
- That there are differences between countries, for example, Asian countries have more organic less coordinated and controlled systems than their European counterparts
- That there are differences with football – badminton nations pay less attention to performance models, and debates around skill acquisition that impact on practice structure.

## A comparison of player development system components across the four countries

	South Korea	Indonesia	Denmark	Spain
<b>Link to contextual resources</b>	<ul style="list-style-type: none"> <li>• System built on extensive participant base and established school club system, as well as wider resources available from the education system in terms of student attitudes and academic services</li> </ul>	<ul style="list-style-type: none"> <li>• System built on extensive participant base and extensive, established and productive club and coach system</li> <li>• Club and coach system tends to produce a rich seam of players with different playing styles</li> </ul>	<ul style="list-style-type: none"> <li>• System built on extensive participant base (for a small country) and notably a very well developed club system</li> <li>• Danish socio-cultural attitudes provide important context for coach-athlete relationships</li> </ul>	<ul style="list-style-type: none"> <li>• No extensive resources</li> <li>• Built on the ideas and energy of a small number of creative and dedicated staff</li> </ul>
<b>Vision, culture, priorities and planning</b>	<ul style="list-style-type: none"> <li>• No extensive player development vision currently</li> <li>• Main focus on high performance and the increasing use of sports science</li> </ul>	<ul style="list-style-type: none"> <li>• An emerging player development vision based around an adaptation of long-term player development, and more formal coach education</li> </ul>	<ul style="list-style-type: none"> <li>• An established but continually evolving vision and plan based on the club structure, clear pathways, and high quality coaching</li> </ul>	<ul style="list-style-type: none"> <li>• A new but strong vision and plan based on increasing participation, building delivery capacity, clear pathways, and coaching</li> </ul>
<b>Performance model</b>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success – although a list of expert performer characteristics developed by Korean Institute of Sport</li> <li>• Emphasis on physical characteristics, discipline, determination, and ‘fighting spirit’</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• Performance model determined by players and coaches in club context</li> <li>• Federation provides physical and psychological preparation support</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• Danish game focused on tactical variation, improvisation, deception, and ‘beautiful shot making’</li> <li>• Players encouraged to develop great technique and tactical understanding, make own decisions on court, and take responsibility for development</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• The Spanish game focused on incorporating elements from Asia (i.e. physical preparation) and Denmark (i.e. tactical appreciation), but with a Spanish ‘hue’</li> <li>• Players encouraged to develop great technique and tactical understanding, and be self-managed independent learners</li> </ul>
<b>Development model</b>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Stages built on school types (elementary, middle and high school) and centralised programme for U13, U15, and U17 and U19</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection to centralised resources based on competition results, the ‘coaches’ eye’ and test data</li> <li>• Selection typically starts about 12 but no definitive decisions until later</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Explicitly influenced by Balyi and Côté</li> <li>• Stages identified for 6-9, 10-12, 13-15, 16-17, 18-19, and 20 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection based on competition results at 16 years; successful players invited to trial at national centre</li> <li>• Emphasis on long-term patient approach</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Concerns about over-interpretation of 10,000 hours rule, and more emphasis on quality in development environments</li> <li>• Stages identified for 6-9, 10-12, 13-14, 15-16, 18-19, and 20 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection into regional programmes about 12 years, selection on to national programmes at 14 years</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Stages identified for 4-7, 8-11, 10-14, 15-18, 19 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection is based on PPSTT characteristics (although technical/ tactical markers are prioritised)</li> <li>• Selection starts slightly younger in Spain</li> </ul>

	South Korea	Indonesia	Denmark	Spain
<b>Training infrastructure</b>	<ul style="list-style-type: none"> <li>• Extensive facilities based in schools and universities (open to public)</li> <li>• Three national facilities for centralised programmes</li> <li>• Extensive sport science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive facilities based on club system (there may be over 500,000 clubs!)</li> <li>• One national centre, Pelatnas</li> <li>• Emerging sports science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive facilities based in dedicated badminton clubs</li> <li>• Some clubs provide regional hubs</li> <li>• Two 'power centres' and a national centre in Brøndby</li> <li>• Sport science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Growing number of facilities in schools and clubs</li> <li>• 8 regional centres including a national centre in Madrid</li> <li>• Sport science programme</li> </ul>
<b>Effective workforce</b>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (although the lower levels of the pathway appear to have been somewhat neglected)</li> <li>• Coach development and education programme in place – 3 level system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching</li> <li>• Coach development and education programme in place based on BWF system – extended to a four level system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (youth coaching prioritised)</li> <li>• Coach development and education programme in place – 'coaching roles' based system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (youth coaching prioritised)</li> <li>• Coach development and education programme in place based on dual HE/BWF 3 level approach</li> </ul>
<b>Effective learning environments</b>	<ul style="list-style-type: none"> <li>• Still rather coach centred</li> <li>• Often group rather than individualised plans</li> <li>• Emphasising player development over winning (but not easy to enforce in Korean community sport)</li> <li>• Use of a range of practice structures – but mainly structured skills based multi-feed</li> <li>• Sampling not typically encouraged</li> <li>• Managed competition an important contributor to development</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Early sampling encouraged</li> <li>• Managed competition an important contributor to development</li> <li>• Most player development work delegated to coaches and clubs</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Individualised and group planning and review</li> <li>• Emphasising player development over winning, although challenge through competition is very important</li> <li>• Use of a range of practice structures but emphasis on games based approaches and manipulating constraints</li> <li>• Early sampling encouraged</li> <li>• Managed competition an important contributor to development – strong domestic competition, but international experience also available</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Individualised and group planning and review</li> <li>• Emphasising player development over winning, although challenge through competition is very important</li> <li>• Use of a range of practice structures</li> <li>• Early sampling encouraged (although players tend to specialise more in Spain)</li> <li>• Managed competition an important contributor to development – attempting to build domestic competition</li> </ul>
<b>System implementation coherence and resource</b>	<ul style="list-style-type: none"> <li>• System appears very stable, although there are some policy changes expected</li> <li>• Possible attempt to drive through a more systematic long-term planning approach for player development system i.e. further down age-groups</li> </ul>	<ul style="list-style-type: none"> <li>• New system emerging</li> <li>• Federation has experienced some resistances from clubs and coaches and their 'traditional approaches'</li> <li>• Communication over such a large country is a problem (although being addressed through an extranet)</li> </ul>	<ul style="list-style-type: none"> <li>• System is well established, but there is a constant job to consult, communicate and work with clubs and coaches</li> </ul>	<ul style="list-style-type: none"> <li>• A new system is being built on the back of an energetic federation staff</li> <li>• The federation are keen to build relationships and maintain a positive approach based on consultation, communication and joint working</li> </ul>
<b>Key success factors</b>	<ul style="list-style-type: none"> <li>• Large number of participants</li> <li>• Schools programme</li> <li>• Sports science programme at high performance level</li> </ul>	<ul style="list-style-type: none"> <li>• Large number of participants and strong club structure</li> <li>• Considerable variety of players and playing styles</li> <li>• Emerging systems approach based on sports science</li> </ul>	<ul style="list-style-type: none"> <li>• Very strong club system</li> <li>• Clear, coherent vision and plan based on existing expertise, consultation and sports science</li> </ul>	<ul style="list-style-type: none"> <li>• A clear, coherent vision and plan, with energised but realistic implementation based on existing expertise, consultation and multi-disciplinary sport science</li> <li>• The good fortune of having a world number 1 and Olympic gold medallist</li> </ul>

## **Some recommendations**

There are some brief recommendations for the BWF and for the federations from the research work:

### **The BWF**

A 'systems' based approach is a useful way of thinking about player development – the proposed framework could be promoted in educational materials and as development tool

The Player Pathway Programme (PPP) corresponds with many of the issues identified in this report - a direct mapping has been undertaken - suggesting the programme is a good place according to the data we have collected

Further research could be undertaken to either analyse player development systems in more countries, and/or to explore in greater detail some of the specific components. For example, there is a potentially interesting study to be conducted on coach-athlete interaction styles across different cultural contexts.

### **The federations**

The conceptual framework overviewed in the report provides a checklist of good practice features of effective player development systems – federations could benchmark their systems against this framework

The detail of the individual components also provides a benchmarking opportunity and information source.



# **1. Introduction**

## **1.1. The research**

The report provides details of a project investigating good practice in player development and coaching systems in badminton in the performance pathway drawing on a review of the research literature, and interviews with experts from badminton federations in Indonesia, Korea, Denmark and Spain.

In this study, when we talk about ‘player development’ we are referring to the development of individual players beyond the beginner and recreational level, who want to, but have not yet achieved, high performance i.e. successfully competing at the highest levels. This is clearly a broad definition including emerging players, and various levels of performing.

When we talk about ‘player development systems’ the crucial focus of attention concerns the word ‘systems’. Systems concern a complex of resources, people and activities that interrelate and connect to produce outputs – in this case badminton players competing for honours at the highest level. All countries have a ‘player development system’ or ‘approach’ regardless of its level of sophistication and/or whether there has been a conscious and explicit vision, plan or considered thinking. Systems exist regardless of forethought or planning; they just reflect how player development ‘occurs’ in a particular country.

Indonesia, Korea, Denmark and Spain are four of the top six most successful nations at world level competition over the last four years (and beyond), representing Asia and Europe where the sport is most frequently played. Therefore, they represent an excellent opportunity to study player development systems in a number of the world’s most successful nations

## **1.2. Research aims**

The research aims are to:

- identify and examine good practice in player development and coaching in four world leading badminton nations
- provide case studies of player development and coaching systems in four world leading badminton nations
- identify principles and models of good practice to inform system development
- open-up good practice thinking to other countries
- undertake comparative analysis between systems.

The overall purpose of the research is to share innovation and best practice throughout badminton and to build upon and complement the Badminton World Federation’s growing and well regarded coach development and education programme.

## **1.3. The report**

The report opens-up with a discussion of sample selection and data collection methods (section 2).

It then provides a brief overview of the four case study countries including their demographic, economic and political make-up; their position in relation to badminton; and their approach to player development (section 3).

Next, it briefly introduces the organising conceptual framework for the study – the main components of effective player development systems (section 4).

Sections 5-9 provide a detailed overview of the results covering embedded systems; research, strategy, and planning; infrastructure and workforce, and effective learning environments.

The final section offers some conclusions and recommendations.

## 2. Selected countries and research approach

### 2.1. Selected countries

The BWF asked LBU to undertake research with four badminton federations in high performing nations in both Asia and Europe with these continents being the most successful in world level competition.

For example, based on an analysis of results of world level competition – the Olympics, World Championships and the All England championship – over the last four-year cycle (2012-2016) across all disciplines (men and women's singles, doubles and mixed) the results were as follows:

**Table 2.1: Overall results in world level competition 2012-2016 (points system)**

Pos.	Country	Points
1	China	154
2	Indonesia	37
3	Denmark	32
4	Japan	31
5	South Korea	22
6	Spain	17
7	Malaysia	15
8	Thailand	4
9	Russia	4
10	Great Britain	2
11	Chinese Taipei	1
12	Taiwan	1

Note: points based on 4 points for gold, 2 points for silver, and 1 point for bronze.

China is clearly leading by some margin, and although we attempted to recruit them into the research, this proved problematic. For Asia we approached Indonesia (2<sup>nd</sup> place), and South Korea (5<sup>th</sup> place). For Europe we approached Denmark (3<sup>rd</sup> place) and Spain (6<sup>th</sup> place). Thus, the research covered four of the top six world learning nations, including the top two in Europe. The recruitment of these countries, together with the calibre of the experts involved (see below), represents an unparalleled opportunity to explore effective player development systems in a badminton, and indeed, any sporting context.

### 2.2. Country contacts

The research was targeted at the badminton federations in each of the four countries:

Country	Federation	Acronym in report
Indonesia	Persatuan Bulutangkis Seluruh Indonesia, sometimes translated as 'All Indonesia Badminton Association', but are also known as 'Badminton Indonesia'	PBSI
Korea	Badminton Korea Association	BKA
Denmark	Badminton Association of Denmark, also known as 'Badminton Denmark'	BAD
Spain	Federación Española de Bádminton, also known as the 'Spanish Badminton Federation', or 'Spain Badminton'	FESBA

The original target was to identify three contacts for each country:

- The performance director/head coach
- Head of player development/senior junior coach
- Main sport science contact.

In reality, the research was limited to:

- those staff members who occupied these roles, for example, in all countries except for Korea, there was not a dedicated sport science contact
- staff members who had time available and were willing to engage with the research during the fieldwork period.

The research was based on eight main country contacts (Table 2.2).

**Table 2.2: Research respondents**

	<b>Performance director/head coach</b>	<b>Head of player development/senior junior coach</b>	<b>Main sport science contact</b>
<b>Indonesia</b>	Basri Yusuf (1)	Ricky Subagja (2)	N/A
<b>Korea</b>	N/A	N/A	Greg Kim (3)
<b>Denmark</b>	Finn Traerup-Hansen (4)	Bo Ømosegaard (5)	N/A
<b>Spain</b>	David Cabello (6) Fernando Rivas (7)	Fran Dacal (8)	N/A
<b>BWF</b>	Ian Wright (9)		

Note: Please take note of the numbers attributed to each of the research respondents as this will be used to identify quotations in the report. N/A means either no staff in this role in the country or the individuals were unavailable for interview at the time of the research.

All the participants were experienced youth development experts with most having 20 years of experience or more. Many of the names are regarded as world leading experts in youth development both at a national and international level.

## **2.3. Research approach**

The project was based on a three-staged approach:

- Review of the academic literature
- Review of country and federation specific documentation
- Expert interviews.

### **Review of the academic literature**

The literature search and review builds on work already undertaken for the English Football Association (the FA)(North et al., 2012a, 2012b) and Union of European Football Associations (UEFA) on player development systems (North et al., 2014).

A new search was undertaken using the EBSCO platform which includes databases such Academic Search Complete, SPORTDiscus etc., around terms such as 'participant, performer and player development'. Specific searches were also undertaken for badminton and racket sports.

The literature review was used to build a schematic of good practice principles of player development in badminton, which was then used to inform the data collection, data analysis, and, also to provide structure to the presentation of the new data in sections 5-9.

The review is not exhaustive but we believe it provides a representative flavour of the research and its implications for the principles of good practice with regards to player development.

What is clear from the search and review process was the lack of extensive and focused research on player development and player development systems in the context of badminton and indeed other racket sports. Relevant badminton research that was located has been included in the review. Otherwise we have used research which extends across sport. Given the background of the broader project, a number of football examples have been included.

### **Review of country and federation specific documentation**

Prior to each interview, extensive online research was undertaken to identify key strategies, programmes, and learning resources from each of the country federations. This was used to build up an early picture of the country and was used to stimulate questioning at the expert interview stage.

### **Interviews with experts from four world-leading badminton playing nations**

A major part of the research consisted of expert interviews (the sample is noted above).

The BWF helped to identify contacts for each country and to facilitate the setting up of the interviews.

A discussion guide was developed based on the principles emerging from the literature review. Where necessary, this was translated into the native language.

The expert respondents were subject to 11 interviews in total lasting in excess of 20 hours (two respondents were interviewed at one time, one respondent three times). The interviews were conducted in English and Spanish.

The interviews were recorded using a digital audio wma/mp3 recording device. Interviews lasted from 56 minutes to over 3 hours. The expert interviews were conducted between March 2015 and September 2016.

The audio interview data were transcribed into written text. These data were then analysed thematically in the qualitative research package *Nvivo* against the emerging theoretical frame. Similarities with the theoretical frame were noted, and novel data led to adaptations of the frame for badminton. This produced a good practice model for player development in badminton.

The report was written in October 2016.

### 3. Country case studies

#### 3.1. Introduction

To provide context for later sections examining player development systems and how they work in particular country contexts, this section provides a brief high level overview of the main approaches in the four countries – Indonesia, Korea, Denmark, and Spain.

#### 3.2. Indonesia

##### 3.2.1. The country

Indonesia is situated in South East Asia (although some parts are in Oceania) on over 13,000 islands, with just under a 1,000 permanently habited. The biggest islands by land mass are New Guinea (shared with Papa New Guinea), Borneo (shared with Brunei and Malaysia), Sumatra, Sulawesi (formerly Celebes) and Java. With 260 million inhabitants, Indonesia is the fourth most populous country in the world, and by far the most populous country in the study (the next biggest is Korea with just over 50 million). Java alone has a population of 140 million (making it the most populous island in the world), and Sumatra has 47 million. Indonesia is a very ethnically and linguistically diverse country, with around 300 distinct native ethnic groups, and 742 different languages and dialects. It is mainly Islamic (87% of population).

Figure 3.1: Map of Indonesia



Indonesia is a constitutional republic. It is the world's 16<sup>th</sup> biggest economy by GDP<sup>1</sup> but is approximately 100<sup>th</sup> when measured by GDP per capita (purchasing power approach)<sup>2</sup>. In other words, it is not a wealthy country nor is it the poorest; it is just below mid-point. It has a compulsory education system from six to 18 years (introduced in 2013). Its educational philosophy is argued to emphasise rote learning and deference to the authority of teachers (Kuipers, 2011).

<sup>1</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(nominal\)](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal))

<sup>2</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(PPP\)\\_per\\_capita](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita)

### 3.2.2. Badminton in Indonesia

Badminton is the national sport of Indonesia, and competes with football, as the main spectator and participation sport. Although there appear to be no specific estimates of the badminton playing population, it is argued, to be open and accessible to all sections of Indonesian society including young and old, and all ethnic groups (Brown, 2006). One estimate (calculated below) suggests the playing population to be in the tens of millions. Brown, in Hernandez (2009), argues that badminton is a successful sport in relatively less economically developed countries like Indonesia because it has not been subject to the same level of sports science and sports medicine engagement as other sports making it a very accessible sport.

Badminton in Indonesia is administered by *Persatuan Bulutangkis Seluruh Indonesia* (PBSI), sometimes translated as 'All Indonesia Badminton Association', but are also known as 'Badminton Indonesia'. The PBSI's headquarters are in Jakarta (Java) but it works with 34 relatively independent 'badminton committees' covering all Indonesia's major provinces. Each province is subdivided into regencies and cities which are further subdivided into districts.

### 3.2.3. Main mechanisms of player development in Indonesia

The Indonesian player development system is based on a massive playing population, an extensive club and competition structure, talent identification through competition results and rankings, and 'traditional' technically focused coaching.

There are 6545 districts in Indonesia and each is estimated to have about 100 clubs. This suggests around 650,000 clubs in Indonesia. If each club has 100 members, this equates to 65 million players!<sup>3</sup> Each club is argued to have its own traditions and cultures which leads to a genuine variety of playing styles amongst players aiming to reach the elite level.

There is also an extensive competition structure with 10 national 'circuits' covering U12, U14, U15, U17, U19, U21, and open age. There are also six national 'private competitions'. At each event, there are typically around 1000 competitors. The PBSI estimate that there are around 150,000 players engaging with the higher level competition structure in Indonesia.

Coaching plays a central role in the Indonesia player development system. This is described as 'traditional' and 'technical' with a relatively equal relationship balance between coach and player compared to some other Asian countries. The PBSI is pushing a relatively new coach education system based on the BWF approach. Talent identification is organised through rankings at competitions notably at U17 and U19. This is supported by a national academy (Pelatnas) and six large regional clubs who support elite players.

The PBSI is pushing sports science including Long Term Athlete Development (LTAD) (Balyi & Hamilton, 2004; Stafford, 2005), although this aspect has been relatively neglected until recently. There is recognition that to maintain Indonesia's relatively high elite rankings, a more systematic, long-term and sports science focused approach will be required in the future.

## 3.3. South Korea

### 3.3.1. The country

South Korea (the 'Republic of Korea') is an Asian country on the Korean Peninsula – bordered to the North by North Korea (the 'Democratic People's Republic of Korea') and separated from Japan to the east by the Korea Strait and the East Sea.

It has a population of just over 50 million (making it the 27<sup>th</sup> most populous country in the world, and the second largest in the study). Ninety two percent of the country is urbanised, with a very high population density, and over half the population live in high rises. It has an ageing population and low birth-rate with the population expected to decrease to 42 million by 2050. If Indonesia is very ethnically and linguistically diverse

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<sup>3</sup> Note: we are not suggesting there are 65 million badminton players in Indonesia (although this may be the case), rather that the playing population is very large.

country, then South Korea could not be more opposite - it is one of the most ethnically homogeneous societies in the world, with more than 99% of inhabitants having Korean ethnicity.

South Korea is a constitutional republic democracy. It has the 11<sup>th</sup> biggest economy by GDP<sup>4</sup> and about 30<sup>th</sup> when measured GDP by capita (purchasing power approach)<sup>5</sup>. In other words, it is a reasonably wealthy country. This has resulted from exceptionally high growth rates over the last 30-40 years (it is the archetypal 'tiger economy').

Education is very important to South Koreans, with success in the education system being a primary determinant of socioeconomic status. A great deal of resource has been invested by government, families, and individuals in education including schools, the use of technology, and tutoring. It achieves high comparative results for maths and science. However, the education system has been criticised for being very hierarchical, with a teacher centred, didactic style, putting considerable pressure on students and stifling creativity<sup>6</sup>, although there are some disagreements about the latter<sup>7</sup>. The Korean education system extends from pre-school kindergarten (3-6 years), to elementary school (6-12 years), junior high school (12-15 years), and high school (15-18 years). Many students also go to university.

### **3.3.2. Badminton in South Korea**

Badminton is one of the most popular sports in South Korea, below football and baseball in terms of spectator numbers, but very high in terms of participation. There are badminton courts all over the country. Politicians are held in very high regard if they locate and build a badminton facility in the local area. Badminton in South Korea is administered by the Badminton Korea Association (BKA). The BKA has set itself a number of objectives including promoting badminton, regulating the sport, working with and for its members, promoting and facilitating participation for health and inclusion, and organising high performance. Specific tasks included educating coaches and referees, establishing badminton competition and tournaments, and undertaking data collection and research to improve the sport<sup>8</sup>. Interviews with BKA contacts suggest that, although there are current plans to integrate participation 'sport for all' programmes with high performance, most attention to date has been invested in organising and facilitating the high performance system.

### **3.3.3. Main mechanisms of player development in South Korea**

The South Korean player development system is based on an existing and substantial school club system, with a selection to a centralised system based around three national high performance centres starting about 12 years of age. Player are identified through a comprehensive competition structure put in place by the Korean 'sport for all' organisation. Higher level competition is put in place by the federation. Coaches identify players for centralised resources through results, the 'coaches' eye', and test results.

It appears that the school system has emerged free from federation influence with the only chance of influence through coach education which appears to have minimal impact. The federation focuses most of its attention at the top of the player development pathway and on high performance. Significant investment has been made in sports science for this stage including, interestingly, the use of neurological techniques to support player development activities. There was a sense from the research that Korea wanted to 'up its game' in relation to player development activities, for example, examining and investing in a longer-term planning approach seen in other countries.

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<sup>4</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(nominal\)](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal))

<sup>5</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(PPP\)\\_per\\_capita](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita)

<sup>6</sup> <http://theconversation.com/south-korean-education-ranks-high-but-its-the-kids-who-pay-34430>

<sup>7</sup> <http://blogs.worldbank.org/education/education-creative-economy-case-korea>

<sup>8</sup> <http://www.koreabadminton.org/bka/purpose.asp>

### 3.4. Denmark

#### 3.4.1. The country

Denmark is a Scandinavian country, the southernmost and smallest of the Nordic countries, located in Europe. The country consists of a peninsula, Jutland, and an archipelago of 443 islands, with the largest being Zealand and Funen. The islands are characterised by flat, arable land and sandy coasts, low elevation and a temperate climate<sup>9</sup>.

In 2014, the population was recorded at just over 5.5 million<sup>10</sup> (making it the 112<sup>th</sup> most populous country in the world). Denmark has a low birth rate but the population rate is increasing slowly. Denmark is a historically homogeneous nation but has more recently become a nation of net immigration. There are no official statistics on ethnic groups, but according to 2016 figures from Statistics Denmark, approximately 87.7% of the population were of Danish descent, defined as having at least one parent who was born in Denmark and has Danish citizenship. The remaining 12.3% were of a foreign background, defined as immigrants or descendants of recent immigrants<sup>9</sup>. The main religion is Protestant (90% of the population)<sup>10</sup>.

Denmark is a liberal representative democracy, with a unitary parliament, and a constitutional monarchy. Denmark has one of the world's highest per capita incomes, and one of the world's highest personal income tax rates<sup>11</sup>. It is the world's 39<sup>th</sup> biggest economy by GDP<sup>12</sup> and about 19<sup>th</sup> when measured GDP by capita (purchasing power approach)<sup>13</sup>. Again, it is a very wealthy country.

Primary and lower secondary education, from age six to 16, is compulsory in Denmark and all levels of education (including higher education Universities and colleges) are free of charge<sup>14</sup>. The education system in Denmark is known for its innovative learning approaches without compulsory examinations<sup>15</sup>.

#### 3.4.2. Badminton in Denmark

Badminton is an extremely popular sport in Denmark ranked as one of the top three sports<sup>16</sup> (along with handball and football). Although there appears to be no recent specific estimates of the playing population, the delivery system in badminton make it a very accessible for all age groups and abilities. Almost every town has a badminton club and facilities. There are over 550 clubs<sup>17</sup>. Denmark is also the most successful European country for badminton on the international stage.

Badminton in Denmark is organised by the Badminton Association of Denmark (BAD) (founded in 1930). There are eight districts under BAD that primarily focus on non-elite participation<sup>16</sup>.

#### 3.4.3. Main mechanisms of player development in Denmark

Player development is based around a very established club network the dominates Danish badminton and is seen as a key contributor to their performance successes. There is seen to be a high level of organisation and expertise in Danish clubs and especially the 20-30 clubs that have an 'international perspective'. The club network is partnered by a high level domestic competition covering all the age groups. Young players are selected from club programmes about the age of 12 years on to regional programmes, and then national programmes at 14 years.

The Danish federation has a clear view of player development processes based around its 'age related training concept' (BATK) which is informed by accumulated good practice, consultation and research. This has influenced coaching in the clubs as well as national programmes. Coach development and education are very

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<sup>9</sup> <https://en.wikipedia.org/wiki/Denmark>

<sup>10</sup> <http://denmark.dk/en/quick-facts/facts>

<sup>11</sup> <https://en.wikipedia.org/wiki/Denmark#Government>

<sup>12</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(nominal\)](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal))

<sup>13</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(PPP\)\\_per\\_capita](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita)

<sup>14</sup> <https://en.wikipedia.org/wiki/Denmark#Education>

<sup>15</sup> <http://denmark.dk/en/society/welfare/education-for-all>

<sup>16</sup> [http://www.badminton-information.com/danish\\_badminton\\_is\\_europes\\_best.html](http://www.badminton-information.com/danish_badminton_is_europes_best.html)

<sup>17</sup> <http://badmintondenmark.com/cms/?&pageid=1793>



important in Denmark, based around a coaching roles approach, which appears very innovative. There is a strong sense of vision, clarity and coherence within the Danish system.

### **3.5. Spain**

#### **3.5.1. The country**

Spain is a European country located on the Iberian Peninsula in southwestern Europe. It has a population of just over 46 million (making it the 30<sup>th</sup> most populous country in the world). Over 80% of the total Spanish population are made up of native-born citizens. Spain has recently experienced large-scale immigration. Other ethnic groups who had immigrated to Spain include those from Latin America, Africa, and the Philippines (South East Asia), Eastern Europe, North and West African, the Middle East, South Asia and China, as well as citizens from the European Union<sup>18</sup>. There is no official religion in Spain, although nearly 70% of the population are reported to define themselves as Catholic<sup>7</sup>.

Spain is a constitutional monarchy. It is the world's 13<sup>th</sup> biggest economy by GDP<sup>19</sup> and about 33<sup>rd</sup> when measured GDP by capita (purchasing power approach)<sup>20</sup>. In other words, it is another reasonably wealthy country. Although Spain is a unified country, it has 17 'autonomous communities' and two 'autonomous cities', first-level political and administrative divisions, that provide it with almost federal structure. The biggest are Andalusia and Catalonia. Education in Spain is supported by the national government and autonomous communities. State education is free and compulsory from the age of six to 16.

#### **3.5.2 Badminton in Spain**

Badminton is a relatively young sport in Spain, with a relatively low participant base, for dedicated facilities and programmes. This issue has been addressed systematically and strategically by the Federación Española de Bádminton (FESBA), who since the late 1990s-mid-2000s have put in place mechanisms to raise the profile of the sport. This includes attracting badminton world championships to Spain and setting up an increasingly wide spread badminton schools programme 'Fly with Badminton'. There are also a club development programmes. Spanish badminton currently has the women singles Olympic champion, Carolina Marin, which is unprecedented in its history and has been very important for raising the sport's profile.

#### **3.5.3 Main mechanisms of player development in Spain**

It is still early days in the history of the Spanish player development system. What is clear is that has been based on widespread consultation and multi-disciplinary research and a clear model of high performance success. It operates a player centred approach, with a clear player pathway and investment in coaching especially for younger age groups. There is an innovative model of coach development and education. It appears, like Spanish football, to offer selection opportunities for centralised resources earlier than other countries (from around 10 years).

The interesting difference with the Spanish system has been the need to create a participation system on which a player development system can be based. The lack of previous infrastructure has also provided considerable opportunity to develop a forward looking strategy and system based on the innovative ideas of a number of Spanish badminton experts.

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<sup>18</sup> [https://en.wikipedia.org/wiki/Demographics\\_of\\_Spain#Population](https://en.wikipedia.org/wiki/Demographics_of_Spain#Population)

<sup>19</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(nominal\)](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal))

<sup>20</sup> [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_GDP\\_\(PPP\)\\_per\\_capita](https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita)

## 4. Main components of effective player development systems

Our research first for the English Football Association (North et al., 2012a, 2012b), then with Union of European Football Associations (North et al., 2014), and now for the BWF suggests a number of common components of effective player development systems.

These have developed and evolved through the different iterations of the work, but at the current stage of development, they are described as:

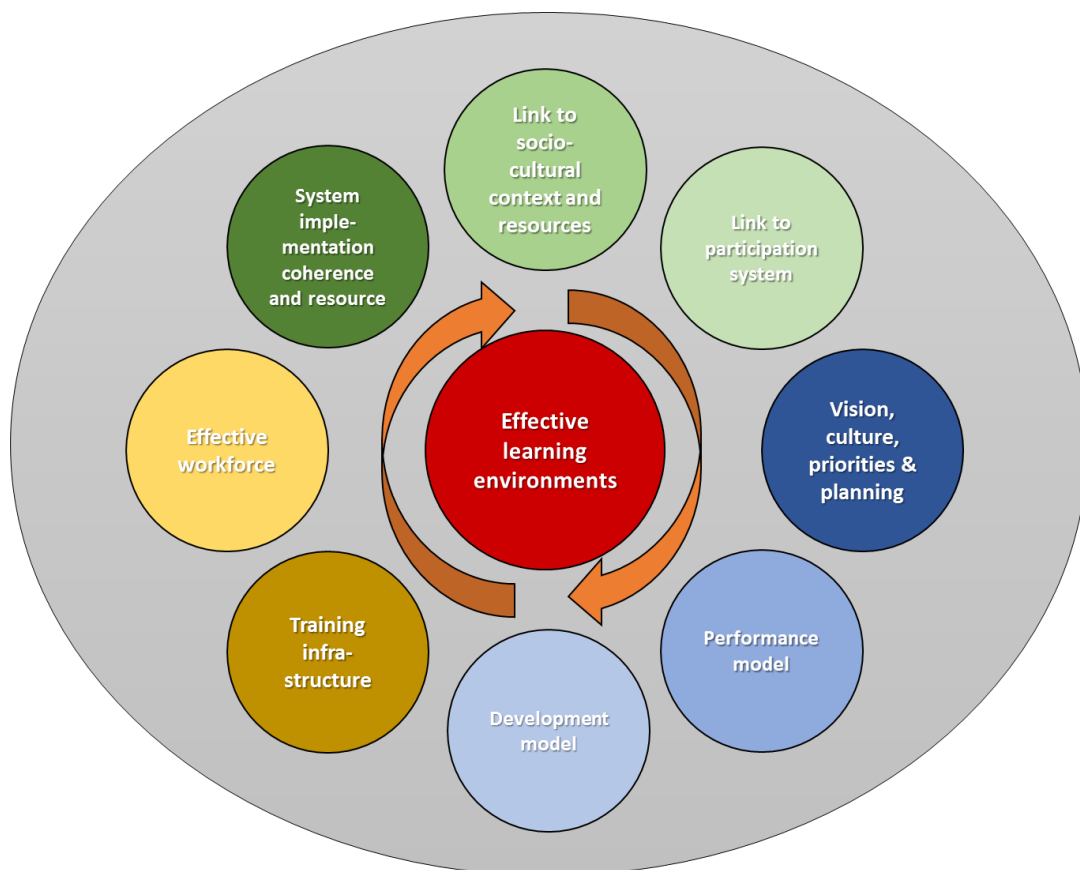
- Link to socio-cultural context and resources
- Link to participation/'sport for all' system
- Vision, culture, priorities and planning
- Performance model
- Development model
- Training infrastructure
- Effective workforce
- System implementation, coherence, and resource.

All leading to:

- Effective learning environments to encourage and facilitate skill acquisition and performance to the elite level.

These are described diagrammatically on the following pages (Figures 4.1 and 4.2).

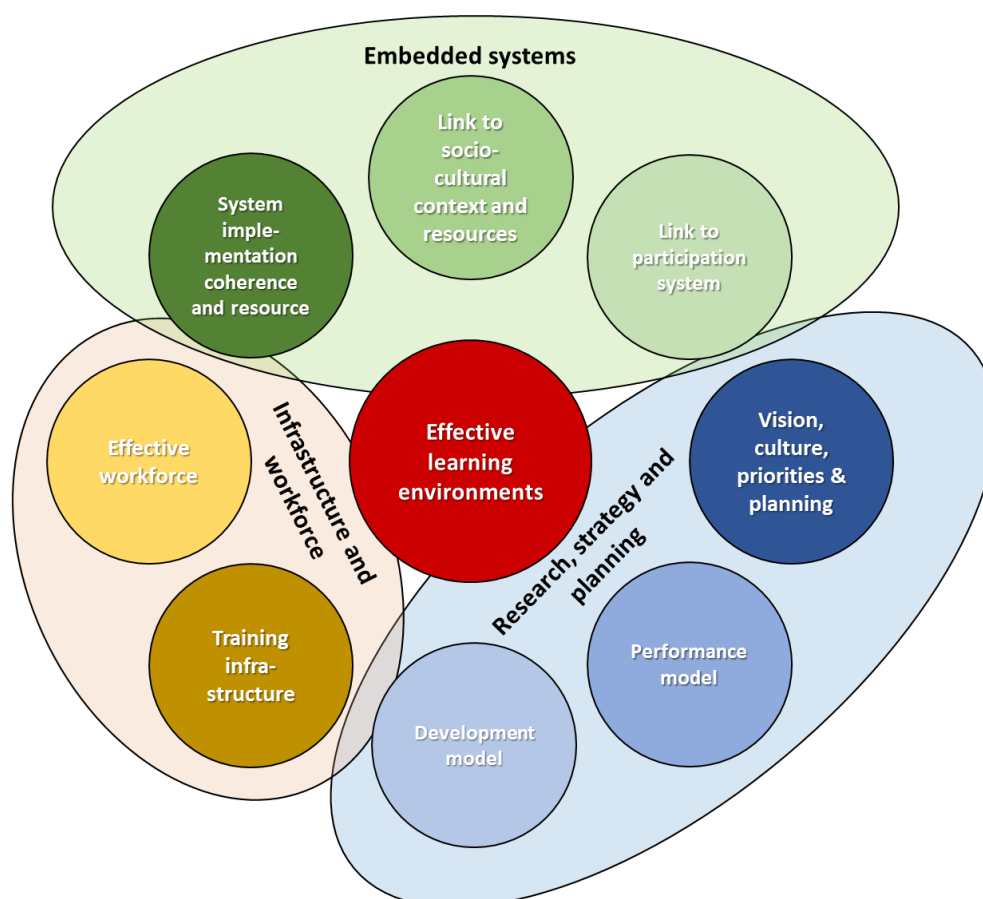
**Figure 4.1: Main components of effective player development systems**



The details of these components will be explored in the report, however, it is useful both conceptually and for presentation purposes (in terms of report structure) to note some similarities and overlaps between components:

<b>Fine gain component</b> (sub-section level)	<b>Aggregated component</b> (section level)
Link to socio-cultural context and resources	Embedded systems
Link to participation/'sport for all' system	
System implementation, coherence, and embeddedness	
Vision, culture priorities and planning	Research, strategy and planning
Performance model	
Development model	
Training infrastructure	Infrastructure and workforce
Effective workforce	
Effective learning environments	Effective learning environment

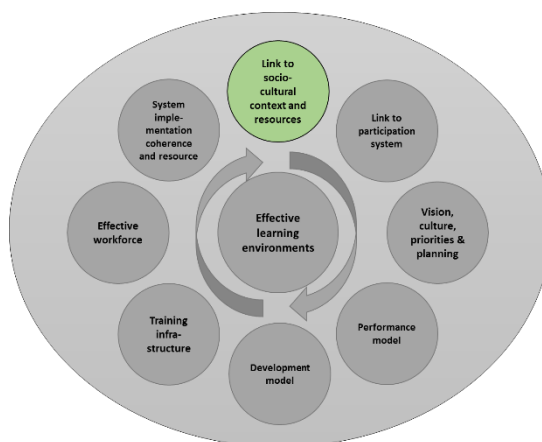
**Figure 4.2: Main components of effective player development systems and aggregated higher level components**



This schematic will be used to organise the sections and sub-sections of the report.

## 5. Embedded systems

### 5.1. Link to socio-cultural context and resources



#### 5.1.1. Underpinning research

There is an increasing recognition in academic research of the need to understand the socio-cultural context and resources available in a particular country, sport, etc. and then embed player development systems appropriately within this (e.g. Abbott, Button, Pepping, & Collins, 2005; Carlson, 1988; Henriksen, 2010; Henriksen, Stambulova, & Roessler, 2010a, 2010b; Larsen, Alfermann, Henriksen, & Christensen, 2013).

This might seem like an obvious point to many undertaking front-line strategic, operational and delivery work around player development, but there are tendencies in both academia and in policy and practice to isolate concepts, to work with ‘universals’, ideas and programmes that are successful anywhere regardless of context, that can be directly and uncritically applied to different contexts without forethought or modification.

For example, a great deal of sport science research tends to focus on atomised elements of the sporting phenomenon, as now discussed: Player development, for example, might be reduced to physical components (e.g. Lloyd & Oliver, 2012) or psychological components (e.g. Hagger & Chatzisarantis, 2007; MacNamara, 2011). These are individual (or sub-individual) reductions rather than conceptualising player development as systemic and social. However, as noted above, the ‘social systemic’ qualities of player development are increasingly being recognised.

In this study we distinguish between two types of embeddedness; socio-cultural embeddedness and spatial embeddedness.

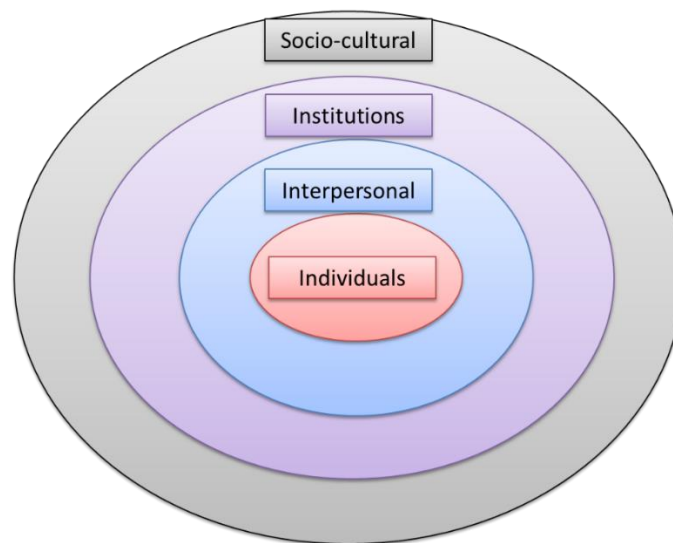
#### Socio-cultural embeddedness

Sport and player development do not exist in a social vacuum. There are many individuals, groups and institutions who work together as part of the player development endeavour. North (2017), for example, describes the contextual factors and resources impacting on performer development systems in kayak slalom in the UK and suggests it is impossible to understand effectiveness in this context without acknowledging contributions at the socio-cultural, institutional, interpersonal and individual levels.

Research by Larsen, Henriksen and colleagues also focuses on the overall organisational context and environment in player development (Henriksen et al., 2010a, 2010b; Larsen et al., 2013). The role of parents, peers, school and immediate social support are clearly very important to sport development (Bruner, Eys, & Turnnidge, 2013; Fraser-Thomas, Strachan, & Jeffre-Tosoni, 2013). There are also very important roles for coaches, assistants, and managers in supporting the overall goals of the sporting context and helping players develop important characteristics and competencies (Henriksen, 2010).

This social embeddedness of player development and coaching is captured in Figure 5.1.

**Figure 5.1: Embedded system of player development and coaching**



### **Spatial embeddedness**

Player development environments are always located spatially.

There is an increasing body of research suggesting that some localities appear more conducive to performer development than others. A review by MacDonald and Baker (2013) suggests that towns and cities with particular population sizes – medium-sized cities ranging 1,000 to 500,000 in population – are more likely to produce high performers because of more access to facilities, a critical mass of players, and access to coaching. Interestingly, research in the US suggests that slightly larger cities – between 500,000 and 1 million inhabitants – are associated with producing more successful soccer players (Côté, Macdonald, Baker, & Abernethy, 2006).

Larsen et al. (2013) note the considerable advantages accruing to one major Danish football club by virtue of its spatial location - large population, many smaller ‘feeder clubs’, with limited and no competition for players from other elite clubs for a radius of 40 km. These factors could feed into decision making about the location of player development environments.

#### **5.1.2. Socio-cultural context and resources in badminton**

An interesting finding from the research was that the country experts were very aware of, and embedded their programmes into, the existing socio-cultural context, resources and arrangements. As one of the experts suggested when asked about the key ingredients of effective player development systems, ‘it’s all connected to the culture you’re living in’ (5). Note: to remind the reader – all bracketed numbers after quotes relate to specific respondents detailed on page 3.

There was a strong sense that what is, or is not, possible within a particular country is strongly linked to existing socio-cultural resources. Particular national attitudes to badminton, participation levels; wider educational attitudes and practices; sport organisations (e.g. club, school, university), infrastructure and facilities; for example, all provide enablers and constraints concerning what is possible in terms of player development activities.

Table 5.1. provides more details of the socio-cultural context in each of the four countries.

**Table 5.1: Social cultural context and resources for badminton by country**

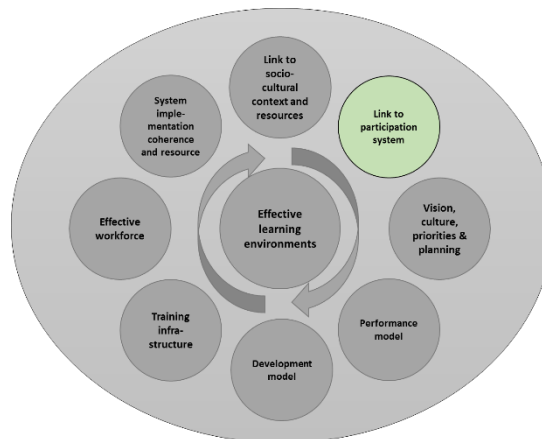
Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Very strong national culture of badminton</li> <li>• It is the number one participation sport – ‘everyone plays, pretty much’</li> <li>• Families are often very keen for their children to progress in the sport, and will often hold their children back a school year so they can secure a slot in the player development system</li> <li>• There is strong culture of education in Korean sports</li> <li>• Many athletes undertake sports science degrees and many get PhDs</li> <li>• Badminton is organised through sport schools - there is little or no club system</li> <li>• “Getting an education, and doing more extra curriculum, or extra studies and other academic courses could be – and probably are - more important to most of the Korean parents” (3) Final reminder – all bracketed numbers after quotes relate to specific respondents detailed on page 3.</li> <li>• Almost all athletes are in education, and most are highly motivated</li> <li>• This creates a context where there is understanding and appreciation of sport science amongst athletes which cascades to coaches</li> <li>• University researchers are engaged with the governing body around sports science</li> <li>• The dominant educational model in Korea emphasises class room provision and is described as ‘more of a lecture’ than problem solving (this was argued to have an impact on the nature of coaching provision)</li> <li>• There is a strong emphasis on exams and passing with high marks</li> <li>• Emphasis is also placed on hierarchy and seniority – with administrators and coaches having considerable power and influence over athlete programmes, and athletes</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Very strong national culture of badminton built on an extensive club system</li> <li>• Badminton is the national sport of Indonesia</li> <li>• Although there are no exact figures, we estimate in section 3, that there could be over 500,000 clubs, with over 50 million regular players!</li> <li>• There are estimated to be 150,000 players engaging with higher level competition</li> <li>• The positive approach towards badminton is argued to be connected to its openness and inclusivity to the many different ethnic groups in the country</li> <li>• There is strong informal, volunteer, and community focus in Indonesian badminton</li> <li>• Each club has its own ‘playing style’</li> <li>• Although not as hierarchical as some Asian countries, the education and the sporting system is still argued to emphasise deference to authority and rote learning</li> <li>• The highly dispersed geography of Indonesia means there are issues communicating key messages and affecting change</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Very strong national culture of badminton built on an extensive club system</li> <li>• Over 550 clubs, 20-30 clubs with an ‘international perspective’</li> <li>• The ‘club system essential to Danish success’</li> <li>• Denmark has a particular socio-cultural and political system which has an important influence on elite and player development systems: <ul style="list-style-type: none"> <li>○ Denmark is a liberal democracy with an important emphasis on individual rights and emancipation</li> <li>○ In the interviews it was noted that ‘Danes are anarchists’ and ‘don’t like being told what to do’</li> <li>○ There is no option of ‘hot housing’ promising youngsters in boarding schools on rigid programmes</li> <li>○ Coaches have to ‘ask’ players rather than ‘tell’ to get the best out of them</li> </ul> </li> </ul>

Country	Detail
Denmark (cont.)	<ul style="list-style-type: none"> <li>○ Danes like to play (compete) rather than train – there is very little practice without a shuttle</li> <li>○ There is a cultural resistance to over-formalisation and writing things down</li> <li>○ There are concerns that player development and high performance system are over-providing for players and that they need to encounter problems and issues to learn how to cope with set-backs and to take responsibility.</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Historically, very low participation base</li> <li>• Current badminton culture largely established by FESBA president, head coach/elite coach and various other important player development experts and coaches</li> <li>• A cutting edge, perhaps even radical, approach has been taken to system design and implementation</li> <li>• There is a sense of considerable opportunity because there is no tradition or structure to negotiate with</li> <li>• Programmes supported by the National Council of Sports, the Secretary of State, with a big institutional backing</li> <li>• Badminton players generally come from badminton playing families, although FESBA are trying to change this</li> </ul>

Note: colour coding on all tables relates to the colours of the country's national flag.

How socio-cultural contexts and resources influence and shape the player development systems, and the kind of enablers and constraints they offer, will be explored throughout the report. However, it is clear that wider education systems in Korea will provide a very different context for player development systems, compared to education systems in Denmark. A thorough research and consideration of existing socio-cultural context and resources by federations is clearly an important part of the development of effective systems.

## 5.2 Link to participation system



### 5.2.1. Underpinning research

If player development systems are concerned with providing resources, environments and opportunities for players who have shown some interest in, or the ability to, compete at higher levels, then the *participation system* provides the more general opportunities for beginners and recreational players of all ages to engage with sport in the first place. These are typically beginner and recreational sessions in sports facilities, schools, clubs etc., which may have very limited formal structure, for example, coaching attached to them. The participation system in effect provides the ‘raw materials’ for the performer development system.

From a research perspective the link between the two systems has not been explored as a positive one. This is because most accounts of player development systems appear to take for granted a robust underpinning participation system. For example, in the UEFA study of European football player development systems the need to nurture the participation system was barely mentioned (North et al., 2014) because football participation was already high in these countries. As we shall note, however, the contribution of the participation system to performer development systems cannot be taken for granted especially in developing nations.

Where research has engaged with this issue, it has been generally to show how performer development and elite performance systems extract resource from, or are disruptive of, participation systems (e.g. Fraser-Thomas, Côté, & Deakin, 2008a, 2008b; Oakley & Green, 2001). Fraser-Thomas et al. (2008a, 2008b), in particular, have argued that drop-out from sport is the result of inappropriate or overly robust player development systems in early age groups.

### 5.2.2. Participation and performer development systems in badminton

Like European football, the linking of participant development and participation systems was not an obvious issue in South Korea, Indonesia and Denmark where there is a considerable societal/cultural tradition of badminton participation and playing.

The main exception was Spain where, historically, there has been no such tradition of, or extensive participation in, badminton. As a result, the Spanish federation have put steps in place to build a participation system to support the sport including performance development. The main elements of the Spanish approach are:

- Attracting and utilising major events to raise the profile of badminton including world championships in Seville in 2001, and Madrid in 2006.
- An extensive schools programme: ‘Fly with Badminton’
- An ‘emerging and talented athletes’ pathway out of schools into clubs
- A club development programme.



These kinds of programme are seen as necessary for countries where there is not an established tradition of badminton participation to provide a supply route for player development.

With regard to the drop-out issue (which is a common problem in Western countries), an interesting discussion emerged with the Korean expert about the link between participation and player development systems. Despite recent policy initiatives seeking a more joined up approach between Korean Sport for All and the Korean Olympic Committee (the details of which were not available at the time of the research), the Korean expert made an interesting point, suggesting that, in a Korean context, the more strategic linkage between participation and performance systems was not necessarily required. Unlike in European football, continued youth and adult participation does not appear to be an issue in Korea with only minimal drop out and a considerable emphasis on returning to take advantage of the social benefits of sport. It was recognised that currently most sport agencies were concerned with high performance. This suggests a more strategic systems approach may not be necessary to address drop-out issues.

However, as a result of discussions emerging through the research process, the Korean expert expressed concerns about the longer-term outputs from the player development system i.e. talented and winning performers. It was recognised that establishing a longer-term planning system which links children's participation and early sporting experiences with future performance success needs some careful consideration. Some of the principles highlighted in this document may be useful to this end.

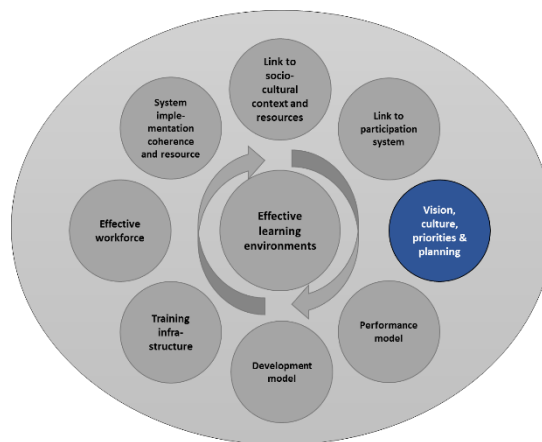
**Table 5.2: Participation and performer development systems in the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Badminton is one of the top two spectator and participation sports in South Korea</li> <li>• There are very few concerns about drop-out from the badminton due to its wider societal/social benefits</li> <li>• The participation system provides significant numbers to the player development system</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Very strong culture of badminton playing in Indonesia</li> <li>• The participation system provides significant numbers to the player development system</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Very strong national culture of badminton built on extensive club system</li> <li>• The participation system provides significant numbers to the player development system</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Historically, very low participation base</li> <li>• Badminton is a 'very young sport in Spain'</li> <li>• 236 clubs in in Spain, 7980 registered players</li> <li>• Spanish badminton clubs typically work with youngsters 'who other sports do not want'</li> <li>• Considerable strategic work undertaken to build participation base to provide for player development system</li> <li>• 'Fly with badminton' established to build a 'bigger pyramid base' through engagement with primary and secondary school PE curriculum, and to encourage school-club links</li> <li>• PE teachers invited to engage with badminton and provided a training programme by experienced coaches and equipment</li> </ul>

If the BWF wishes to grow the sport and have more nations competing for top honours in international competition, it needs to consider carefully the link between participation and player development systems.

## 6. Research, strategy, and planning

### 6.1. Vision, culture, priorities, and planning



#### 6.1.1. Underpinning research

There has been very little academic research on vision and strategy development in the context of player development systems other than acknowledging that adopting a strategic approach is important (e.g. Martindale, Collins, & Daubney, 2005; North et al., 2014). For example, Martindale et al. (2005) suggest to system builders that they should develop a long-term vision, purpose and identity, backed by systematic planning and implementation, that is monitored throughout the delivery chain. They also make strategic recommendations (based on research evidence) for specific components of the player development system, for example, with regard to the development model, using age-stage approaches etc.

There has been considerable analysis of the use and problems of a strategic approach in wider participation systems and high performance (e.g. Green & Houlihan, 2005; Green & Oakley, 2001; Oakley & Green, 2001). In sports administration, and notably in sport coaching, there has also been an increasing use of 'framework' approaches which set-out the characteristics of world leading systems (ICCE, ASOIF, & LMU, 2013).

In the UEFA study on European football player development systems (North et al., 2014), a very important finding was the centrality of having a clear defined vision, culture, priorities and planning for effective player development system typically developed and orchestrated by the federation/governing body. In badminton, the BWF's 'player pathway programme' (PPP) provides guidance on the key strategic aspects of player development systems building.

#### 6.1.2. Vision, culture, priorities and planning in badminton

In the current study, all country contacts recognised the importance of a centralised vision, clear cultural framework, priorities, and plan, but there were different levels of attention to this, and ultimately implementation, between Europe and Asia.

#### **'Systems' – the case of Asia and Europe through the eyes of Spain**

"In Indonesia, even in China, badminton is the no. 1 sport ... this is a big culture ... you have millions of kids playing badminton ... In many countries in Europe you ... need a system. You need to compete with other sports, first of all (in the same country), that's the first step. So if you don't have a system, there is no winning. I have to fight with many other sports just to try to identify the talent, and to get the talent. Because if you are a talented player, you want to be a football player in Spain, or a tennis player" (6)

The European countries were much stronger on centralised vision, culture, priorities and planning than the Asian countries. For example, Denmark had a clear but evolving vision for badminton development and performance, as well as establishing a clear cultural framework to underpin these activities. These were formally written up in various strategic plans and development documents. In Spain, a 'systems approach' had been adopted relatively recently. In the late 1990s, and into the 2000s, the president and head coach of the federation led a comprehensive review and strategic development exercise which eventually led to a 'root and branch' review of participation, performer development, and high performance systems. This led to a number of key programmes: a schools based 'Fly with Badminton' and talent identification programme 'Looking for a Champion' supported by a regional and national network of facilities and coaches and high performance support. It has also led to the prioritisation of U15s, and an emphasis on coaching, and coach education and development.

#### **Vision and planning in the Spanish system**

"We set up a strategic plan for the first time in Spain - not only for high-performance, but also the other areas of the federation. And it was developed with the team, with all the people who were involved at that time ... we did an analysis of the environment, and we also did an analysis of the high performance in badminton ... we engaged the regional federation to get the feedback. So it was also very important for us to... we defined, theoretically the future structure in 1999 and 2000. It was two years trying to find the right theoretical future, and at that time we also started working with the strategic plan to ensure that we could find the right strategies to be implemented to transform the theoretical view in a practical strategy, to ensure that finally we could do some actions to implement and to construct the theoretical approach ... you can see that it's not luck, there is a lot of planning, a lot of analysis, evaluations" (6)

Although the Asian countries acknowledged the importance of a centralised vision, strategy, and planning this was much less developed than in Europe. The Asian countries appeared to rely more on high 'mass' participation levels, and existing 'traditional' systems of player development and coaching, whilst, interestingly, suggesting that this approach was not a viable long-term strategy and a more coordinated long term approach was required.

The Korean federation, for example, did not have a wide-ranging vision for its player development system beyond taking advantage of an existing emergent institutional arrangement based on a schools programme from U13 to U19, a competition structure, and some modest interventions in coach education. The Korean contact suggested, for example, 'I think our association does not really push our coaches who are coaching the youngsters' (3). There was considerably more interest and investment in national level high performance programmes, and increasing the use of sports science (especially near the top of the pathway). This, it was recognised, did not amount to a long-term systematic approach to player development and that this was 'big homework for countries like Korea' (3). There was a sense that the 'talent pool is drying up' and that a more forward looking strategic planning approach is becoming more imperative.

In Indonesia, there was a strong, informal, culture of badminton organisation, which as elite level competition results highlight, is very effective. The culture was based around the clubs, the coaches and the players using traditional coaching methods, but with a spirit of fun, variety and innovation. The federation, however, were aware of wider developments in professional and elite sport, and within world badminton, which has led to reflection on systems and how they may develop. There has been an attempt within Indonesia to promote a more systematic approach to player development, at least partially based on the work of Istvan Balyi (e.g. Balyi & Hamilton, 2004; Stafford, 2005) and Jean Côté (e.g. Côté & Lidor, 2013a). The PBSI have also adopted and adapted the BWF's coach education template as a basis for their own system. Finally, the federation have put in place a nationwide 'extranet' to communicate with, and seek to influence, coaches across the many islands and cultures of Indonesia.

### The PBSI wants to incorporate sports science into its player development programmes

“In Indonesia, the players, the talent is very good, and the coaches (former players) also good. And the technical knowledge is also very good ... but now we need to think about sports science. So, in other countries like Japan they use cameras, and they do the performance analysis. We cannot rely on the last previous, just producing champions and champions, because when we lose we have to know why is this? When the players and coaches know their strengths and weaknesses they learn. So we have to change the coaches’ mindset. But this is not easy” (1)

**Table 6.1: Vision, culture, priorities, and planning in the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• There appears to be a twin track strategic approach in Korea</li> <li>• The participation and performer development systems (up to national level camps and squads) appear to be reasonably self-sustaining. This is based on an existing schools/education programme, and some coach education</li> <li>• Most strategic developments appear to have occurred around the top of the player development pathway, and at the high performance level, with the strong integration of sports science being a key direction</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Emerging vision and strategy in Indonesia seeking to influence behaviour change in a very large, disperse, informal and traditional system</li> <li>• Key focus has been on long-term athlete development, improving the quality of coach education, and more systematically communicating with coaches</li> <li>• Vision and strategy are still relatively new, so time will judge whether it is successfully embedded and starts to achieve results</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• A clear vision, culture, priorities, and planning in place</li> <li>• ‘A clear vision that everyone can get behind ... in documents and in your head’ (4)</li> <li>• ‘Simple enough to understand and operationalise’ but also ‘flexible and dynamic’ (4)</li> <li>• For Denmark this includes a series of strategic ‘master plan’ and ‘elite plan’ documents, and the BATK development concept (see section 6.3.3.2)</li> <li>• These vision and strategic documents are widely disseminated to clubs and coaches are given the task of implementing this</li> <li>• Performance targets are also set for age group and elite competition</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• A clear strategy for participation in the sport, emerging athletes, performer identification and development, and high performance</li> <li>• High levels of research and consultation; the use of ‘multi-disciplinary’ research to inform thinking</li> <li>• All information contextualised to fit Spanish context and to develop ‘a Spanish approach’</li> <li>• Strategy and operational approach communicated to clubs and coaches</li> <li>• Clear implementation plan developed for each programme</li> <li>• Targets for age-group numbers to support player development and high performance systems</li> <li>• System judged by participation numbers and performance at age group competition</li> </ul>

### 6.1.3. Informing the vision, culture, priorities and planning

In the UEFA study on football player development systems (North et al., 2014), it was noted that the countries involved relied heavily on knowledge generated within the sport by national technical leads, academy directors, and head coaches, for example, to inform strategic and operational thinking. However, there were

also examples of wider consultations of clubs and 'lower level' coaches, as well as engagement with academic researchers.

In the badminton study, there was evidence of similar information gathering and consultation approaches. For example, in Korea, the federation had established partnerships with the Korean Institute of Sport. There were also many university based sports scientists seeking to support player development programmes. Partnerships and programmes had been established around physiology, interestingly, the neurological brain scanning of athletes, and psychology.

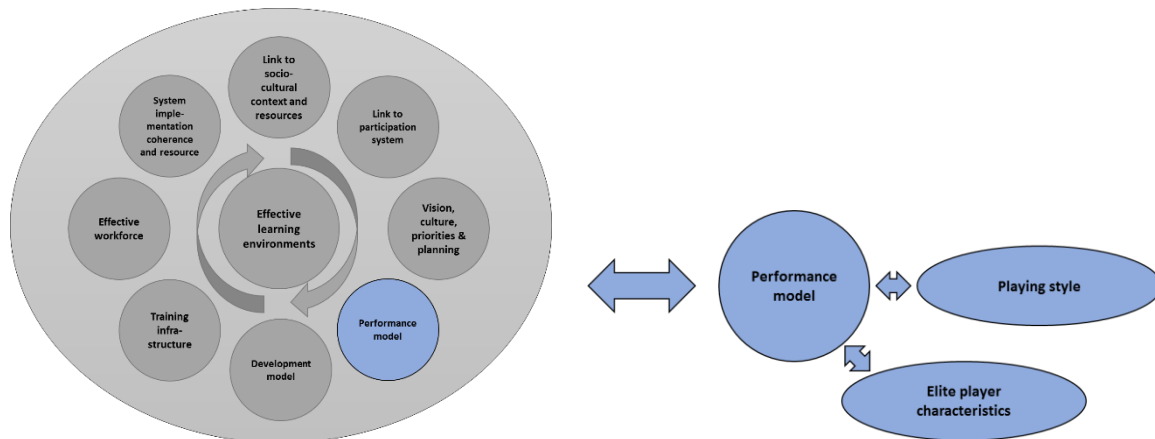
In Indonesia, the performance director was attempting to reshape the player development system based on the application of principles from Istvan Balyi's long-term athlete development (LTAD) and Jean Côté's developmental model of sports participation (DMSP). He notes: "When I was at Singapore sport school they came and give their presentation. I've combined these two ideas for the Indonesian system – they are not really different – Istvan has his stages, train to train etc. and Côté has his stages: sampling, investment and specialisation. For our long-term athlete development I try to modify these two models ... They are not so different" (1)

In Denmark, the compilation of the strategic documents and development concepts made considerable use of in-house expertise, but also wider consultation – 'all coaches are encouraged to contribute, to take ownership' (4). There was also considerable academic input.

In the Spanish system, in the context of building a new system on limited foundations, a significant emphasis was placed on establishing 'open minded' expert individuals from the sport to lead the new system. This was then backed up by extensive research, study-visits, and benchmarking both inside and outside Spain, and inside and outside the sport of badminton, to identify the best practice examples. Considerable use was also made of academic 'scientific' research notably drawing together insights from a 'multidisciplinary point of view' (7). The Spanish approach also undertook considerable consultation with coaches from within the sport.

There is a strong sense that effective systems, and the personnel that design, implement and operationalise them, need to be open minded to knowledge from outside the country and the sport, including the incorporation of good practice from other sports and research/sports science knowledge.

## 6.2 Performance model



There is increasing recognition in business, sports administration, sport performance, and now in player development, about the value of having a clear view of what constitutes elite success, which then acts as a guide to all other system components. Recent successes in British Cycling at the Olympics and Tour de France have been attributed to having a clear model of success (Denyer, 2013). This view is what we call the performance model. The performance model is typically broken down into two components: playing style and elite player characteristics (North et al., 2014).

### 6.2.1. Playing style – underpinning research

In the UEFA research on football player development systems, successful countries had clear views about playing style typically linked to playing identity, playing principles and playing systems (North et al., 2014; North, Lara-Bercial, Patterson, Rongen, & Duffy, 2015).

The limited research on badminton rarely offers a conclusion on what playing styles are most effective but provides an assessment of the playing style characteristics of successful players e.g. number of winners through shot selection (e.g. Hong and Tong, 2000).

Research analysing the elite game has examined a range of issues: analysing playing patterns (Hong and Tong, 2000, Oswald, 2006); comparisons between elite and novice performers (Ooi et al., 2009, Andersen et al., 2007), and the change in playing patterns following the onset of rule changes (Chen and Chen, 2008, Chen and Chen, 2011). General conclusions have been drawn from these highlighting that successful performers at the elite level produce more winning shots from every area of the court and produce longer rallies.

### 6.2.2. Playing style in badminton

Playing style was much more difficult to distil and differentiate in a badminton context than football, although the four country experts understood the value of this kind of analysis. The difference with football was attributed to the greater degrees of freedom associated with individual sports when compared to team sports. An understanding of what it takes to win elite competition was focused more on individual player characteristics and capability, the quality of the opposition, and the competition context e.g. place and level.

Each country appeared to have a general view of the performance model required for success – although this was seldom written down. It was more informally shared and discussed, for example, between the performance director, head coaches and players.

In Korea, playing style was associated with a more physical, disciplined, and determined approach. The Indonesia playing style was argued to be highly dependent on the individual player, and the club they emerged from, with a plethora of styles noted throughout the country. The Danish experts suggested their style was

associated with a more tactical, intelligent, and deceptive game. Spain suggested they built on both the Asian and Danish models whilst recognising their own national hues and preferences.

There was a much greater reliance on individual player and opposition analysis when compared to football. This might be stimulated by a bad performance at a competition, or attempting to find the next innovation in playing style, for example, connected to the serve. “The game changes, so that it’ll be a dynamic system all the time, and in some ways what we’re trying to do is to find solutions to break the code of something that we can’t achieve” (4). There was also a sense of ‘individual plans for individual performances’.

In Spain, a distinction was made between strategy in game situation, and tactics that were used as part of the strategy. Spain also noted the indivisibility of tactics from technique: “if you don’t have the technique you cannot have tactic, it’s indivisible. Badminton has evolved because there are new players using technical tools that allow new tactical approaches. From the very first moment that I give a racket to a kid, it’s all tactics” (7).

Ultimately, there appear to be too many variables and too many degrees of freedom within badminton to suggest one playing style guarantees success. What is clear is that particular player characteristics (discussed below) employed in the most effective and efficient manner relative to the opposition, increases the chances of competitive success.

**Table 6.2: Playing styles in the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Style depends on head coaches, who s/he is coaching i.e. the player, and the opponent</li> <li>• However, there is strong focus on physical and mental preparation rather than on technical skills and tactics</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Style depends on players, coaches, and clubs</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Danish playing style focuses on technical skills and tactical variation and improvisation; clever/elegant/beautiful shot making, deception and artistry</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Significant emphasis on performance analysis</li> <li>• ‘What do the best athletes have in common today, what do we think they will have in the future?’ (8)</li> <li>• ‘We analyse the situation in world badminton; we see what happened in all the medals from 1992 to 2008’ (8)</li> <li>• Rejection of tradition and emphasis on innovation (in playing style and training methods)</li> <li>• Argued to be based on the best elements of the Asian and Danish style</li> <li>• However, this is not copying: ‘from the moment we are copying other models, we are left behind’ (7), but an attempt to build on them, but also adapted to Spanish culture</li> <li>• Less physical than the Asian approach, and more located ‘in the technical-tactical location’</li> <li>• The head coach generated a large Excel worksheet of the typical shots made by the best badminton players around the world. This was used to build tactical knowledge for competition success</li> <li>• The head coach talked about ‘spider webs’ – ‘putting the opponent in a technical, tactical position he/she cannot get out of’</li> <li>• There was a sense that the game is getting faster and ‘more direct’</li> </ul>

#### 6.2.4. Elite player characteristics – underpinning research

In the UEFA research, a number of countries considered their playing philosophy and style and made a formalised assessment of the kind of elite players they needed to win competitions using these philosophies/styles (North et al., 2014).

A clear view on elite player characteristics was seen as providing a context for the development of players. In football, these were generally defined in terms of physical, psychological, social/lifestyle, technical and tactical (PPSTT) characteristics. For example, players should be physically fit, strong, fast, flexible; psychologically motivated, willing to learn, resilient; technically skilful; and tactically astute.

In football there was a particular emphasis on elite level psychological characteristics, and then technical and tactical considerations. Physical and social/life style characteristics were mentioned to a lesser degree.

Within the context of the UEFA study, however, there were also concerns about this kind of formalised 'listy' approach:

- Some countries thought playing principles and playing style were important considerations for sharing with coaches and players
- The over-formalisation of lists was seen as being restrictive and reducing innovation in the player development system
- 'Ideal list' were not reflective of the reality of players who are often strong in some areas and not in others.

Most countries however either explicitly or implicitly adopted a clear position on the types of players they wanted to produce based around PPSTT considerations.

Wider research has identified a range of desirable athlete characteristics that enable a high level of performance and to a considerable extent also facilitate development – although most of the research is from outside badminton/racket sports.

Table 6.3 provides some indicative references for each of the PPSTT characteristics. The headline results of this research are captured in Table 6.4. This sub-section should be viewed as complementary to the later sub-sections on age-stage and holistic development; it attempts to describe the finished article (the 'ultimate' player playing at the elite level); the later section goes into more detail about their development. This could be viewed as the difference between outcome and process.



**Table 6.3: Selected references supporting PPSTT characteristics**

Characteristic	Selected References
Physical/physiological	There is a growing literature on physical and physiological characteristics of elite badminton players (e.g. Andersen et al., 2007; Badminton England., 2005; Badminton England., 2011; Cabello et al., 2004; Cabello and González-Badillo, 2003; Cronin et al., 2003; Faude et al., 2007; Fuchs et al., 2014; Gucluover and Esen, 2013; Hong et al., 2014; Hu et al., 2015; Huang et al., 2014; Jeyaraman et al., 2012; Lees, 2003; Lei et al., 1993; Lin et al., 2007; Ooi et al., 2009; Phomsoupha and Laffaye, 2015; Singh, 2011; Subramanian, 2013; Tiwari et al., 2011; Van Lieshout and Lombard, 2003; Yadav and Urs, 2014).
Psychological	There is an increasing attention in the research literature to psychological characteristic of elite badminton players (Badminton England., 2005; Callow et al., 2001; Dadkhah et al., 2013; Gencer, 2010; Gencer and Ilhan, 2012; Khan et al., 2011; Lees, 2003; Munzert, 2008), <u>and especially</u> elite sportsmen and women in general (Barker-Ruchti, Barker, Rynne, & Lee, 2012; Button, 2011; Durand-Bush & Salmela, 2002; Ericsson et al., 1993; Finn & McKenna, 2010; Gould, Dieffenbach, & Moffett, 2002; Hodges & Baker, 2011; Holt & Dunn, 2004; Jackson, 1996; Jonker, Elferink-Gemser, & Visscher, 2010; Kreiner-Phillips & Orlick, 1993; Lens & Rand, 2000; MacNamara & Collins, 2012; Mills, Butt, Maynard, & Harwood, 2012; Orlick, 2007; Orlick & Partington, 1988; Sagar, Busch, & Jowett, 2010; Van Yperen, 2009; Ward, Hodges, Starkes, & Williams, 2007).
Social	There is an increasing attention to social characteristics of elite sportsmen and women more generally (e.g. Baker, Horton, Robertson-Wilson, & Wall, 2003; Bloom, 1985; Carlson, 1988; Holt & Dunn, 2004; Wylleman & Lavallee, 2004) and in badminton (Badminton England, 2005; 2011).
Technical	There is increasing attention to technical characteristics of elite badminton players (Bankosz et al., 2013; Huynh and Bedford, 2011a; Phomsoupha and Laffaye, 2015; Shanti et al., 2013; Wang and Liu, 2012; Yadav and Urs, 2014; 2011b, Zemková and Hamar, 2014).
Tactical	Tactical characteristics have been researched and identified mostly when highlighting the differences between elite and novice levels (e.g. Abernethy and Zawi, 2007; Badminton England, 2005; Badminton Canada, 2009; Bankosz et al., 2013; Cabello & González-Badillo, 2003; Wang and Liu, 2012; Vu Huynh & Bedford, 2011). There has been analysis of the 'logics of the game and tactics associated with them' (e.g. Duarte et al., 2012; Elferink-Gemser et al., 2004; Gréhaigne, Godbout, & Bouthier, 2001; Richards, Collins, & Mascarenhas, 2012). Also, decision making (Diaz del Campo, Villora, Garcia Lopez, & Mitchell, 2011).

**Table 6.4: Player characteristics at the elite level identified through research**

	Physical/ Physiological	Psychological	Social/lifestyle	Movement/technical	Tactical
What the elite level game is like:	<ul style="list-style-type: none"> <li>Short bursts of very high level physical intensity at a rapid pace - consistent sudden changes in direction, lunges, jumps and short sprints</li> <li>The game expects high levels of physical fitness and endurance - matches typically last 45-60 minutes.</li> </ul>	<ul style="list-style-type: none"> <li>Is highly pressurised during practice and competition</li> <li>This requires a number of highly developed psychological characteristics</li> </ul>	<ul style="list-style-type: none"> <li>Dedication, lifestyle management</li> </ul>	<ul style="list-style-type: none"> <li>Exceptionally movement literate and technically skilled players</li> </ul>	<ul style="list-style-type: none"> <li>Tactics vary according to player, opposition, and context</li> </ul>
Elite players will typically have <u>high levels</u> of the following characteristics and competencies:	<ul style="list-style-type: none"> <li><u>Strength</u></li> <li><u>Power</u></li> <li><u>Muscular Endurance</u></li> <li><u>Speed</u></li> <li><u>Anaerobic Fitness</u></li> <li><u>Aerobic Capacity/endurance</u></li> <li><u>Flexibility</u></li> <li><u>Hypertrophy</u></li> </ul>	<p><b>Psychological characteristics that benefit the individual</b></p> <ul style="list-style-type: none"> <li><u>Ambition</u> - a desire to become a great player</li> <li><u>Motivation</u> - especially intrinsic motivation, love of the game</li> <li><u>Effort and commitment</u> - engagement, investment, work ethic, determination to succeed</li> <li><u>Awareness</u> - high level of awareness of self in all contexts; realistic performance evaluation; strengths and weaknesses and acts accordingly</li> <li><u>Attentiveness and focus</u></li> <li><u>Vision</u> - knowing what it takes to succeed, goal setting; planning, effective and appropriate imagery use</li> <li><u>Discipline</u> - dedication, taking responsibility, sacrifice, self-control, concentration, distraction control, delaying gratification</li> <li><u>Resilience</u> - mental toughness, perseverance, anxiety control, coping strategies (with and under pressure), responding to setbacks appropriately</li> <li><u>Character</u> - attitude, identity, ability to understand and position the self and influence social environment</li> <li><u>Knowledge, understanding, and appropriate attribution</u> e.g. about competition management</li> <li><u>Confidence</u> - self-belief, self-reinforcement (measured, not arrogant)</li> </ul>	<p><b>Social characteristics that benefit the individual</b></p> <ul style="list-style-type: none"> <li><u>Supportive and educated parents</u> informational, emotional and practical; who understand the player development/ performance environment</li> <li><u>Supportive important others</u> - partner, friends, team-mates, coaches, club officials, broader social connections</li> <li><u>Access/exposure to player development resources</u> - facilities, coaching</li> </ul> <p><b>Lifestyle characteristics and competencies</b></p> <ul style="list-style-type: none"> <li>Development of knowledge about nutrition and hydration</li> <li>Development of the understanding of training diaries and evaluation</li> <li>Rest and recovery</li> <li>Injury management</li> <li>Managing finances</li> <li>Anti-doping control</li> </ul> <p><b>Social characteristics that benefit the club/team</b></p> <ul style="list-style-type: none"> <li><u>Team spirit and cohesion</u></li> <li><u>Team work</u></li> </ul>	<p><b>Fundamentals of movement</b></p> <ul style="list-style-type: none"> <li><u>Agility</u></li> <li><u>Balance</u></li> <li><u>Coordination</u></li> </ul> <p><b>Fundamental movement skills</b></p> <ul style="list-style-type: none"> <li><u>Stability</u></li> <li><u>Object control</u></li> <li><u>Locomotion skills</u></li> </ul> <p><b>Fundamental sport skills and sport-specific skills</b></p> <ul style="list-style-type: none"> <li><u>Movement</u> - movement around the court, footwork patterns, increased agility (changes of direction in response to a stimulus e.g. opponent's movement or shot)</li> <li><u>Lunge</u> - the lunge makes up 15% of elite level badminton matches. High levels of speed and anticipation to take the shuttle early</li> <li><u>Reaction time</u> - simple and complex - choice and differential</li> <li><u>Serve</u> - long, short, high, low and drive, execution of racket speed and technical shot through the use of arm and wrist</li> <li><u>Stroke play</u> - the smash, the clear, the drop, the net shot, the lift, backhand and forehand and <u>serve</u>; execution of racket speed and technical shot through the use of arm and wrist. Shots are executed accurately and consistently at a high pace with key precision of shuttle placement.</li> </ul>	<ul style="list-style-type: none"> <li>Event specific tactical concepts, awareness of own and opponent's strengths (technical, tactical, physical and mental),</li> <li>Individual tactical concepts linked to strengths and weaknesses</li> <li><u>Ability to self-analyse</u> - positive and negative aspects of performance</li> <li><u>Tactical planning</u></li> <li><u>Ability to analyse opponent's game</u></li> <li><u>Early and accurate anticipation of opponents' strokes</u> (type, direction) through identifying arm and racket positions.</li> <li><u>Anticipation of opponents' movements</u></li> <li><u>Pick up of cues from opponents</u></li> <li><u>Court placement</u> - of shots in accordance with opponents positioning.</li> <li><u>Strategy</u></li> <li><u>Recognising threats.</u></li> <li><u>Game knowledge/Intelligence.</u></li> <li><u>Recognising opponents' weaknesses</u> - e.g. weak backhand from deep drive serve.</li> <li><u>Decision-making</u></li> <li><u>Creativity</u></li> <li><u>Risk management</u></li> </ul>

	Physical/ Physiological	Psychological	Social/lifestyle	Movement/technical	Tactical
		<ul style="list-style-type: none"> <li>• <u>Competitiveness</u> - intensity of performance, a desire to win</li> <li>• <u>Desire to learn/improve</u> - identify and work on weaknesses; receptive to knowledge; growth mind-set</li> <li>• <u>Effective learning</u> - listens, observes, discusses, thinks, understands concepts and ideas quickly, reflects</li> <li>• <u>Seeking out learning/practice opportunities</u></li> <li>• <u>Evaluating performance and imagery</u> problem focused, aware of, seeks feedback on, strengths and weaknesses; uses imagery to construct performances</li> <li>• <u>Self-regulation</u> including use of planning</li> <li>• <u>Enjoyment and 'flow'</u> (enjoyment does not appear to be a necessary part of performance though it does appear to mediate motivation and commitment)</li> <li>• <u>Consistency</u> (staying there)</li> </ul> <p><b>Psychological characteristics that benefit the wider team (and by default the individual)</b></p> <ul style="list-style-type: none"> <li>• <u>Leadership</u></li> <li>• <u>Awareness of others</u> - empathy</li> <li>• <u>Caring</u></li> <li>• <u>Humility</u></li> <li>• <u>Responsibility</u></li> <li>• <u>Solidarity</u></li> <li>• <u>Respect</u></li> <li>• <u>Communication</u></li> <li>• <u>Social skills</u></li> </ul> <p><b>Psychological characteristics related specifically to the sport e.g. knowledge of the sport, game understanding, and decision making are overviewed in the 'tactical' column.</b></p>	<ul style="list-style-type: none"> <li>• <u>Collective responsibility</u></li> <li>• <u>Community understanding and integration</u></li> </ul>	<p>Deception and disguise through racket and arm movements</p> <ul style="list-style-type: none"> <li>• <u>Shuttlecock control</u> - speed, velocity and spin</li> </ul>	

#### **6.2.4. Elite player characteristics in badminton**

The results from the four badminton countries clearly show the identification of elite player characteristics across the five PPSTT areas (Table 6.5). This aligns with many of the characteristics identified through research in Table 6.4.

There was an interesting variation of profile and emphasis between countries, however, reflecting the discussion of playing style in the previous section. For example, there was more of a targeting of physical and psychological characteristics in the Asian countries, often using separate physiology and psychology experts, and sports science tests. The technical and tactical development of a player was not an area targeted to a significant extent by the federations and was generally left to the players, coaches and clubs. This was different in Denmark and Spain where there was much more discussion of technical and tactical specifics e.g. good footwork, loose grip, 'beautiful stroke production', and game intelligence.

The differences appeared to reflect the different traditions and histories in the countries, and what was culturally acceptable in terms of targeted characteristics. For example, it might be culturally acceptable in South Korea for players to undertake extensive physical preparation programmes, but this does not appear to fit quite as well with Danish culture – with players preferring to use 'racket and shuttlecock' in training.

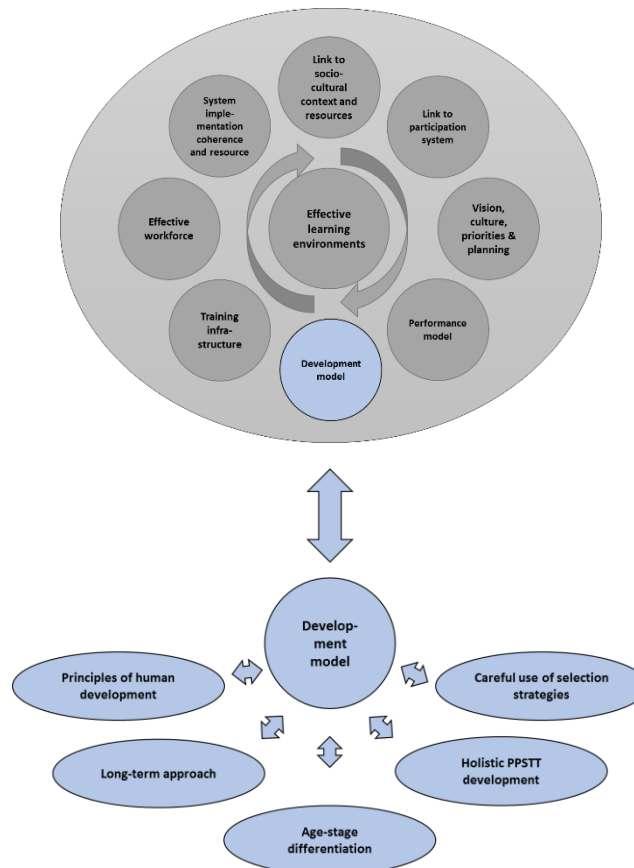
It was also interesting that in the badminton study, there was not the same level of drive towards formalised lists of elite player characteristics as in wider research, and indeed, in football, although clear views on important characteristics emerged through discussion (and were clearly discussed between coaches in the four countries).

It was recognised that such lists could be generated and that this might be useful: 'I'm sure if we had, like, a psychologist or sociologist sitting next to us that we'd be able to start to formalise things like that, and it could be a helpful tool' (4). The experts suggested that they could be useful to understand the 'basics' of player development that could then be built upon by the players and the coaches to reflect individual situations, or to stimulate discussions around selection perhaps where there is a disagreement between selectors that needs to be resolved. The Korean Institute of Sports Science had produced a generic (across) sport player characteristics document for talent identification and development which had been applied in badminton.

**Table 6.5. Elite player characteristics across the four countries**

Country	Physical/ Physiological	Psychological	Social/lifestyle	Movement/technical	Tactical
<b>South Korea</b>	<ul style="list-style-type: none"> <li>• Speed</li> <li>• Strength</li> <li>• There is a big emphasis on physical development in South Korea</li> </ul>	<ul style="list-style-type: none"> <li>• Discipline</li> <li>• Enthusiasm</li> <li>• ‘Addiction to badminton’</li> <li>• Good listeners and learners</li> <li>• Motivation to improve</li> <li>• Self-learning</li> <li>• Fighting spirit</li> </ul>	<ul style="list-style-type: none"> <li>• Most training coordinated through centralised regional/national centres</li> <li>• Considerable importance attached to education – with the commitment to education and badminton, there is little scope for athletes who have problems with lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>• Good footwork technique</li> <li>• Fast movement around court</li> <li>• Hard hitters</li> </ul>	<ul style="list-style-type: none"> <li>• ‘Decision making in games is not encouraged, they are very coach reliant’</li> </ul>
<b>Indonesia</b>	<ul style="list-style-type: none"> <li>• Target physical development components – some centralised guidance</li> <li>• Physical testing is used – by dedicated physios etc.</li> <li>• Benchmark physical data has been developed within the sport to assess players</li> </ul>	<ul style="list-style-type: none"> <li>• Small scale psychology programme in place (although it does not appear integrated with the coaching programme)</li> <li>• Psychological testing is used</li> <li>• In relation to selection, the Indonesians talked about mental toughness</li> </ul>	<ul style="list-style-type: none"> <li>• Social and lifestyle issues not mentioned during research (that does not mean they are not important to Indonesia)</li> </ul>	<ul style="list-style-type: none"> <li>• Technical development is not within the remit of the PBSI – this is left to the players, coaches and clubs</li> <li>• However, mention of posture, step, skill, in selection assessments</li> </ul>	<ul style="list-style-type: none"> <li>• Tactical development is not within the remit of the PBSI – this is left to the players, coaches and clubs</li> </ul>
<b>Denmark</b>	<ul style="list-style-type: none"> <li>• It was acknowledged that Danish players cannot compete with Asian players in terms of physical strength and fitness, and movement around the court</li> </ul>	<ul style="list-style-type: none"> <li>• Dedicated to getting to the top of the sport</li> <li>• Focus</li> <li>• Take responsibility</li> <li>• Self-managed</li> <li>• Self-reliant</li> <li>• Working hard</li> <li>• Reflective</li> </ul>	<ul style="list-style-type: none"> <li>• Recognition of the unique character of Danish players and their need to be individuals and express themselves</li> </ul>	<ul style="list-style-type: none"> <li>• Less movement around court</li> <li>• Loose grip on racket to quickly change from forehand to backhand grip</li> <li>• ‘Excellent/beautiful stroke production’</li> <li>• Excellent ‘hitting technique’</li> <li>• ‘Huge array of technical weapons’</li> <li>• Low levels of unforced errors</li> </ul>	<ul style="list-style-type: none"> <li>• Intelligent (intelligence seen as a key characteristic to beat Asian competition)</li> <li>• Adaptable/fluid</li> <li>• Good decision makers</li> <li>• Use variation</li> <li>• Use improvisation</li> <li>• Use deception</li> <li>• Can make own decisions irrespective of coach</li> </ul>
<b>Spain</b>	<ul style="list-style-type: none"> <li>• Developed physical characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Resilience</li> <li>• Persistence</li> <li>• Leaders</li> <li>• Independent, autonomous learners</li> <li>• Self-management</li> <li>• Desire to win ‘champion belief’</li> </ul>	<ul style="list-style-type: none"> <li>• Family support</li> </ul>	<ul style="list-style-type: none"> <li>• Significant emphasis on technical skills linked to tactical components</li> <li>• Good footwork</li> </ul>	<ul style="list-style-type: none"> <li>• Strong tactical understanding</li> <li>• Ability to set ‘spider’s webs’</li> </ul>

### 6.3. Development model



The performance model provides a framework for what the development system is aiming towards. For example, in Denmark experts commented how high level competition provides a model for lower level clubs and coaches to follow. There is growing evidence from both research and practice to inform the structure of development systems (North et al., 2014).

Effective player development systems should:

- Situate programmes in the key principles underpinning human development
- Adopt a long-term approach
- Within a long-term approach recognise developmental difference between age and stage
- Recognise that development is holistic incorporating aspects of PPSTT
- And, finally, given the longer-term nature of development, systems should be inclusive and patient.

#### 6.3.1.1. Situate programmes in the key principles underpinning human development – underpinning research

Participant and performer development in sport is conditioned by the same processes that impact on wider human development, yet the literature on performer development systems only occasionally or implicitly makes reference to theory and evidence from the human development literature (e.g. Henriksen et al., 2010a; Martindale et al., 2005).

The lack of explicit attention to the human development literature is a significant problem because how researchers and practitioners both explicitly or implicitly think about and conceptualise human development has very important implications for the development of research approaches and findings that naturally,

logically and morally emerge from them. For example, and put crudely, if one were to subscribe to the genetic determinist view of human development, there would in theory, be very little need for sport coaching because genes alone determine sports development potential and performance.

The three main theoretical positions on human development overviewed here are:

- (1) genetically determined/centred development
- (2) environmentally determined/centred development
- (3) an interactionist position between the two.

### **Genetically orientated positions**

The genetically determined position is most commonly associated with Francis Galton's work *Hereditary Genius* (Galton, 1979 [1896]). The importance of genetics within human development has been restated in recent work (e.g. Pinker, 2002). Genes also feature prominently in development models which have influenced sport (e.g. Gagné, 2013). In sport-specifically, the important role of genetics has also been given prominence (e.g. Epstein, 2013; Singer & Janelle, 1999).

Genetic or, as it sometimes called, biological determinism, emphasises the influence of genes and biological processes as a predetermined potentially predictable plan for maturation and human development. That is, genes determine or significantly condition human development beyond or outside of environmental influence (Sigelman & Rider, 2012).

This approach has serious implications for the way we think about and act in society and sports development. Most notorious is the connection to eugenics and human genetic engineering. If genes are central to development then isolating 'bad' genes to remove negative influences and encouraging 'good' genes to encourage positive influences appears the logical next step. Genetic manipulation has been discussed in a sport context<sup>21</sup>.

Perhaps more relevant to the mainstream of sport activity is the idea that since genes determine future performance, there is a limited role for individual agency (goals, motivation, ambition, determination) and environmental influences such as teaching and coaching (Tallis, 2011). The 'naturally gifted' athlete would succeed in their chosen sport regardless of the effort put in and resources made available to them.

These ideas provide the intellectual justification for talent identification schemes – i.e., there are (genetically) talented youngsters 'out there', it is simply just a case of finding them. These approaches also suggest that the coach has a more limited role identifying talent and then accompanying the athlete on his/her path to glory rather than any strongly defined developmental remit. There is no motivation or responsibility, only genes. Success is inevitable - so why bother too much with the coaching or indeed the whole player development environment beyond selection?

### **Environmentally orientated positions**

The environmentally determined position is most commonly associated with John Locke's *An Essay Concerning Human Understanding* (Locke, 1997 [1690]) which introduced the concept of humans as a *tabula rasa* or blank slate. The importance of the environment to human development has been central, for example, to behaviourism (e.g. Skinner, 1957), social perspectives on learning (e.g. Bandura, 1977) and in popular science (James, 2007). Bloom's (1985) analysis of the development profile of performers in a variety of domains (e.g. scientists and athletes) highlighted the important role played by social context; notably family and coaches over the 'natural ability' of the performer. Ericsson's *theory of deliberate practice* often associated with the 10,000 hours rule (e.g. Ericsson, Krampe, & Tesch-Römer, 1993; Simon & Chase, 1973) also adopts a highly environmental position and has been influential, for example, in English badminton (Badminton England, 2005).

The environmentally oriented position not surprisingly emphasises the importance of the environment as a context, enabler and constraint on development. This suggests the importance of parents, peers, teachers,

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<sup>21</sup> <http://www.bbc.co.uk/news/magazine-25687002>

coaches etc. as well as the broader institutional and macro-social environment in learning and development. Under this theory, the role of natural genetic endowments in development are minimised, and perhaps even to a degree the impact of individual agency (Tallis, 2011). Experience and social and environmental influences are seen as most important (Sigelman & Rider, 2012). Thus, educationalists – parents/teachers/coaches – have a significant role setting up environments which facilitate development.

### Interactionist positions

Despite the prominence of the above positions in the public imagination and in education and sport policy and practice, an interactionist position between genes and environment is almost unequivocally the mainstream position in philosophy (Bhaskar, 2012), biology (Lewontin, 2000; Noble, 2008; Ridley, 2011), psychology, and developmental science (Bronfenbrenner & Morris, 2006; Gagné, 2013; Gottlieb, Wehlsten, & Lickliter, 2006; Sigelman & Rider, 2012) though there are differences in models and in the importance of genetic contributions. Not only do genes and the environment contribute to human development, they do so in a particular way. From the moment of conception, genes and the environment work together epigenetically and emergently (Carey, 2012; Gottlieb et al., 2006).

As Sigelman and Rider suggest:

“human development is an incredibly complex process that grows out of *transactions between* a changing person and a changing world and out of dynamic relationships among biological, psychological, and social influences. No contributor to development – a gene, a temperament, a parent, a culture – acts alone and is unaffected by other influences on development” (Sigelman & Rider, 2012, p. 2 italics added).

In sport, research has increasingly conceptualised player development as a multi-layered complex emergent process involving the dynamic and non-linear interaction of multiple variables – genetic-environmental; physical, psychological, social; luck etc. (Bloom, 1985; Button, 2011; Helsen, Hodges, Winckel, & Starkes, 2000; Phillips, Davids, Renshaw, & Portus, 2010; Simonton, 1999; Singer & Janelle, 1999; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). Review work by Baker and Horton (2004) identifies a range of influences on performer development including genetics, time devoted to training and practice, psychological enablers, and access to social resources such as coaching and support from the family.

Researchers have speculated about genetic influences on sporting performance. For example, genetics have been hypothesised to impact on physical characteristics, personality, intelligence, adaptation to practice which can all be conducive to sport performance development (Singer & Janelle, 1999). However, these researchers concede that it is the interaction between genes and environment that is crucial to success.

There are a number of important implications of a multi-layered interactionist emergent approach to player development. First, the multiple and interacting components and processes mean that human development is *highly heterogeneous and individualised*. The number of variables involved and the interaction between them in player development suggest that it is non-linear and unpredictable (Vaeyens et al., 2008).

Second, and related, there are *increasing concerns about the practice of early talent identification* and selection (e.g. Côté & Lidor, 2013b; Régnier, Salmela, & Russell, 1993; Vaeyens et al., 2008). Genetics certainly play a role in development (Singer & Janelle, 1999) – but it remains highly contentious whether early genetic markers (or their apparent physical manifestations) transfer to exceptional performance in adulthood (Vaeyens et al., 2008). Early talent identification and selection remains a mainstream activity in many sports (although apparently less so in badminton) though this appears to be driven less by theoretical ideas on human development than by resources, pragmatism and politics. Once selection decisions have been made – for whatever the reason – a key issue appears to be keeping youngsters in the system long enough to reach their potential.

Third, *there is a limit to what system architects, coaches and players can realistically hope to control*. The interactionist model suggests that participant and performer development will necessarily be subject to a range of influences and forces. This means stakeholders have to accept that their interventions will only be successful under certain indeterminate conditions. Consequently, systems have to be flexible, adaptable and above all patient (Martindale et al., 2005). Coaches need to recognise that their role is important whilst



repositioning themselves from ‘controllers’ to ‘facilitators/guiders/influencers’ working with the resources available to them and doing the best they can. Whilst from one point of view it could be argued this eases the expectations and pressures on coaches ‘to get it right’, it will remain to be the case that certain coaching strategies and approaches that can be used to influence and guide performer development will be better than others and this places a new kind of pressure on coaches.

#### **6.3.1.2. Attending to the principles underpinning human development in badminton**

All the countries appeared to subscribe to an interactionist view of human development through their descriptions of player development and the systems components they put in place, for example, with regard to the duration of development and the use of selection.

For example, Danish experts noted the need to take a long term patient approach giving an opportunity to both ‘early developers’ and ‘late adjusters’ and recognising the ‘twisty’ non-linear journey involved:

##### **Danish experts on player development and selection**

“Every player has a different development pattern. We have tried and tried (to work out) just what player will make it in the end and we can’t tell. We can exclude someone, say ‘this won’t work’, but we see players being a happy participation player until 16 years of age, but having all the basic competences, and then suddenly ‘bang!’ they begin and they go all the way, for instance” (5).

In the Spanish system, experts emphasised the development of players over the longer term rather than selection: ‘I don’t like to call it ‘talent selection’ but ‘development of players’. I don’t really like the term ‘talent’; if you ask me what’s the best talent I would say it’s the ability to work. I believe more in causality than in fortune. When we talk about talent we talk about fortune, therefore when people talk about talent the role of the coach is being downplayed, but coaches are important. Would the girl (Carolina Marin) have done it with just anybody? Certainly, but she would have never become what she is without a coach, any coach’ (7).

In the Asian countries, there was a similar response. The Korean expert suggested performance development success was a combination of ‘good talent’ and ‘good coaching’. One of the Indonesian experts suggested ‘for the under-15 I think (they are born), and then 15 and above, I think made’ (1). On balance, however, he focused on ‘the made’.

Badminton stakeholders need to consider their view on the principles of human development, and ensure that systems they develop are consistent with these principles. If they subscribe to an interactionists view, which we believe they should, then systems should be flexible, adaptable, patient, long-term and minimising the use of early selection and deselection.

### 6.3.2.1. Adopting a long-term approach – underpinning research

One of the most consistent results from research examining the development of talented and expert performance relates to the length of time involved (Baker, Cobley, & Fraser-Thomas, 2009; Bloom, 1985; Newell & Rosenbloom, 1981; North, 2012a; Simon & Chase, 1973). Although estimates of the length of the development process from novice to elite vary, many researchers quote the figure of 10,000 hours, or 10 years (e.g. Ericsson et al., 1993).

In sport, a connection has been established between the number of practice hours and expertise (e.g. Baker, Côté, & Abernethy, 2003a, 2003b; Baker, Côté, & Deakin, 2005; Gould et al., 2002; Helsen et al., 2000; Helsen, Starkes, & Hodges, 1998; Hodges & Starkes, 1996; Larsen et al., 2013; Mischel, 1973; Starkes, Deakin, Allard, Hodges, & Hayes, 1996). Ford et al. (2016) examined the amount and types of developmental and professional activities engaged in by elite badminton players in Malaysia and Europe over a 40-45 week period (Table 6.6):

**Table 6.6: Practice hours in Malaysia and European countries**

	Malaysia			Europe		
	Practice	Play	Competition	Practice	Play	Competition
Children	4-5 hours	3 hours	1 hour	2-3 hours	30 mins	30 mins
Adolescence	16 hours	2 hours	7 hours	10-12 hours	1 hour	1-3 hours
Adulthood (19-21 years)	19-20 hours	1 hour	10-11 hours	17-18 hours	1 hour	1-2 hours
Middle adulthood (22-25 years)	22-23 hours	-	10 hours	25 hours	1 hour	5-6 hours
Per year total for middle adults	963 hours	-	423 hours	1031 hours	43 hours	223 hours

Source: Ford et al. (2016)

In a recent article by the chief executive of the Badminton World Federation, Poul-Erik Hoyer suggested the Chinese performers have undertaken 10,000 hours of practice by the age of 19-20 year. In Europe this is closer to 24 years (Kin-wa, 2013). Hoyer suggests that Europeans need to increase the practice intensity at younger ages.

Work by Badminton England (2011) and Badminton Canada (2009) utilising 'long term athlete development' (LTAD) suggests to reach a world class level in any sport requires a minimum of 10 years and 10,000 hours of practice, training and competition. Badminton England (2005) state that this rule certainly applies to badminton and, if anything, considering the complex technical nature of the sport, coupled with its immense physical demands, is an underestimation of the commitment required to become truly world class. On average, this translates into slightly more than three hours of training or competition each day for 10 years (Badminton Canada, 2009). Badminton England (2005) recommend that elite players should look to take part in approximately 14-16 hours of on-court work, 5-7 hours of off-court work and three hours of personal player development (one-on-one evaluations of progress with their coach, including goal setting, planning, video analysis, psychology, sports science).

One implication of this result, when combined with the evidence on the peak performance age of badminton players (the average age of an Olympic medallist is in the mid-20s<sup>22</sup>), is that to achieve the requisite practice hours, individuals have to engage relatively early in physical development and sport. This might be from 4-5 years old upwards.

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<sup>22</sup> Based on an analysis of the medallists at the last three Olympic games – Beijing 2008, London 2012, Rio 2016 – the mean average for the men's singles is 26 years, women's singles is 23 years, men's doubles is 27 years, women's doubles is 25 years, and mixed doubles is 26 years.

There is considerable debate, however, about what form this engagement should take varying from early single sport specialisation (Ericsson et al., 1993) to early diversification and sampling of different sports with later investment (at 12 years) and specialisation (at 16-17 years) (Côté et al., 2007). An 'early engagement' hypothesis has also recently been advanced in a football context (Ford et al., 2012; Ford, Ward, Hodges, & Williams, 2009).

### 6.3.2.2. A long-term approach in badminton

All four countries in the study recognised that developing elite players was a long-term project. All countries noted that young children could be introduced to badminton from 5-6 years of age and that they would peak – as noted above – typically in their mid-20s. Thus, for many players it is a 20 year development journey.

Although the Korean expert was not aware of Ericsson's '10,000 hour rule', the structure of the system suggested a long-term approach (although it was suggested in Korea that a more systematic approach to long term planning in the performer development pathway could occur). The Indonesian experts worked with a long-term approach informed by the 10,000 hour rule including prescribing practice hours.

The Spanish were deliberately attempting to recruit youngsters into sport at a younger age e.g. below 12 so that they could build up development experiences in the sport.

#### A long term approach in Spain

"Achieving high performance in badminton is a result of a very long process where a big amount of work is needed ... we ... prioritise their (the athletes') potential in the mid and longer term ... In that way, we (have) changed the perspective of the interests of the children and the coaches at those ages" (8)

The Danish federation established an 'Age Related Training Concept' or 'BATK' discussed further in the section on age-stage, which, in its early iterations, embraced Ericsson's 10,000-hour rule approach. More recently the DBA and others have distanced themselves from this idea, focusing more on the quality of practice than the quantity:

#### Danish Badminton on the 10,000 hours rule

"The way we used this 10,000-hour rule was to get the message out that we needed to practise more than we used to. And we definitely needed to do that. But there have been some side-effects we can see of communicating this 10,000-hour rule, because it means that many coaches tend to think that 'as long as I'm practising a whole lot more, everything's OK.' And our point is that you need to be *training intelligently*. It's not just to train. We can also see that there has been focus on the young players training too much, losing motivation and peaking too early, and so on, and dropping out of the system. Clubs have also set up some systems where as a prerequisite for a young talented player to play in the club was that they needed to practise every day, and some mornings too. If you don't want to do that, you cannot be a member here. And that excluded too many players because they just wanted to play three or four times a week. So this has been misused and had some bad side-effects which we want to get rid of. So the 10,000 hour rules that we had, we have put that in the graveyard" (5) (*italics to emphasise*)

Clearly badminton stakeholders considering and potentially designing/re-designing their player development systems will need to think about it as a system covering a long time span. There is research and good practice evidence to suggest (North, 2012a), however, that system designers should focus on the quality as well as the quantity of practice hours.

### **6.3.3.1. Within a long-term approach recognise developmental difference between age and stage – underpinning research**

Age-stage differentiation is based on the idea that individuals at different ages and stages of development acquire particular characteristics or can be exposed to environments that provide the foundation – or enable them to be ready – for engagement in particular types of training activities (though chronological age and stage may not always be aligned and there can be considerable individual differences).

For example, the ability to mentally rehearse e.g. mentally repeating new information in order to remember it develops around the age of 7 (Kail, 1990), and has been shown to enhance the acquisition of skill in children (Thomas, Thomas, & Gallagher, 1981). Children develop new knowledge, skills and meta-skills through exposure to school environment which can be transferred to sport! This is based on the emergent development processes outlined in section 6.3.1.1. on human development principles.

Age-staged approaches have a considerable history in physiology, psychology, and education and have also featured strongly in the context of player development and coaching. Moreover, age-stage development has been a central feature of research into physical and neurological development (e.g. Scammon, 1930), cognitive development (e.g. Piaget, 1952), and movement development (e.g. Gallahue, Ozmun, & Goodway, 2012).

For example, Gallahue, Ozmun, and Goodway's (2012) life-span model of motor development suggests there are four broad stages of movement development: reflexive movement (from birth to one year old), rudimentary movement (one to two years old), fundamental movement (two to seven years old), and specialised movement (seven to adulthood). Thus from a movement development perspective, there is a notable transition age between seven and upwards.

In sport, a number of age-stage models have been proposed including the Long-term Athlete Development (LTAD) model (Balyi & Hamilton, 2004; Stafford, 2005) and the Developmental Model of Sports Participation (DMSP) (Côté, 1999; Côté et al., 2007). A further overview of non-sport and sport age-stage development models is provided on the next page. A collective analysis of these models suggest a number of key age groups – 5-7 years, 8-11 years, 12-14 years, 15-18 years – and key transition points around 4-5 years, 7-8 years, 11-12 years, 14-15 years, and 18-19 years.

The research provides a number of recommendations for how development environments should vary between age groups. For example, youngsters up to seven years of age should focus on fun, the development of fundamental movement skills, social engagement and connection skills through games, friendly coaching etc. From 7-8 years onwards, the refinement of fundamental skills and more sport-specific skills can be introduced. Disagreements exist between academics about how age-stage approaches should be prescribed and coordinated; for example, between Balyi (Balyi & Hamilton, 2004), Côté (Côté et al., 2007), and Ford and colleagues (Ford et al., 2009).

#### Age-stage approaches – some complexities

There is a considerable amount of research and commentary analysing the use of age-stage thinking both descriptively and retrospectively, and as a means of thinking about player development prescriptively.

From a descriptive and retrospective perspective research has pointed toward a tendency in sport to ignore age-stage thinking particularly in younger age-groups where children are often exposed to variants of the adult game, adult practice structure and adult coaching. Partington and Cushion (2013) describe professional soccer as a 'living and ecologically sensitive' site for age-stage approaches. Citing research by Fraser-Thomas et al. (2008a) they suggest that "a mismatch between children's developmental needs and coaching behaviours leads to more dropout, injuries and shorter careers than when children are trained by a competent age appropriate coach" (p.403).

A key aspect of age-stage thinking is transition points – by definition, this is when something novel and significant happens (for example, change, progression, or drop-out). A number of researchers have commented on the difficulties for players transitioning between age-stages and this confers responsibility on coaches and others to ensure that the former are equipped for what lies ahead (e.g. Larsen et al., 2013; MacNamara, 2011). Recommendations for negotiating transitions are provided by Alfermann and Stambulova

(2007) and include the importance of information provision and communication between stakeholders (i.e., coaches, managers, elite athletes).

**Table 6.7: Age-stage models and common transition points**

	Physical development	Cognitive development	Movement Development	Educational Key Stage	Participant-performer development		Commonly identified transition points relevant to player development		
	Lloyd and Oliver (2012)	Piaget (1952)	Gallahue, Ozmun, and Goodway (2012)	Educational key stages in the UK based on Hadow Report (1931)	Balyi & Hamilton (2004) Stafford (2005)	Côté, Baker, & Abernethy (2007)			
25	Decline in growth rate	Formal operational	Specialised movement	Tertiary education	Training to win	Performance sport			
24									
23									
22									
21									
20									
19									
18									
17	Adolescent growth			KS5	Training to compete	Investment years	17-18 years		
16				KS4					
15				KS3	Training to train	Specialisation years	14-15 years		
14									
13									
12				Steady growth	Concrete operational	KS2	Learning to train	Sampling years	11-12 years
11									
10									
9	Pre-operational	Fundamental movement	Fundamentals		7-8 years				
8									
7	Rapid growth	Sensorimotor	Rudimentary movement		Active start	Entry into sport	4-5 years		
6									
5									
4									
3									
2									
1									
0		Reflexive movement							

Age/stage models, both in and out of sport, have been subject to criticism notably concerning the dynamic, complex and non-linear nature of human development suggesting that individual players may be very different to their chronological age profile (e.g. Bailey et al., 2010; Ford et al., 2011; McMorris, 1999; Thelen & Smith, 1996).

More specifically, it has been argued that ‘stages’ in their early behavioural and cognitive formations were general descriptive categories (individuals of a particular age on average have the following physical, psychological characteristics), but were unfortunately reified to become explanatory or causal categories suggesting a single or unified causal development process (Brainerd, 1978; Thelen & Smith, 1996). Piaget’s cognitive development stages had some empirical validity at the aggregate large scale level, but not “when developmentalists turned up the microscope” (Thelen & Smith, 1996, p. 22).

These criticisms, however, has generally been anticipated by Balyi and Côté etc. They suggest using other markers e.g. relative age, development age, and skeletal age etc. to provide a means for coaches to individualise development programmes, environments and activities. However, some researchers doubt the coaches' ability to apply this information appropriately (Ford et al., 2011). Other researchers have suggested the use of developmental or learning phases disconnected from chronological age. For example, Bloom and colleagues (1985) suggest a sequential development process – 'early, middle, late' that is disconnected from chronological markers.

It is important to note that there have been other criticisms of these models. For example, Balyi and Hamilton (2004) have been criticised for basing their development model largely on physiological principles which remain unsubstantiated (Bailey et al., 2010; Ford et al., 2011). The search is on for a developmental model which integrates different disciplinary perspectives and has robust research backing. The next section considers the development of players in a holistic sense.

Ultimately, age-stage information is just that, information - it is not a rigid programme - coaches should use the information when they think it is useful to an individual player's development.

### 6.3.3.2. Age stage approaches in badminton

All the countries in the study utilised an age-stage approach and there were some interesting similarities and differences.

All countries roughly traced the following stages:

- Early engagement in the sport from 5/6 years to 11/12 years
- Technique development from 10/11/12 years to 14/15/16 years
- Tactical development from 14/15/16 years to 17/18 years
- Focus on higher level competition and competition behaviours from 18/19 years

In addition, each countries centralised programmes started around the 10/11/12 years age – mainly with regional provision and then moving to the national level. More serious competition exposure also started in the 10/11/12 age range although this was intended as a development experience rather than with winning. There were some differences with regard to physical preparation and development. This was emphasised at all ages in South Korea, but was focused around 14 years and upwards in Denmark and Spain.

**Table 6.8: Typical age stage trajectories in the four countries**

Phase	South Korea	Indonesia	Denmark	Spain
Start	5-6 years	6 years	6 years	4 years
Engage	6-12 years	6-9 years	6-12 years	5-11 years
Technique	12-15 years	10-12 years, and 13-15 years onwards	12-16 years	10-14 years
Tactics	15-18 years	Not clear	16-17 years	14-18 years
Compete	19 years and over	20 years and over	18 years and over	19 years and over
Other notes	Physical development support at all ages Centralised programme starts at 12 More serious competition exposure at 12	Centralised programme starts around 16 years National level competition programme starts at 14, competition for selection around 16 years Local area competition for U12 and U14	Physical development support 14 years upwards Centralised (regional) programme starts at 12 More serious competition exposure at 12	Physical development support from 14 years Centralised (regional) programmes start at around 10 years More serious competition exposure at 10

**Table 6.9: Age/stage approaches in the four countries**

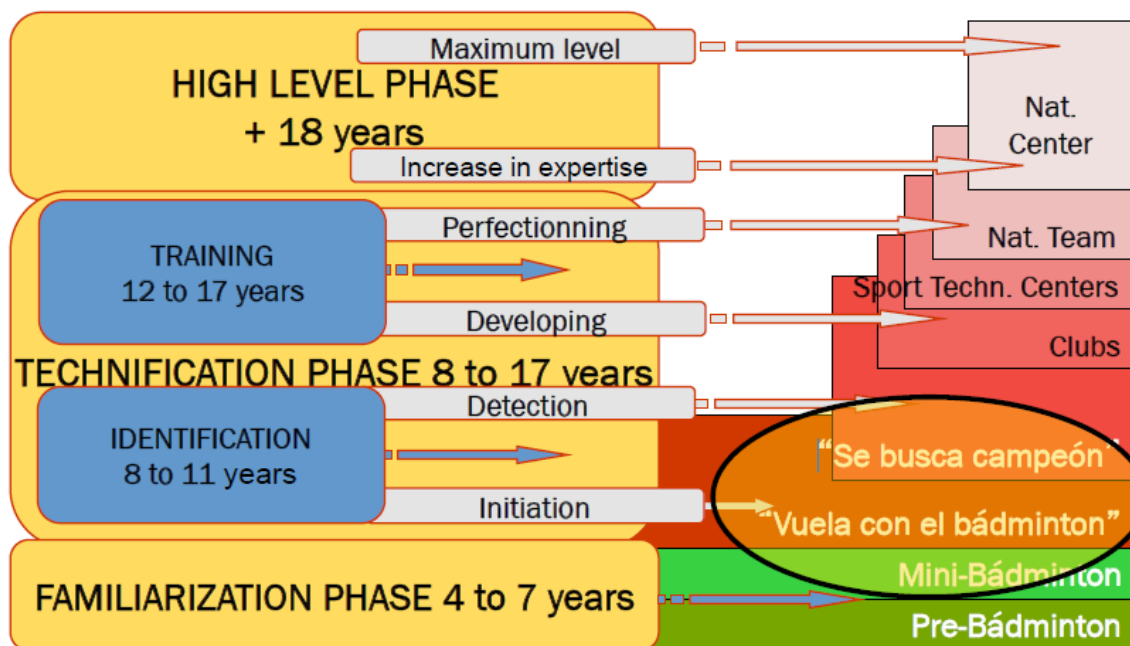
Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Age-stage differentiation in place through school system and centralised programme</li> <li>• There does not appear to be any specific guidance from the BKA on pathway stages outside the centralised programme; although coaches receive coach education</li> <li>• Centralised programme for U13, U15, U17 and U19 during summer and winter vacation</li> <li>• There is big emphasis on physical and mental preparation even at younger ages</li> <li>• High performing players will ‘play up’ age group competition</li> <li>• Start the sport 5-6 years <ul style="list-style-type: none"> <li>○ Typically, in the context of playing with family</li> </ul> </li> <li>• 6-12 years – elementary school <ul style="list-style-type: none"> <li>○ School provision of badminton</li> <li>○ No centralised programme or advice for schools</li> <li>○ However, there are around 170 dedicated ‘badminton’ elementary schools in South Korea</li> <li>○ This stage is described as encouraging engagement and motivation through fun and enjoyment, not pushing the youngsters too hard</li> <li>○ After school practice from 3-6 pm</li> </ul> </li> <li>• 12-14/15 years – middle/junior high school and first centralised programme at U13 <ul style="list-style-type: none"> <li>○ At school, increasing attention to both technical development and experiencing competition</li> <li>○ Physical preparation emphasises running, jumping jacks, and sit ups; no separate weight training</li> <li>○ After school practice from 3-6 pm</li> <li>○ In reality, selection to the ‘talent programme’ can begin around 9-11 years</li> <li>○ Centralised training, focus on group based goal setting</li> <li>○ Sometimes individualised training sessions</li> <li>○ 11 days, five hours per day</li> <li>○ Not much sports science support at U13 and U15. However, sports scientists will be with this age group for a few days for centralised training</li> </ul> </li> <li>• 15-18 years – high school and centralised programme <ul style="list-style-type: none"> <li>○ Continued development of technical skills, increasing focus on tactics, and more experience in competition</li> <li>○ Centralised programme</li> <li>○ 20 days centralised training</li> <li>○ Advanced sport science support starts at U17 including brain scanning to support development and selection, a more advanced psychological programme</li> </ul> </li> <li>• 19 years and over – Junior National Team/National Team <ul style="list-style-type: none"> <li>○ Cementing technical skills, greater focus on strategy and tactics</li> <li>○ Individualised goal setting, training and competition</li> </ul> </li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• PBSI operates an interpretation of Balyi’s LTAD and Côté’s DMSP</li> <li>• “When I was at Singapore sport school they came and give their presentation. I’ve combined these two ideas for the Indonesian system – they are not really different – Istvan has his stages, train to train etc. and Côté has his stages: sampling, investment and specialisation. For our long-term athlete development, I try to modify these two models ... They are not so different” (1)</li> <li>• They have defined a player pathway</li> <li>• 6-9 years <ul style="list-style-type: none"> <li>○ Fun and enjoyment</li> <li>○ Sampling as many sports as possible</li> </ul> </li> </ul>

Country	Detail
	<ul style="list-style-type: none"> <li>• 10-12 year olds <ul style="list-style-type: none"> <li>○ Continue fun and enjoyment</li> <li>○ Focus on technique</li> <li>○ 'most of the session – stroke, stroke, stroke and then at the end of the session play a real game' (1)</li> <li>○ Player still sampling other sports – usually football and basketball</li> </ul> </li> <li>• 13-15 years <ul style="list-style-type: none"> <li>○ Much more focused on technical improvement</li> <li>○ Start to specialise in badminton</li> <li>○ Move to bigger more focused clubs</li> <li>○ Coaching is more intense</li> <li>○ National level competition programme kicks in at 14 years (U15)</li> </ul> </li> <li>• 16-17 years <ul style="list-style-type: none"> <li>○ Badminton only by this stage</li> <li>○ Serious selection for centralised resources starts about 16 years (U17s), continues at 18 years (U19s) and then at 20 years (U21) the players start to work with the elites</li> <li>○ 16 year olds (U17s) get invited based on rankings to centralised squads</li> <li>○ Work with 16 year olds because this is 'long term athlete development'</li> </ul> </li> <li>• 18-19 years</li> <li>• 20 and over</li> </ul>
<b>Denmark</b>	<ul style="list-style-type: none"> <li>• Age related training concept (BATK)</li> <li>• This is Danish Badminton's interpretation of long term athlete development</li> <li>• Start in the sport aged 6 to 9 years <ul style="list-style-type: none"> <li>○ Mainly in clubs</li> <li>○ Emphasis on engagement and fun</li> <li>○ Experiencing a friendly social environment</li> <li>○ Get playing</li> <li>○ Learn basic competences – loose grip, low centre of gravity, moving around the court etc.</li> <li>○ Common introduction - similar experiences for all participants</li> </ul> </li> <li>• U13 – starting to develop <ul style="list-style-type: none"> <li>○ Mainly in clubs</li> <li>○ Continue to engage in and enjoy the sport</li> <li>○ Develop and master basic competencies - how to move, how to improve stroke production</li> <li>○ Experience competition although winning is not important</li> <li>○ "You have this 'peak on Friday approach' to things, and parents and coaches who are not that knowledgeable, they are focusing too much on winning this actual game" (5) – this needs to be managed</li> <li>○ Experience playing against higher level competitors</li> </ul> </li> <li>• U15 – engage with regional and national systems <ul style="list-style-type: none"> <li>○ Regional and/or national selection</li> <li>○ More focus on physical development and gaining speed on the court</li> <li>○ More competition experience with players at same level and above</li> <li>○ Learning how to win as favourite and how to lose against stronger players</li> </ul> </li> <li>• U17 – further sharpening of game – the federation have good idea whether the player has elite potential at this age</li> <li>• U19 – getting more serious – international competition</li> <li>• Some players 'play up' and 'play down'</li> </ul>
<b>Spain</b>	<ul style="list-style-type: none"> <li>• Age-stage approach in operation</li> <li>• Start in the sport aged 4-7 years – 'Familiarisation phase' <ul style="list-style-type: none"> <li>○ Free activities, fun games, and 'mini-badminton'</li> <li>○ School based, modified court and equipment etc.</li> </ul> </li> </ul>



Country	Detail
	<ul style="list-style-type: none"> <li>○ Child may not 'even see a shuttle cock initially (perhaps using a balloon), as long as they associate badminton with being enjoyable'</li> <li>○ Playful, engaging, although directed sessions, to familiarise the youngster with the sport</li> <li>○ Playfulness, experimentation and creativity is encouraged from an early age</li> <li>○ Balance, eye and hand coordination, through games</li> <li>● 8-11 years - 'Fly with badminton' programme ('Vuela con el badminton') <ul style="list-style-type: none"> <li>○ School based</li> <li>○ Continue emphasis on engagement, fun and enjoyment</li> <li>○ However, more focus on playing the game and building skills, what the Spanish call 'technification'</li> <li>○ Big investment in coaching at this age to maximise initial experiences</li> <li>○ Two hours per week</li> </ul> </li> <li>● 10-14 years – 'Looking for a champion' <ul style="list-style-type: none"> <li>○ Emerging performer identification and development</li> <li>○ Club based</li> <li>○ Regional and national training also available for players and coaches</li> <li>○ Focus on skill development – continuing the process of 'technification' – practicing same skills as the elites - not concerned with physical development, or winning – technical skills are very important in the Spanish system</li> <li>○ Quality of coaching is very high</li> <li>○ More exposure to competition from 10 years</li> <li>○ Three days a week for one and half hours in each session</li> </ul> </li> <li>● 14/15 years to 18 years – 'Centres of Excellence' network <ul style="list-style-type: none"> <li>○ Training phase</li> <li>○ Regional and national centres</li> <li>○ Completing technical training; tactical component becoming more important as player gets older</li> <li>○ Very high quality coaching</li> <li>○ Support services – physiology, strength and conditioning, psychology, medical support</li> <li>○ Coordination of training with education – athletes have opportunity to live</li> <li>○ Six days per week; twice a day training at U17</li> </ul> </li> <li>● 18 years and over - National centre in Madrid – high level phase <ul style="list-style-type: none"> <li>○ High level and international competition experience</li> </ul> </li> </ul>

Figure 6.1: Example pathway – The Spanish system



Age-stage thinking has some important implications for other aspects on the player development system including: systems for recognising skill development and the positioning and prioritisation of coaching in different age groups.

One of the problems with 'traditional' badminton provision in many countries is a tendency towards emphasising winning over development in younger age groups. Many countries address this issue through coach education, and competition structure, however, the Spanish had developed a novel solution using a 'martial arts' style use of colours on racket handles to denote skill development. 'This was an extraordinary motivational factor for the children, it worked very well and it still works. In this way, we established a guide of colours from white to black, during the process of the categories under 11 and under 13' (8). Good technique (rather than winning) is rewarded with different coloured grips (to avoid RAE and issues with bigger/stronger children).

There were also some interesting age-stage differences with regard to coaching. South Korea appeared to have only superficial interest in coaching outside its high level performer development and elite programmes (indeed, as a result of the research, the expert contact raised the issue of children's coaching with his committee). In Spain, on the other hand, investment in high quality coaching for children was seen to be highly important: 'we have to invest the money in order to have good athletes in 10 years' time. What I'm saying is: feed the ones that lay eggs, the ones who don't... Chop their heads off and make a chicken soup! Look at this: equip coaches with knowledge' (7), 'the highest quality in the initial phase' (8).

These are just two example of how age stage thinking can strategically and operational impact on player development system provision.

#### **6.3.4.1. Recognise that development is holistic incorporating aspects of PPSTT – underpinning research**

This study has already identified the multi-dimensional PPSTT character of elite players and their development. Although researchers – driven by their disciplinary instincts – remain largely focused on the development of particular characteristics e.g. physiology (Lloyd & Oliver, 2012) and psychology (MacNamara & Collins, 2012), more recent development models are increasingly working with notions of holistic development (e.g. García Bengoechea, 2002; Haskins, Jolly, & Lara-Bercial, 2011; North, 2009).

It is interesting that in a study at different levels of the performance development pathway and high performance, coaches were more likely to attend to holistic factors of player development such as nutritional, social and wider educational development compared to those at the beginner and early developer stage (Bloom, Schinke, & Salmela, 1997). The attendance to holistic development features – physiological, psychological, social, and sport specific – by expert performance development coaches has been suggested in other research (Walsh, 2004).

In a badminton context, the holistic aspects of player development have been recognised in a Canadian context. For example, Badminton Canada (2009) suggests its long term athlete development framework recognises cognitive and emotional development, including the emphasis on ethics, fair play, and character building throughout the various stages.

However, more than this, coaches need to think about their players as human beings – as individuals with their own histories, personalities, ideas, preferences, strengths and weaknesses. There are a range of theories which suggest that if the coach focuses more on these human qualities then there is a greater chance of successful development and sporting performance (see, for example, Jones, Armour, & Potrac, 2004). If coaches are enabling and supporting these development processes they need both disciplinary and multidisciplinary concepts and ideas to work with.

This sub-section will briefly present some research on specific aspects (layers) of player development, notably physiology and psychology, before moving on to more holistic development models.

##### **Research - Physiology**

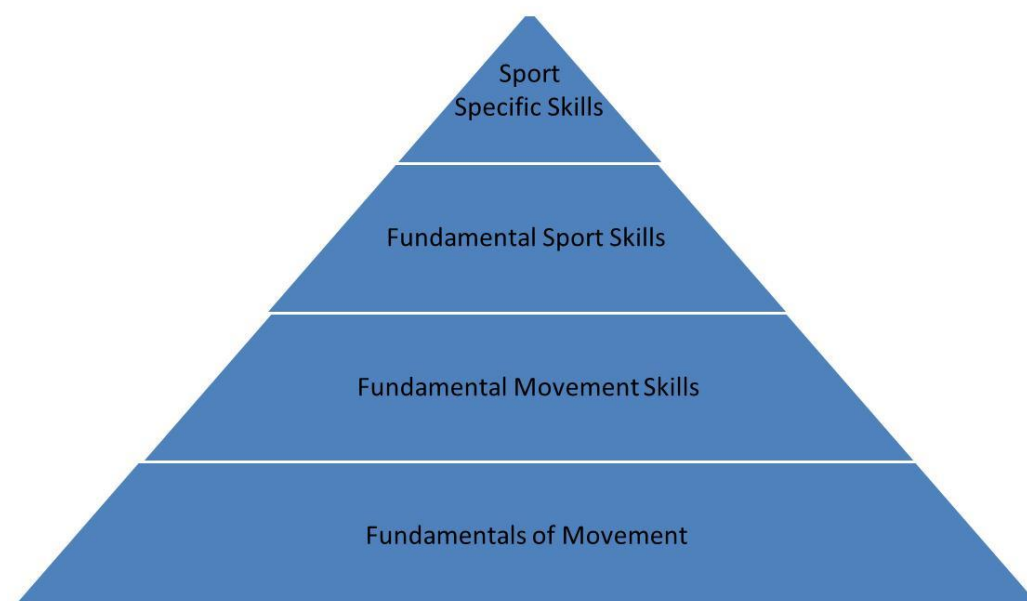
There are a number of old and emergent models of physiological development with varying degrees of evidential backing and peer review (e.g. Bompa, 1995; Lloyd & Oliver, 2012) (excluding here the work of Balyi and Hamilton (2004)). These models basically focus on the development of specific physiological characteristics – emphasising ordering and staging.

For example, Lloyd and Oliver (2012) propose a model for long-term athletic development which focuses on agility, mobility, power, speed, strength, endurance, hypertrophy, fundamental movement skills and sport-specific skills and suggest the chronological ages or age periods at which they should be a focus for development.

They suggest that strength work should be integrated into age appropriate programmes from very early childhood, whereas work on hypertrophy can start from 12 years. Furthermore, like Balyi and Hamilton (2004), Lloyd and Oliver (2012) propose the early development of fundamental movement skills up to the age of 7-8 years (and, indeed, beyond into adulthood), with a gradual increase in the development of sport-specific skills from 8-9 onwards. This work has been given evidential backing by recent work in rugby league and gymnastics in the UK (North, 2011, 2012b). Lastly, Lloyd and Oliver (2012) suggest physical development programmes should be undertaken in conjunction with a trained strength and conditioning coach.

A key set of concepts here relates to the 'fundamentals continuum':

## Fundamentals Continuum



Permission: Kevin Till

Skills	Description	Priority development age	Possible badminton example
Sport-specific Skills	Specialised sport-specific skills. Combination of fundamental and movement skills to create skills specific to the sport	8-11 years	Overhead clear to the back of the court to put opponent on the defensive.
Fundamental Sport Skills	Fundamental movements skills applied to the sport	5-7 years	Improved footwork, repeated forward and backward braking, push-off, gliding, lunging and jumping at various speeds.
Fundamental Movement Skills	These combine the fundamentals of movement to develop more complex actions. These are split into three areas - stability, object control and locomotion skills.	5-7 years	Not Badminton specific.
Fundamentals of Movement	The introduction and development of agility, balance and co-ordination (ABCs of movement). They are the building blocks for the development of future more complex skills.	5-7 years	Not badminton specific.

Thanks to Kevin Till for comments on this table.

The fundamentals continuum suggests the staged development of movement characteristics with more complex skills building on previous movement development work. Yet, it is important to note that all these skills can be developed at any time – age/stage guidance suggests the prioritisation, but not exclusive development, of particular skills at particular ages.

In badminton, the main goal during the early stages of player development could be to hit the shuttle across the net. This would then progress in the next stage to hitting the shuttle in a way that makes it difficult for the opponent to return (Blomqvist et al., 2000). For further progression, the player would then begin to apply basic strategies of net and wall games including fundamental offensive and defensive tactics. For example, moving the opponent from side-to-side and long/short and finding the opponent's weaknesses (offensive tactics), and hitting overhead clears to buy time and returning to base (defensive tactics) (Blomqvist et al., 2000).

## **Research - Psychology**

In their review of the factors facilitating expert performance, Baker and Horton (2004) highlighted the importance of psychological characteristics which focus and facilitate development.

Áine MacNamara and colleagues (in particular) have stressed the importance of psychological characteristics of developing performers (MacNamara, 2011; MacNamara, Button, & Collins, 2010a, 2010b; MacNamara & Collins, 2012). More specifically, the following 'psychological characteristics of developing excellence' (PCDEs) have been identified by MacNamara et al. (2010a): commitment, competitiveness, coping under pressure, game awareness, goal setting, imagery, importance of working on weaknesses, motivation, quality practice, realistic performance evaluations, self-belief, social skills and vision of what it takes to succeed.

Interestingly, MacNamara et al. (e.g. 2010b) suggest "the differential deployment of PCDEs relative to the individual's age, focus, stage of development/level of maturation, and performance domain" (p. 93). For example, there appears to be a shift in responsibility from 'others' (e.g. parents, teachers, coaches) promoting and reinforcing PCDEs in the early years toward self-initiated and autonomous behaviours in the later years. Essentially, the differential deployment of PCDEs can be understood from a self-regulation perspective. Self-regulated learners have the skills to self-monitor their progress, manage their emotions, focus on self-improvement, and seek help and support from others when necessary. Conversely, performers without these skills do not take personal responsibility for their own development, but instead rely on others and attribute failures to maladaptive reasons. Both these standpoints find interesting partial resonance in the ideas of Dweck's 'growth mindset', which emphasises the importance of success being based on hard work, learning and training (Dweck, 2006). This provides interesting insight to guide coaches' planning, strategies and action with players in different age groups.

Developing psychological characteristics in players to navigate the development journey and to succeed at the highest level introduces another strand of literature. For example, Mallet (2005) describes using self-determination theory (Deci & Ryan, 1985) to develop motivational characteristics in elite track and field athletes. Similarly, Thelwell, Greenlees, and Weston (2006) used a qualified sports psychologist to deliver a psychological skills training programme to elite footballers.

Racket sports in particular have provided a vehicle for exploring psychological characteristics and the interrelationships between human behavioural, cognitive and motor abilities because they place a unique demand on the individual player for speed and accuracy within a rapidly repeating sequence of similar movements (Lees, 2003).

In squash, Mahoney and Todd (1998) described the use of a 'psychological skills inventory for sports' that enabled them to establish baseline data for male and female junior squash players on six cognitive characteristics (anxiety, concentration, confidence, mental preparation, motivation and team focus). Jones (1995) reported the use of the 'sport related psychological skills questionnaire' with an elite racket player. Terry (1995) referred to a tennis-specific questionnaire ('tennis test of attentional and interpersonal style') as well as other more generic psychometric tests for personality and imagery.

Another approach to baseline assessment is 'performance profiling'. This is an athlete-driven procedure and focuses on what is important to the athlete. Jones (1995) described this process as one where a player is asked

to identify the qualities or characteristics that an ideal player possesses. In this example, the player is then asked to rate the importance of each of these to an ideal performer and then to rate his or her own skill. The difference between the ideal and the self-assessment provides the basis for the psychological skills intervention, with the biggest discrepancy indicating the area of most perceived need. Jones described an application to a world-ranked tennis player that consisted of a baseline assessment using performance profiling and psychometric testing. From this, an intervention was devised based on imagery, cognitive restructuring, relaxation and simulation training. Jones reported the positive effect that six months of this programme had on the player, who subsequently won a major world tournament for the first time. Performance profiling can be used in groups as well as with individuals, and with coaches involved in the process as well as players.

### **Research – Social Development**

There is a considerable body of research which has explored the social dimensions of participation and performer development. These consider the influence of issues such as coach-athlete relationships (Poczwadowski, Barott, & Henschen, 2002), team dynamics, clubs, parents and family (Côté, 1999; Fraser-Thomas et al., 2013), friends (Bruner et al., 2013; Wylleman & Lavalée, 2004), school (Bailey et al., 2010) etc. Recent work in Denmark emphasises taking a social systems approach (Henriksen, 2010; Henriksen et al., 2010a, 2010b; Larsen et al., 2013).

### **Research - alternative approaches to PPSTT development**

Research situated originally in developmental psychology and positive youth development has proposed a set of developmental characteristics/outcomes – the 5Cs: competence, confidence, connection, character, and caring/compassion (e.g. Lerner et al., 2005). These characteristics, if targeted and developed, would provide considerable benefit to individuals, groups and societies. Some researchers have suggested that youth sport programmes should be used to develop these 5C outcomes in sporting participants (Fraser-Thomas, Côté, & Deakin, 2005).

The 5Cs are becoming increasingly well known in sport and coaching in the US, Canada and the UK. The relevance of the 5Cs would appear to be in drawing coaches' attention to a wide range of development characteristics/outcomes for young players and performers related to, but conceptually different from, the physical, psychological, social, technical and tactical characteristics identified earlier. In other words, it is another conceptual approach for thinking about holistic development.

There is certainly overlap between the characteristics identified through the 5Cs and those proposed by the wider research literature notably on the psychological aspects of player development as desirable e.g. respect, humility and so on. The 5Cs information could be useful to coaches to explore this kind of thinking as long as it does not get confused with more disciplinary-focused holistic approaches.

### **Research – Holistic approaches applied in football**

In the study of European football player development systems (North et al., 2014), there was an emphasis on the development of holistic physical, psychological, social/lifestyle, technical and tactical components as a necessary feature of developing players with the wide ranging characteristics required to compete at the highest level. However, there appeared to be two main approaches (1) an *explicit PPSTT approach* where player developers and coaches treated each of the developmental features (physical, psychological, social, technical and tactical) on a relatively equal footing and often attempted to develop them in isolation, and (2) a *game based approach* where there was more of a focus on technical and tactical development with other factors such as psychological, social, lifestyle developments emerging from game specific problems (e.g. France, the Netherlands, Spain and to a smaller extent Belgium and Italy).

#### **6.3.4.2. Recognise that development is holistic incorporating aspects of PPSTT in badminton**

In the badminton study, all the four countries recognised the need to develop a wide range of player characteristics, not just the physical, technical and tactical, through either an implicit or explicit holistic PPSTT approach. For example, in Korea, although there was a greater emphasis on physical development, there was also psychological support, particularly through the centralised programmes, and a keen eye on technical and

tactical development at all stages. In Denmark the BATK concept considers physical, psychological, social, technical, and tactical development. In Spain experts talked about five aspects: physical skills, psychological skills (crucially persistence), social characteristics and skills, technical skills (ability to play badminton) and tactical skills.

#### **Holistic development in Spain**

“From the viewpoint of the physical capacities, psychosocial and methodological research, learning, etc. There aren’t any training courses in Spain where those factors aren’t present. There is always an external expert who has got nothing to do with badminton who comes to teach about visualization, attention capacity, improvement of learning of motor skills or tasks, behaviour, etc. It’s got a scientific base if you like. (The head coach) has led these training courses, because of his background, which is around the scientific aspects and also he’s been adding things throughout the years, and this has been spread as a top down approach” (8)

Although there was a general commitment to a holistic PPSTT approach amongst the badminton countries, there were also, like football, some nuances in their application. These related to the usefulness of ‘developmental checklists’ and whether holistic development should focus on one component at a time or be integrated.

It was agreed that age-stage holistic checklists can be important – for guiding training, warning against over training – but they must be sensibly applied. For the Danish federation: “it’s not just playing the teacher and saying ‘you must, you must’, it’s also about (the coach) taking responsibility for their (the players’) development and physical health” (5). Individuals are encouraged to take charge of their own development, their own training and competition to meet their needs – identify own weaknesses, book their own courts, bring own equipment – ‘de-systematising the system’. It was important to recognise that, despite age/staged and holistic development profiling, there will be crucial individual differences between players and coaches, and in their relationship. The Danish federation were very wary of imposing just ‘one profile’, for example, outlined in the BATK concept document, on a wide range of very different individuals and relationships. Both players and coaches must have scope to interpret and carefully apply centralised information to their own contexts, and indeed the right to ignore it all together.

In Denmark there was also a discussion of separated PPSTT development, and integrated game based development similar to football. It was recognised that there were strengths and weaknesses in both approaches, but unlike football, which appears to be moving towards game based development for nearly all aspects, the Danes still valued monitoring for individual aspects such as ‘efficient physical training by learning lifting techniques’. In Spain there was more emphasis on an integrated approach.

#### **Integrated holistic development in Spain**

“You would see an integrated training, of all the important aspects in badminton, from the psychological, physical, technical and tactical viewpoint, placing more emphasis on the technical and tactical components, and integrated with the other aspects, not worked separately, but integrated together. This is something that we’ve changed throughout the years. In the past, we used to do a technical and tactical training, on a daily basis, the psychologist worked by himself, the physical preparation was done independent of the rest, and it was done based on what we knew about other Spanish sports, but not badminton. Nowadays, the training sessions are very different, the physical training is integrated with the technical and tactical aspect, and the psychosocial aspect is integrated within the training session, and this is specific and complex. That’s why I said that it’s integrated.” (8)

Finally, there was a strong sense of athlete welfare in the Danish system within both the wider vision/culture which understands that not all players will reach the highest levels (and therefore need some payback for their engagement), and the specifics of the development environment context as influenced by the BATK work

#### **6.3.5.1 1. Systems should be flexible, inclusive and patient – underpinning research**

There is a fundamental tension at the heart of player development systems: there are limited resources for player development, necessitating some kind of selection of players, but the associated selection processes are something of a gamble. This is especially the case given what has already been noted about the unpredictability and long-term nature of player development, and problems with early talent identification and selection approaches introduced in the human development principles section.

Players who are not selected, for example, for a centralised programme are unlikely to be selected later (Csikszentmihalyi & Robinson, 1986; Starkes, Deakin, Allard, Hodges, & Hayes, 1996). Thus, they miss the opportunity to compete at the highest level if they later turned out to be a good player (this is analogous with a Type 1 error in statistics – incorrectly rejecting a true hypothesis). Those selected will have a much better chance of success – because of all the additional investment and coaching – but they may not have been the ideal candidates in the first place (this is analogous with a Type 2 error – incorrectly accepting a false hypothesis).

The player development ‘gamble’ is intensified by the fact that player development systems naturally streamline from many players at lower age groups to few players in first team squads. Thus, sitting alongside selection is a natural funnelling process which appears to compound Type 2 errors, making them appear much worse (a point missed by many critiques of selection approaches).

The research has identified two key issues related to player selection: (1) improving player selection strategies and (2) withholding selection for as long as possible.

#### **Player selection strategies**

Early player selection strategies have something of a bad name in the academic research literature. There are a number of reasons for this. Most research has tested and evaluated simplistic one-dimensional approaches; for example, physiological predictors of future success. Researchers have been critical about coaches’ application of selection approaches in terms of the use of particular methodologies and the age at which they have been applied. The following provides more detail.

We have already conceptualised elite player and player development characteristics holistically: physical, psychological, social/lifestyle, technical and tactical (PPSTT). Player selection strategies have historically focused on physical and performance (technical and tactical) characteristics and markers. Early anthropometric and physiological markers and tests have been proposed (e.g. Falk, Lidor, Lander, & Lang, 2004; Reilly, Bangsbo, & Franks, 2000), as a means of predicting later performance success, but their efficacy has been questioned by others (e.g. Lidor, Côté, & Hackfort, 2009).

Technical and tactical markers and tests have been proposed (Falk et al., 2004) and then similarly questioned. Discrete performance variables may be helpful, it is argued, in signposting potential talented athletes during development, but they should not fool coaches into believing that they can distinguish or predict future performance (Abbott et al., 2005). More recently, psychological and social characteristics have also been proposed and then questioned (e.g. Anshel & Lidor, 2012). The point here is that all of these tests have generally been used in ‘isolation’ and do not reflect the holistic nature of player development, as well as the fact that early characteristics might not predict future success due to the non-linear and unpredictable nature of human development.

The academic mainstream is increasingly moving toward a multi-layered, multi-disciplinary approach to selection strategies based on a range of PPSTT factors (e.g. Reilly, Williams, Nevill, & Franks, 2000; Vandendriessche et al., 2012). This multi-layered approach was dominant in the practice descriptions of 15 Premier League and Football League coaches in a recent study by North, Morgan and Rongen (2012a). The coaches talked about a lack of precision in selection practice, and instead applying a ‘balance of probabilities’ and/or ‘gut instinct’ when making selection decisions.



The PC Coaching Handbook (Badminton England, 2011) suggests selection on a range of criteria:

Winning ability	Hitting ability	Athletic ability	Train ability
Enjoys competitive challenges	Can hit soft & hard	Good posture & balance	Motivated
Focuses on activity	Overhead upwards clear	Able to accelerate rapidly	Listens and understands
Keenness to WIN	Overhead downwards shot	Able to move in all directions	Acts on instructions
Focused after errors	Can hit left & right	Ability to stop quickly	Respectful
Sportsmanship	Can rally	Athletic build	Progresses quickly

Although coaches may have good intentions with regards to their talent identification and selection strategies, it appears that systematic biases are evident. A relatively consistent finding in research is that of *relative age effects* – the overrepresentation of age-group/squad/team members with birthdates early in the selection year (i.e. the first quarter) (Helsen et al., 2012; Helsen et al., 2000; Helsen, Starkes, & Hodges, 1998; Helsen, van Winckel, & Williams, 2005; Vaeyens et al., 2008) including in badminton (Romaneiro, Folgado, Batalha, & Duarte, undated).

The relative age effect (RAE) reveals a number of beliefs, preferences and actions amongst sport coaches which have been challenged for their developmental qualities. For example, a preference for short-term competitive success over player development, and selection based on biological and physical markers (Vandendriessche et al., 2012). This is not surprising because youth teams with relatively older age group players appear to have more success (Augste & Lames, 2011). Recent research by Carling et al. (2012) suggests that RAE might not just be based on selection of physical characteristics but also based on other development influences early in the selection year – cognitive development, more practice etc.

### Delaying selection

To avoid the problems associated with early selection using either single or multiple markers, a number of researchers have advocated keeping developmental pathways open until as late as possible, including past sexual maturation (Abbott et al., 2005; Abbott, Collins, Martindale, & Sowerby, 2002; Côté et al., 2007; Martindale et al., 2005).

‘Snapshot’ tests of early performance and physical capacities, it is argued, have not proved to be reliable indicators of later expertise and success (Cobley, Schorer, & Baker, 2012). Early performance and physical markers underestimate potential (Button, 2011). Many performers have made it to the top of their chosen domain despite not showing promise as a junior (Schneider, 1993). Early talent identification is seen as investing scarce resources on a ‘gamble’ (MacNamara & Collins, 2012), and undermining players’ lifelong engagement in sport (Côté, Lidor, & Hackfort, 2009).

These problems have prompted some researchers (e.g. Abbott et al., 2005) to suggest that the focus should shift from ‘selection’ to ‘development’ – with identification/selection withheld at the very earliest until the age of 12, but perhaps even well beyond this. According to our research with the four badminton nations, this does not appear to be a significant problem, with only one country, Spain, talent identifying youngsters before 12 years.

A concern with this approach is that it rather side-steps issues related to player needs, the quality of learning environments and associated resourcing issues. Although Côté et al. (2007) suggest that selection should be minimised until the end of the ‘sampling years’ (c.12 years of age), there is evidence to suggest that coach-led sport-specific practice should start from around eight years at the latest to meet player wants and readiness (North, 2013; North et al., 2012a), and to provide the sport-specific practice required for elite development. In the English football system, for example, there was a general concern about the quality of community coaching in younger age groups, thus a selection approach was used to introduce players into an academy structure at 8 years of age to access higher quality coaching (North et al., 2012a). This was a similar pattern in football across Europe (North et al., 2014).

We believe there are some interesting questions to be asked concerning development, selection and inclusivity. We agree that development pathways should be as broad as possible for as long as possible, but argue that some kind of specialisation and access to higher quality resources is important at an early stage to meet players' wants and needs, and ultimately for the country to remain competitive internationally. The question is, at what age and in what environment? Should selection start at five years, eight years, 12 years or later? Where should resources best be allocated? To local, regional or national level structures? In European football there has been a general rejection of community-based solution to early player development (all serious development took place in academies and training centres). In an English football context, we have argued for substantially improved community resources for 8-11 year olds, with more paid coaches and better coach education, and the removal of the academy system for this age group (North et al., 2012a). The first academy selection decisions should then start around 11-12 years of age (in England *de facto* decisions are actually made from around 5 years of age for 'development centres').

We argue here that at around 11-12 years of age, we can think of selection approaches as more about identifying a pool of individuals who researchers and practitioners believe have the potential to succeed, and in whom the significant development resources available can be invested, rather than guaranteeing first team success. These models must be judged on these terms rather than as cast iron predictors of success.

This 'potential', with the associated investment, will become to an important degree, a self-fulfilling prophecy (as we have suggested very few/virtually no players now emerge from outside of the established talent pathways). Questions will always remain about those who fall outside of the initial talent selection net, but with limited resources and the need to provide high quality sporting experiences what choices do sporting nations have?

#### **6.3.5.2. Selection in badminton**

In the context of badminton, a slightly different selection profile emerged to football although there were some minor similarities. With the exception of Spain which started its selection processes anywhere from five years of age, the remaining three countries started selection around 12 years of age, with final in or out decisions being made around 17-18 years. This is consistent with the advice offered, for example, by Côté and Lidor (2013a) and with a later selection approach.

There also appeared to be an important role for community based organisations (schools and clubs) in delivering quality coaching to younger athletes before they moved on to centralised programmes from typically 12 years onwards. Some countries had invested in schools and clubs, notably Denmark and Spain, although the differences with football may reflect a lower level of resource to establish academies for younger players, and less of a need to sign-up players to prevent them from going to competitors.

There was also an awareness, again, notably in Denmark and Spain, about recruiting the right kinds of youngsters onto centralised programmes focusing on a range of factors enthusiasm, discipline, willingness to learn, technical ability rather than just size and strength, and competition results. There was also an acknowledgement that development was a long term process lasting nearly 20 years.

**Table 6.9: Performer selection in the four countries**

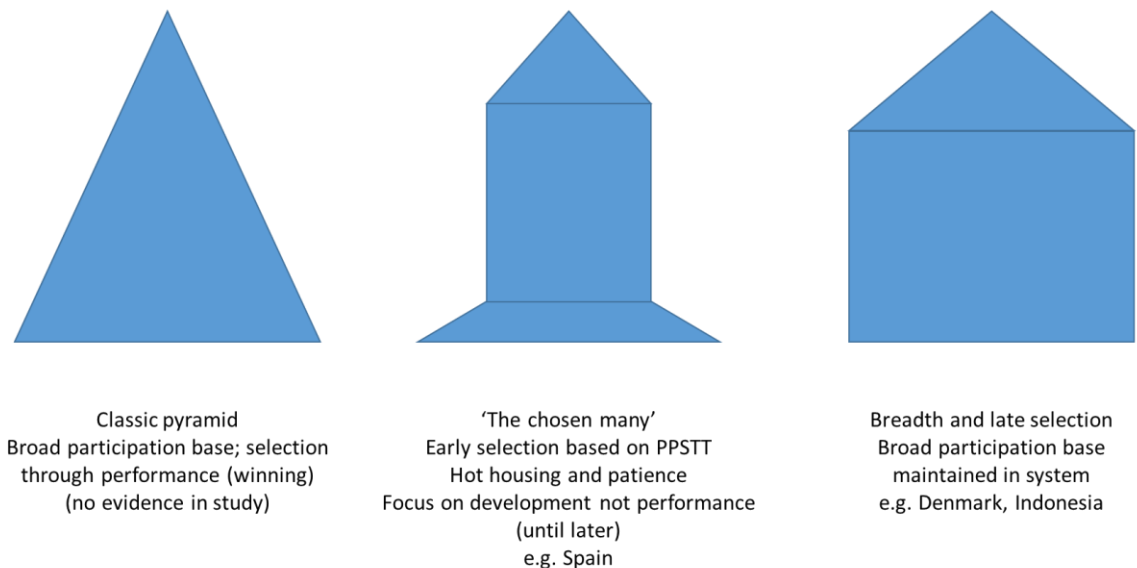
Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Selection from school system, and then from centralised programme into national squads and teams, occurs at a variety of ages – starting about 12 years of age</li> <li>• Selection is informed by results in 8-10 domestic competitions, then the coaches' instincts (65% of decision), and is at least partially informed by sports science data (35% of decision) including inventories and, at age/group and/or performance higher level, 'brain scanning'</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Selection from club system initially based on competition results and rankings in the 10 national competition 'circuits' and six private competitions</li> <li>• The coaches use competition results, rankings, but also 'their eyes'/'by feeling' 'this one is quite good, their posture is good, their skill, their step' etc.</li> <li>• The best 16 players at the year-end get invited to a competition known as the 'Junior Master' for U17, U19 and U21</li> <li>• They are then invited to the national training centre, <i>Pelatanas</i>, to train for three months. If they show good achievement they will be invited to stay. Players still stay with their clubs. Pelatanas and club negotiate over player time in competition</li> <li>• The PBSI operates a system of later selection – giving the players more time to develop than in other countries</li> <li>• The Indonesians do not believe they can accurately identify talent until at least 17 years of age</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Selection from clubs, into regional programmes starting from about 12 years (U13), and then from regional programme into the national programme about 14 years (U15), squads and teams</li> <li>• Interestingly, there has been a recent decision to increase national selection age from U13 to U15. This has avoided problems with making difficult decisions at a still relatively young age, dealing with problem players and parents, but also giving players two years extra for others to grow in club competitions</li> <li>• The Danes suggest, with regard to selecting future potential, there are 'no certainties at U13, very little at U15, and more confidence at U17' (a similar view to the Indonesians)</li> <li>• Selection criteria is initially based on club and national competition to raise awareness of players - especially at U15</li> <li>• The main selection criteria for junior development squads is 'development potential'. The BAD attempts to avoid selecting those who are 'big and strong' which can be difficult because they often do well in tournaments and the classification system</li> <li>• The use of competition to initially identify talent tends to emphasise winning over development – this is seen as a problem which is politically difficult to negotiate</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• The Spanish appear to emphasise selection from earlier ages than the other countries which matches results from football</li> <li>• Selection from the school programme 'Fly with Badminton' through the programme 'Looking for a Champion' anywhere from 5-7 years of age (typically six), however, most selection occurs from nine onwards (which is still slightly younger than the other countries)</li> <li>• As with most countries the selection works from the local (school to club), to regional and then national, through centres</li> <li>• Selection is multi-faceted based on identification of 'good characteristics' across the physical, psychological, social/lifestyle, technical, and tactical (PPSTT) profile (e.g. level of family support)</li> <li>• There is a deliberate strategy to avoid early performers based on size and strength linked to relative age effects</li> <li>• The ability to develop technique and tactical understanding at earlier ages are much more important than winning</li> </ul>

Country	Detail
	<ul style="list-style-type: none"> <li>• 'If the kid is a Spanish champion, I don't care about that. I pay attention to what type of grip they have, their shots... If they can read the game. That's why I always start with tactics. Tactics come first' (7)</li> <li>• The Spanish suggest that after their programme is run for a number of years they will be able to identify key PPSTT data to inform selection – but do not have this currently</li> <li>• Teachers and parents are educated about the programme.</li> </ul>

The results suggest some generally good practice in talent identification selection across the four countries when measured against research recommendations, and against other sports.

Most countries appear to encourage participation and performance simultaneously with crucial decisions not being made until early to late teens. This compares very favourably with football, for example, where selection can start *de facto* at five years of age!

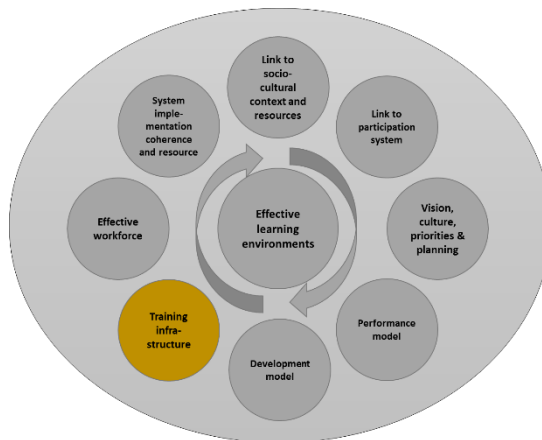
In this study we offer three pathway models:



Denmark and Indonesia appear to have opted for the broad and late approach to the pathway, whereas Spain, like in football in the country, appears to be opting for the 'chosen many' approach. There was no strong evidence of the classic pyramidal approach often seen in different sports and across the world.

The countries, in keeping with their performance models, and use of holistic development, also appeared to be making decisions about selection on PPSTT factors (although they may come the attention of the federations through competitive results/rankings).

## 7. Infrastructure and workforce



### 7.1 Training infrastructure, facilities and equipment

#### 7.1.1. Underpinning research

Research reports that training facilities assist the delivery of player development programmes, and specifically the preparation for high performance athletes to execute successful performances (Sotiriadou et al., 2008). The ownership of facilities by sport organisations or teams, rather than the sharing of, and competition for, facilities with other sports and commercial organisations was noted in one Canadian study to increase player development and player retention (Edwards, 2016). In the context of the United Kingdom's system of managing excellence in sports performance, Lyle (1997) acknowledged the importance of facilities and competitions as 'delivery mechanisms' or 'structural strategies' for the progression of athletes. However, Lyle argued that progress was also likely to be achieved through better management of systems, education, training and investment in people rather than facilities themselves.

The importance of training infrastructure, facilities and equipment did not emerge as a major issue in the UEFA study of European football player development systems (North et al., 2014). This is surprising because, for example, facilities, and a 'spiritual home', for player development and coaching is very evident in football such as St George's Park in England, and La Masia in Spain.

We conclude that training infrastructure, facilities and equipment remain an important part of the effective player development systems 'jigsaw'.

#### 7.2.2. Training infrastructure, facilities and equipment in badminton

In the four countries, facilities emerged as an important part of the player development system providing a space for badminton activity at all levels. There were different models in the four countries – Indonesia and Denmark were built on an extensive club system, South Korea was built on a school and university system, and Spain – as an emerging badminton playing nation – was attempting to build capacity in schools and clubs with a reciprocal relationship between the two. Beyond the entry points for participants, there were regional facilities in Denmark and Spain, and national facilities in all countries. The country federations appeared to develop partnership relationships with bigger clubs, sport schools, academies – with some of the latter being private providers.

**Table 7.1: Player development infrastructure in the four nations**

Country	Detail
South Korea	<p><u>Facilities</u></p> <ul style="list-style-type: none"> <li>• Extensive network of badminton facilities</li> <li>• Mainly located in schools and universities (elementary, junior high school, high school, university)</li> <li>• Wide ranging access for children and adults; courts open at 6 am in morning and close at 11 pm at night</li> <li>• All educational institutes have a multi-purpose gym available to badminton players</li> <li>• No regional academies</li> <li>• There is a national centre – Korean Olympic Committee – (22 courts at the national centre), and national training centres at three different locations – they have facilities/dormitories etc. <ul style="list-style-type: none"> <li>○ Taeneung – the biggest</li> <li>○ Jincheon – newest</li> <li>○ Taebaek</li> </ul> </li> </ul> <p><u>Equipment</u></p> <ul style="list-style-type: none"> <li>• Equipment is provided by the schools for younger age groups, at the representative age-groups equipment is provided by the BKA – it is sponsored</li> </ul> <p><u>Sports science</u></p> <ul style="list-style-type: none"> <li>• Sport science is a very important part of the South Korean programme (however, it was relatively absent until about 2007-08)</li> <li>• Sport science support is provided to the national teams by the Korean Institute of Sports Science, plus the sports science working group from the BKA which includes university researchers</li> </ul> <p><u>Athlete funding</u></p> <ul style="list-style-type: none"> <li>• Most athletes get a salary from the city team</li> <li>• National athletes get a salary from the Olympic committee – around \$1,000 USD per month – but all food and accommodation is provided separately for free (this is just for the senior team)</li> </ul>
Indonesia	<p><u>Facilities</u></p> <ul style="list-style-type: none"> <li>• Most facilities within dedicated badminton clubs (as noted there is an extensive club network in Indonesia, perhaps over 500,000!)</li> <li>• The clubs vary in size, ambition, and quality, with some taking on a role of representing provinces, cities and regencies. Each club generally has a minimum of three coaches</li> <li>• (As far as we are aware) there is no regional level centralised structure (i.e. operated by the PBSI) for badminton in Indonesia</li> <li>• There are a range of badminton ‘sport schools’ and ‘academies’ across Indonesia including two in Jakarta – these are often private providers who work with the PBSI</li> <li>• The top of the player development pathway (from about 18 years onwards) and the high performance programmes are based at, <i>Pelatnas</i>, the national training centre</li> </ul> <p><u>Sport science</u></p> <ul style="list-style-type: none"> <li>• Basic programme in place with players having access to physiologists, strength and conditioning, and psychologists</li> </ul>
Denmark	<p><u>Facilities</u></p> <ul style="list-style-type: none"> <li>• Most facilities within dedicated badminton clubs (as noted there is an extensive club network in Denmark)</li> <li>• In each region, there is a network of clubs, of which the top one hosts the ‘training cell’ for the region, for example, a training cell in Aulborg (there are 6-8 regions)</li> <li>• There are several private academies in Denmark where participants pay and play.</li> </ul>

	<ul style="list-style-type: none"> <li>• There are two 'elite power centres' in Aarhus and Odense for 13 to 20 year olds</li> <li>• There is a 'national centre' at Brøndby – 21 years and over (plus local youngsters)</li> </ul> <p><u>Athlete finance</u></p> <ul style="list-style-type: none"> <li>• Athlete finance – no living support, tournament support - World Team Championships Group and Youth Senior Development Group</li> </ul>
<b>Spain</b>	<ul style="list-style-type: none"> <li>• Facilities increasingly established in schools and linked clubs</li> <li>• It has been a challenge for FESBA to access court time at elite facilities</li> <li>• A network of Centres of Excellence for national teams and higher level competition</li> <li>• Regional training centres: Andalusia, Galicia, Asturias, Basque Country (Pais Vasco), Catalonia, Valencia, Balearic Islands, and Madrid</li> <li>• The national training centre is in Madrid</li> </ul>

### 7.2.3. Centralised training, squads etc.

In terms of the intensification of training further up the pathway, and access to a greater amount and concentration of player development resources including facilities, each country tends to use centralised (regional/national) training, training groups, squads etc.

In Korea, for example, centralised training is held in the three major training facilities identified, as well as other locations where training space can be identified for U13s, U15s, U17s and U19s. Korean camps and squads are typically undertaken in the winter and summer vacations. Winter training tends to be focused more on physical development; summer training on technical and strategic practice through game based approaches.

#### Winter squad training in Korea

“(It’s) physical training, because, usually, in Korea, the wintertime is super-cool. There’s a very surprise training at, like, 3, 4 in the morning – they just wake up... You know like in army they usually call up all of a sudden at 3, 4 in the morning and ask all to run tracks. Actually, from time to time, our junior programme actually do that during the winter time. The old style of our coaches think that if they survive those kinds of things then maybe mentally they’ll get stronger. There’s no scientific proof of it, they (the players) just hate when they run in the morning” (3) The Korean expert provided some examples of the training schedule during camps: 6 days out of seven (Sunday off); two sessions per day for younger athletes; three sessions for national team; each session 2 and half hours; mixture of practice types: physical preparation, drills, games ‘The atmosphere in the centralised training is sometimes very serious. Because I guess the association and our coaches do not want our players to lose any focus during training’ (3)

In Denmark, there are 'elite national groups' for U15, U17, and U19. U15 has, on average, 32 players, U17, 22 players, and U19, 18 players. Denmark previously had a U13s elite group but this was removed because it was argued to be too early in the players' development. Instead, centralised staff go out to the clubs and organise 'training weekends, try-outs, and inspiration days, training days, two or three times a year in each of these counties' (5). This is also an opportunity to influence player development and coaching practice in the clubs. At the U11, U13, and U15 level almost all players are still located in local clubs near their parents. At U17 and U19 they 'move naturally' from local club, to bigger clubs, to regional centres, and then to the national centre.

## 7.2. Effective workforce



### 7.2.1. Underpinning research

The important role played by sport coaches, strength and conditioning coaches, sport psychologists, and other parts of the sporting workforce in player development are now widely recognised (Bloom, 1985).

Effective sport coaches, for example, have been argued to create environments which are conducive to the development of performance, the psycho-social well-being of players and teams, and a range of other player development benefits (Taylor & Bruner, 2012). At the same time, ineffective or poor coaching may have a detrimental impact on player development; including stress, burnout, drop-out and lasting psychological issues (Alexander, Stafford, & Lewis, 2011; Arnold, 1997; Dodge & Robertson, 2004; Donegan, 1995; Lyle, 2002).

The above has two implications; first, that a workforce is required to support player development and, second, that it needs to be effective, and this effectiveness needs to be supported, developed and monitored. There is a considerable literature discussing coach development and education (for a review see Cushion et al., 2010).

There has been very little research on coaching in a badminton context. One study provides example coaching models (Hastie et al., 2009). This research suggests that the traditional educational model has favoured a coach led rather than player centred/coach facilitated model of pedagogy. Hastie et al. (2009) refer to badminton colloquially adopting a 'traditional' approach to shaping a learning environment, relying on a behaviourist view of learning through the use of technical instruction and autocratic coaching behaviours.

### 7.2.2. Effective workforce in badminton

#### The centrality of the coach

All four countries recognised the importance of coaching, and, in particular, high quality or effective coaching, to player development system success. An appropriate player development pathway, and quality/effective coaching were often identified as two of the most important features of effective player development systems.

#### Importance of coaching in Denmark and Spain to player development

"The next world champion might be born close to the west coast... So the next one (champion) can be born anywhere. No matter what club, they will start playing badminton, they should be led with a coach who has that perfect knowledge about the basic competences and how they should learn them ... one of the limiting factors is the quality of the coaches. I cannot think of any talent development systems where the quality of the coaches is not the limiting factor" (5)

"The quality and effectiveness of the coaching workforce is prioritised" (4)



“The coach is the key driver of the sport ... and that’s the reason we need really very good coaches ... to guarantee that all these talented players will be in good hands from the beginning” (8)

### **Workforce structure**

The four countries reported different workforce structures. In Korea, many coaches, working in schools, clubs and in the national set-up, were paid, with payment linked to their qualifications. The Korean experts suggested it was possible to make a very good career coaching badminton in Korea. In Indonesia there was a mixture of volunteer coaches at the lower reaches of the participant system and player development pathway, but increasingly paid part- and full-time further up the pathway. In Denmark coaches were mainly volunteers. Indeed, many of the coaches working at the highest level remain part-time with only 20-30 full-time paid. There was no licencing system, and no compulsion for coaches to become qualified in Denmark.

There was also some interesting role based and functional structuring of the workforces in each of the countries. In Indonesia, the lowest qualified coaches tended to work in the smaller community clubs, whereas the highest qualified coaches were generally deployed at the provincial and national level.

Denmark reported the identification of distinct workforce roles linked to particular player segments. For example, a ‘basic coach’ for beginners, a ‘talent coach’ for players who have moved beyond emerging, a ‘senior coach’ working with players in clubs just below the national level focused on domestic competition, and an ‘elite/high performance coach’ for those competing at the highest level. There was also a ‘youth coach’ for young adult participation players. In Denmark, each coaching role had its own distinct education and development provision. Coaches were also encouraged to ‘sample’ working with different age groups and pathway stages to gain experience and to ‘see the big picture’ (4).

It was interesting in Denmark and Spain that there was a philosophy of ensuring the coaches who work with beginner younger players are just as important and prestigious as those who work with elites. However, it was recognised that many of the ‘worse coaches’ were still working with the beginners and ‘talent was being lost’ (8).

### **Coaching practice and behaviours**

The four country experts provided information on the qualities of coaching practice with some interesting inter-country differences noted.

All the experts commented on the need to establish professional practice with good coaches being attentive to their knowledge and development, planning and preparation for programmes and sessions, use of different practice structures and coaching behaviours to meet context and goals.

Beyond this, three main issues emerged: (1) the focus of coaching (2) the place of the coach in the coach-athlete relationship (3) the nature of coaching as a structured or flexible process.

First, the focus of coaching. We have noted that elite and developing players are defined by the PPSTT characteristics and development needs. A question was raised about the role of the coach in this broader development process. In some countries, notably Denmark and Spain, there was a sense of the coach being the orchestrator, located close to the player, working with him/her to find the best solution to specific player development problems. This might involve drawing on sports science resources, for example, but always through the coach. In Korea, the coach appeared to work alongside sports scientists, and, although anecdotal, there seemed to be a disconnect between the coaching and sports science applications. This also appeared to be the case in Indonesia and there was a push to move the coach away from simply technical skills coaching:

### **Broadening coaching in Indonesia**

“In Indonesia, the players, the talent is very good, and the coaches (former players) also good. And the technical knowledge is also very good ... but now we need to think about sports science. So in other countries like Japan they use cameras, and they do the performance analysis. We cannot rely on the last previous, just

producing champions and champions, because when we lose we have to know why is this? When the players and coaches know their strengths and weaknesses they learn. So we have to change the coaches' mindset. But this is not easy. Competition is very important, and the coaches have produced world champions using traditional methods. We have to change their mindset, to show the importance of sports science. They have to know about the coaching process. They have to know about how to make a programme. They have to learn a lot of knowledge" (1)

Second, the place of the coach in the coaching athlete-relationship. A distinction was made between what is perceived to be the traditional coach centred approach to coaching, and, a more facilitative athlete centred approach that has emerged more recently. Coaching styles, and as we will also note, practice structures, have an important influence on the nature of player learning experience, and ultimately, what kinds of players are developed. Connections have been made between a controlling hierarchical coaching style and a more robotic type of player, and between a more athlete centred, facilitative coaching style and more motivated and intelligent players:

### **Coaching in Denmark**

"It's very visible when you see them coach the players during competitions – how they behave there. We are talking about not putting yourself as a coach and your personal needs in front, but look at the players and see what their needs are, and how should you behave (to meet the players' needs) ... For instance, if you're coaching and sitting behind the court, some coaches have this dialogue playing, telling the players all the time what to do in the next rally, what to do in the next rally, instead of letting them make their decisions themselves, or encouraging them to think. Internationally, you are allowed to coach behind the court in all age groups. In Denmark we have forbidden to do this kind of coaching in under-13 and under 15. And that's to encourage the players to make the decisions themselves ... (We are working with coaches) on their personal coaching style, and how we would like to see it. We want them to move away from taking their own personality as the starting point, and do more outside and look at the players, what their needs are" (5)

Similarly in Spain, there was a rejection of a hierarchical, autocratic view of coaching (which was seen as important to the Asian model), with coaching seen more a process of partnerships and agreements:

### **The Spanish partnership model extended even to very young children**

"I have been monitoring sessions where we've had 10-year-old kids and their coaches, who are training them from their own limitations, and they are surprised by how the kids respond. I always tell them: 'kids are not stupid! Don't patronize them'. Because when you ask a kid you are going to get a great answer, and you are going to learn a lot. So just ask, don't instruct ... Train to learn, so they learn to learn. You don't teach a kid to play badminton, teach him how to learn. Don't teach them, don't focus the process on the teacher: "I teach". No, you are not a good teacher because you know a lot, the one who has to learn is the kid. It's quite philosophical what I am saying, but it's turning over the process" (5)

A similar model was emerging in South Korea – although with progress to be made. It was noted there had been a very hierarchical approach to coaching with the coaches clearly in charge and athletes in the background. More recently and notably in the Olympic cycle around London 2012 there had been change which emphasised (relatively speaking) a more democratic approach with more interaction, communication and attempt to gain mutual understanding between coaches and players.

In the Korean system, coaches still appeared to be very much in charge in competition – there is a great deal of in game coaching in Korea, for example, compared to the Danish approach.

### **The Korean approach - In game coaching**

“Usually, one of the big roles for coaches during the international matches is finding out the momentum of the game. There are always ebbs and flows during the matches, so understanding that is very important. Usually there are very good coaches who catch that fast enough. For instance, just looking at the opponents, let’s see who is nervous or not. Some coaches have the ability to find out who will be a better target to attack. So I think just communicating with coaches is one of the... a big part of the game” (3)

A very interesting question is whether more facilitative coaching styles work universally across context (in line with for example self-determination theory) or whether styles are culturally fixed to western/European countries and less culturally workable in Asia.

Third, there was some discussion about the nature of coaching: is it something that can be learned in a formulaic manner, or something more flexible and adaptive. Here we note a distinction between how coaching is necessarily practiced, and an image of coaching presented through coach development and education opportunities. In some countries’ coach education systems, there is an emphasis on the rote learning of knowledge with high test scores demanded (e.g. Korea). In other countries there has been a reaction against this. For example, in Denmark, it was noted how the coaches were not bound to centralised programmes, and coach education and training manual recipes, but ‘allowed to coach’, using their expertise to work with their athletes against the coaching goals in their particular contexts. The development of expertise was seen to be an important part of this approach: “the less people - coaches - know about things, the more rigid answers they give. If you don’t know anything about cars, you ask ‘what car should I buy?’, you ask someone you think knows a lot about cars, if you ask ‘what car should I buy?’ then the guy begins to explain ‘Yeah, but what would you prefer, what would you like?’ and then starts explaining. And then the guy who asks, he says ‘Stop, stop, stop. I just want you to tell me what is the best car, what kind of car should I buy.’” (5).

### **Coach development**

As just noted, there is a link (often implicit) between an understanding of coaching, and how coaches are developed and educated. This link was illustrated by the different approaches to coach development and education in Korea, Denmark and Spain. In Korea, coaches are ‘educated’ by experts in terms of received knowledge and ‘best practice’ typically in classrooms and then are tested to see whether they understand this knowledge.

In Denmark and Spain, there was a greater awareness of the role of ‘theoretical’ knowledge (what we might call external propositional knowledge), against a range of other knowledge types e.g. the federations’, the practitioners’ etc. ‘Theoretical knowledge’ is seen, not as a determinant, but as a *tool to inform and challenge*, practice. This completely recasts the development and educational experience for coaches. The coach developer becomes like the coach described above working in an athlete centred way, as a facilitator of development.

### **Theoretical knowledge as a tool**

“The whole concept of a training plan - the scientific-based principle of a training plan... there are a few things that we need to educate those coaches, so that experiences from their own coaching career plus their own playing career, there will be a framework for that, where they can put their experiences and act more scientifically, act more efficiently. In terms of where a lot of where coaches are coming from in the first place.” (5).

“The training area, as I was telling you, if we have the best athlete in the world and her coach is constantly in contact with science, research and innovation, generating new content, shaping that knowledge and creating training courses to boost their level” (7)

This more coach centred approach to development also tends to respect the knowledge and experiences the coach brings to the educational experience. For example, in Denmark rather than providing set curriculums, their approach ‘works with the coach’s experience, not against it’ (5). For example, many coaches were ex-players with a great deal of technical knowledge. Many also have a scientific background being physiologists, medical doctors etc. It was recognised by the Danish federation that it was important to recognise, work with, but also challenge this coaching knowledge to gain the greatest traction on coaching change. There was an emphasis on ‘actual practice’ rather than ‘theoretical knowledge’.

There were some commonalities between the countries also. For example, there was a significant emphasis on more experienced coaches working with less experienced coaches across countries. In Denmark performance directors, youth development experts and other technical specialists work 1:1 with the high performance coaches in a mentoring capacity. The Danes would also put on training camps where the seniors, and age-group squads and coaches were together in one place so they could share knowledge. In Spain, high performance coaches would often interact and exchange ideas as part of a group/community of practice of coaches of excellence, or ‘GEX’. The informal sharing of information and established communities of practice was something that was very evident in Spanish football in the UEFA research (North et al., 2014). There was a strong sense that ‘coaches are the ones to train other coaches ... when you train other coaches you are also learning. It’s the best way to learn and the best way to recycle, and above all, the best way to organize your knowledge. As I have had to teach many courses it’s helped me to improve as a coach’ (7).

In Korea, high performance coaches would work with age group coaches e.g. at U13 and U15 in an observational and mentoring capacity. Age group coaches, in turn, would travel to meet coaches in the provinces, in schools, for example, to evaluate and help their practice, as well as to assess potentially new talented athletes. There was a more general sharing of information between coaches at all pathway stages – elementary, junior high school, and high school.

### Coach education and qualification

All four countries understood the value of coach education for coach development, and had coach education systems in place. For example, in Spain, with a newly emerging system, there was a sense that there was not yet enough coaches, and enough coaches of the right quality, to meet their wider goals and system aspirations. Thus, there has been a significant drive on coach recruitment and education.

Most countries operated either a three or four level system. There was a combination of external (sports institute and university) and internal (federation) contributors. The federation aspects of the Indonesian and Spanish systems were at least partially based on the BWF’s three level coach education system. However, there had been some tailoring of both novice and expert provision.

**Table 8.1: Coach education across the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• Coach education system in place</li> <li>• 3 level system: <ul style="list-style-type: none"> <li>○ Level 3 - (lowest level) - BKA with Korean Olympic Committee</li> <li>○ Level 2 - BKA with Korean Olympic Committee</li> <li>○ Level 1 (highest level) – mandatory for national elite coaches - provided by Korean Olympic Committee and Korean Institute of Sport - the ‘big picture of being a coach’ - top disciplinary experts provide seminars from universities or Korean Institute of Sport – a very challenging approach</li> </ul> </li> <li>• Most senior coaches also do Level 3 and 2 because they want to – most ‘expert coaches’ are committed to education</li> <li>• BKA provides coaching courses (twice a year)</li> <li>• Coach education tends to focus on physical and technical demands of badminton</li> <li>• There are also modules for sports science (the different disciplines), coaching theory and leadership</li> <li>• 70% classroom; 30% practical</li> </ul>

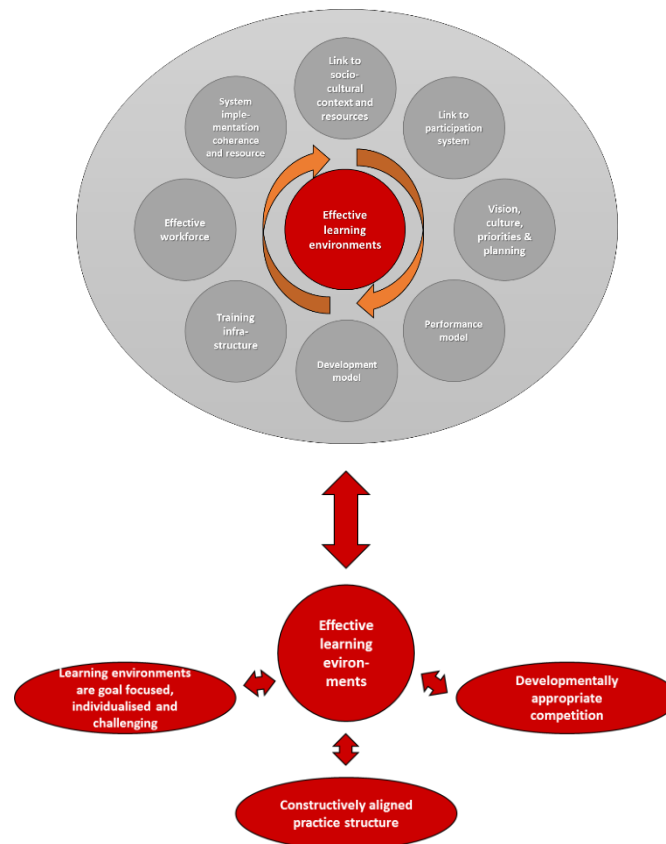
Country	Detail
	<ul style="list-style-type: none"> <li>• There is some informal sharing of information between coaches, for example, at tournaments</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Coach education has become a priority for the PBSI</li> <li>• Linked to the notion of long term coaching development</li> <li>• Coaching levels (with the exception of 'Pre-level', this is based on the BWF's coach education system): <ul style="list-style-type: none"> <li>○ Pre-level - small club</li> <li>○ Level 1 - Regency/city level</li> <li>○ Level 2 - Province level</li> <li>○ Level 3 - National level</li> </ul> </li> <li>• PBSI - has developed own programme for the Pre-level because <i>Shuttle Time</i> programme was deemed too basic for Indonesia's pre level coaches</li> <li>• The education is delivered through seminars, clinics, learning resources and mentors</li> <li>• Often the mentors are ex-national players – there are some concerns that the mentors are 'on script'; they are not monitored.</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Coach education system in place</li> <li>• Based on coaching roles: <ul style="list-style-type: none"> <li>○ Basic training program – the start of coach education – knowledge of child development, technical and physical-motor training, so that the coach can plan, organize and implement child-friendly training</li> <li>○ Talent coach – focus on young talents – further knowledge of child and adolescent development and assumptions, as well as skills in technical, tactical, physical and mental training. The coach can plan organize and implement individual talent development process and create a common thread between the different ages and the club's training team</li> <li>○ Youth coach - focus on recruiting and retaining young people in badminton including knowledge of youth culture and their motivations, and how to set up engaging badminton environments</li> <li>○ Senior coach - training and guidance of adults – knowledge of management, team building and personnel care and skills in technical, tactical and physical training and competition strategies so that the coach is equipped to handle training and competition for adults</li> <li>○ Elite coach - optimizing the performance and training of national team players. The themes are training planning and delivery, tournament preparation and performance optimization as well as personal development and training role</li> </ul> </li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Coach education system in place</li> <li>• There is a national generic coaching education system linked to higher education</li> <li>• There is a 3-level badminton specific coach education system – a FESBA interpretation of the BWF coach education system – this is provided by each of the regional federations</li> <li>• There is also guidance linked to the key programme 'Fly with Badminton' and 'Looking for a Champion'</li> <li>• FESBA also provides coaching education that attempts to link directly to practice on court 'the perfect work comes with training courses and daily training with the athletes' (7)</li> <li>• Performer development coaches – focus on technical development and not on performance and winning</li> </ul>

## Sports science

There was only extensive discussion about sports science in the South Korean context, although each of the remaining three countries operated a sports science workforce. As noted, sport science was a very important

part of the South Korean programme. It was managed by a 'sport science committee' and 'working group'. The committee was constituted by head coaches, BKA staff, and university researchers working together to decide what is feasible and acceptable in terms of sports science interventions. The working group involved the day to day interaction between sports scientists, athletes, and coaches – "there is a lot of communication ... so they feel comfortable". They worked together at centralised camps, and the sports scientists also go to the international competition.

## 8. Effective learning environments



The player development system components described in sections 5-7 are positioned at a 'high' strategic and structural level albeit with important implications for player development activities. However, these components/sections do not provide specific detail about these activities.

Player development systems are put in place for a reason - to develop players. Thus, there must be a more detailed focus on the point where the 'system', notably, although not exclusively through coaches, interacts with the player. We have called this component 'effective learning environments' because ultimately that is their focus of attention – helping young players to learn how to engage with badminton at a higher level.

In terms of both research and practice, effective learning environments have been shown to be shaped by the following:

- Learning environments are goal focused, individualised, and challenging
- Constructively aligned practice structure
- Developmentally appropriate competition
- (We have discussed coaching behaviours briefly in the previous section).

The section will now go through each in turn.

### 8.1. Learning environments are goal focused, individualised, and challenging

#### 8.1.1. Goal focus - underpinning research

In previous sections, we hinted at the goal orientation of player development environments. Successful learning environments are likely to have a clear philosophy and culture, with a clear idea about the final

endpoint on the journey of development (performance model), and how this development should occur (development model).

The development model suggests that learning environments are usefully thought of as long-term, age-staged and holistic. That is, there is a long-term commitment to learning and development, there is differentiation in learning environments between different age-groups, and coaches should think of learning environments attending to physical, psychological, social/lifestyle, technical and tactical components. These ideas provide the framework for more specific explicit or implicit curricula which guide programmes and session plans.

Goal setting and planning provide the mechanism to integrate longer term macro level goals, information and activities into seasonal and sessional programmes (Abraham & Collins, 2011). Effective goal setting and planning have an established relationship with effective coaching practice (e.g. Gallimore & Tharp, 2004).

The dynamic and contextual nature of player development and coaching means that coaches will have to be flexible and adaptive to take account of incidents and events in the coaching context as they happen. Coaches should not rigidly or blindly follow the plan but consider what is happening in front of them (Cushion, 2010). Being flexible and adaptable to changing conditions are also a hallmark of effective coaching (Saury & Durand, 1998).

### **8.1.2. Goal focus in badminton**

A number of the countries talked about an explicit planning approach to training with focus on both individual and groups. For example, the Danish experts talked about a more explicit planning approach for U15s, gradually increasing in detail and intensity as the players grew older through U17, U19 and into the seniors. There were planning and review cycles in evidence in Korea – players at the top of the pathway generally had a review meeting every two weeks.

### **8.1.3. Individualisation – underpinning research**

We have already noted the highly individualised nature of human development (see section 6.3.1.1. on human development principles). One implication of this is that development programmes and learning environments should also be individualised to meet differing and emergent player needs (Martindale et al., 2005).

Although there are a range of theories that provide insight into player learning and development and pedagogical processes, the theories with the widest contemporary support generally place the learner at the heart of the learning and development process (Cassidy, Jones, & Potrac, 2004; Cushion, 2010; Kidman & Lombardo, 2010).

Older theories of learning - notably behaviourist and information processing theories - generally support a view of development where the player is passive and the learning designer/educator is central, highly directive, instructive and prescriptive (Cassidy et al., 2004; Kidman & Lombardo, 2010) transmitting knowledge in a unidirectional way.

Learning theorists such as Vygotsky place considerable emphasis on learner centeredness and individualisation: “the fundamental prerequisite of pedagogies inevitably demands an element of individualisation, that is, conscious and rigorous determination of individualised goals” (Vygotsky, 1997, p. 324). In this approach there is no assumption that the coach has all the knowledge and controls the coaching process. Players are seen to have essential insights into their own learning and development (Jones & Standage, 2006). This means that there is active collaboration between coach and player with the coach investing significant time to develop and nurture relationships. The coach helps the player to identify development issues and provide guidance and support to address them.

The relationship is generally seen as being facilitative and nurturing - encouraging and supporting the player rather than dictating and forcing (Cushion, 2010; Kellett, 1999). Learner-centeredness and individualisation have important implications for goal setting, monitoring and review – though there is a high level of flexibility and responsiveness. “Effective coaches are able to focus on the needs of individual athletes; and behaviour should be shaped around individual athletes’ progress and responses, and also the context at any given moment” (Cushion, 2010, p. 56)



Martindale et al. (2005) see individualisation as important for youngsters seeking to navigate tricky transition periods when they may excel and/or drop-out of sport. Coaches can help to provide players with the most appropriate psychological skills and social support to negotiate difficult periods.

### **Self-determination**

Highly related to notions of learner centeredness are notions of self-determination which have had considerable currency in sports research (e.g. Hagger & Chatzisarantis, 2007).

Deci and Ryan's self-determination theory (e.g. Deci & Ryan, 2012) suggest that optimal development occurs in situations where a number of basic psychological needs are satisfied. These are: *autonomy* i.e. individuals have agency, choice and/or control over their environment, *competence* i.e. feel effective as part of their interactions in the environment, and *relatedness* i.e. feeling connected to others. The theory has received a high level of empirical and peer backing (Vallerand, Pelletier, & Koestner, 2008).

An implication of the theory is that sport coaches and institutions can most appropriately support player development through establishing environments where players have choice and choice initiation, feel they can contribute, and are understood and supported.

### **Team centred learning environments**

Since badminton is an individual sport (singles) or played in pairs (doubles), it may be suggested that team development would be neglected, however it is appropriate to acknowledge the team aspects of development. Research within net-wall sports across volleyball (Chen, 1993) and table tennis (Wang et al., 2011) all identify a positive correlation between team cohesion and support in accordance with learning and performance both at an elite and development level. Similarly, in research undertaken by North (2017) in performance kayak slalom (an individual or small team sport), coaches use explicit team related development strategies where paddlers are expected to support but also challenge each other to improve.

#### **8.1.4. Individual and team focused in badminton**

There was evidence of both individualised and team focused learning environments in the four countries. In Denmark, individualisation was a key element of the BATK concept tailoring training and competition environments to meet individual need. The Danish coaches worked with the concept of 'primary focus' that the player and coaches agree on: "this primary focus area, we are very, very aware to tell the players that they need to have this, your own personal primary focus area in the back of your head at any time when you are on court – which means that, no matter what you're practising at the moment, you still can have, in the back of your head, focus on your own primary focus area" (5)

In the Danish system there was also a particular emphasis on 'group training' rather than individual 1:1 training: "our culture is that you are participating in group training. Clubs are setting up group training sessions, which means that if there are five or six courts in the hall, you use all five and six courts, and you have, say, 16 to 24 players and one or two coaches, and then everybody's doing the same thing. This concept of one-to-one coaching, which is very popular in Ireland or England or elsewhere around the world, that's a new thing for us" (5). Some 1:1 training is still used in Denmark suggesting a mixed approach.

There were some interesting nuances. For example, in countries such as Korea, there appeared to be less autonomy for athletes than in notably Denmark, but also Spain. In Korea, players near the top of the player pathway were often located in national training centres with very controlled training programmes and regimes. The players seldom left the training centre although there was leisure time on weekends. The following was a typical day:

- 6 am – jogging/running, yoga, or group exercise
- 6:30 am to 8 am – breakfast
- 9 am to 12 noon - team practice
- Lunchtime
- 3 pm to 5:30-6 pm - afternoon training
- Dinner

- Then train from 8 pm to later – it's up to them; also English or Chinese language programmes in the evening
- Curfew 10 pm.

The Korean expert suggested with regard to this intensity 'most of them are used to it'.

### 8.1.5. Learning environments are challenging

Although, as noted above, there are many different theories of learning to inform player development and wider pedagogical processes, one theory, Vygotsky's (1986) 'Zone of Proximal Development' (ZPD), has received significant attention in the player development and sport coaching literature (e.g. Cassidy et al., 2004; Cushion, 2010).

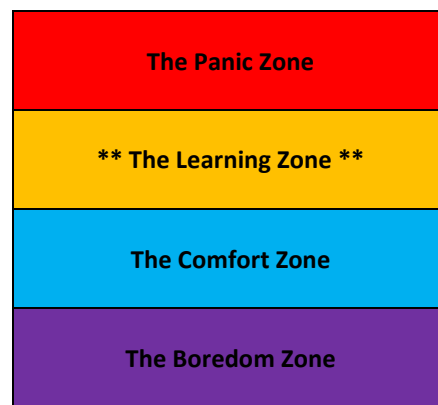
The theory suggests that optimal learning occurs in the space between the player's current knowledge and skills (where they feel competent and comfortable) and what is deemed a developmentally appropriate next step. The coach diagnoses the learner's understanding and skill level and estimates the support needed. The coach is said to 'scaffold' the player's learning by designing activities to increase the player's understanding of a particular concept or skill. Scaffolding enables the player to solve problems, carry out a task, or achieve a goal which would be beyond an unassisted effort.

The level of support is contingent on the learner's progress - more progress less support, less progress more support. The coach looks to ensure progress while reducing the level of support, thus gradually withdrawing control over the task and transferring control to the learner.

The coach's behaviour focuses on controlling those elements beyond the athlete's capacity, thus allowing the athlete to complete those that were within their capabilities. In this sense scaffolding implies simplifying the learner's role rather than the task (Daniels, 2001). Proximal role models and training groups can have an important role to play in this regard - supporting and challenging group members (Henriksen, 2010)

Players learn most effectively when they are in the learning zone:

**Figure 8.1: The learning zone**



Permission: Sergio Lara-Bercial

The learning zone: the task and/or the set up fall just above the comfort zone thus stretching the learner's current capacity and maximising learning.

The panic zone: the task and/or the set up are too far away from the learner's current level of ability. As anxiety and eventually panic set in, learning will decrease. Being in the panic zone can also jeopardise future engagement with similar tasks due to negative associations.

The coach aims keep learners in the learning zone as often as possible and for as long as possible, thus facilitating learning.

### 8.1.5. Learning environments are challenging in badminton

Implicit in a great deal of the experts' description of player development practice was the notion of challenge – establishing the conditions to move individuals and groups to the next stage of their development. It was the Spanish who discussed this idea most explicitly in the interviews. There were two aspects they focused on in particular. First, was the development of skills through the use of a colour coded martial arts style grip. This encouraged/challenged the young players to incrementally develop technical skills rather than being overly concerned with winning matches. Second, was an insistence on the part of the head coach, that the young players engage more cognitively in their development: "I like kids to know why they do things since they are very young. I want them to understand why they do things. They shouldn't be treated as they were stupid; sometimes children don't progress because coaches don't let them" (7). There was also the use of 'playing up and down' as a challenge mechanism.

### 8.2. Constructively aligned practice structure

Within the wider developmental context described above, one of the most charged discussions within the research literature, and within player development practice, concerns practice structure, and if, when and how this varies according to development goals and contextual considerations.

Put simply, to maximise development, what are the most effective methods of structuring practice, how should the coach manage practice, and how does it vary?

The research literature has emphasised different approaches. There is no simple way to conceptualise this, however, the following are useful analytic binaries:

- Specialisation versus sampling
- Structured practice versus unstructured play
- Skill- versus game- based practice

Competition is clearly also important to the developmental context, as are the strategies and behaviours that coaches use to manage and deliver both practice and competition.

Muir, Morgan, Abraham, and Morley (2011) adapted Biggs's (2003) notion of constructive alignment in adult learning to a sports education context. Biggs's idea is simply that learning environments are about achieving particular long, medium and short term goals or learning outcomes and these goals act as key reference points from which coaches can plan, deliver and reflect on learning environments and sessions. A key concept is using the most appropriate practice activities and coaching behaviours to achieve these goals. Thus, there is not one model of practice or coach behaviours but many approaches to achieve the goal depending on the task, the individuals involved (players, coaches etc.), and the environment.

#### 8.2.1. Specialisation versus sampling – underpinning research

Discussions about early specialisation, or the sampling of different sports as a means to expert performance development, remain a live debate in sport science (e.g. Côté et al., 2007; Ford et al., 2012; Ford, Ward, Hodges, & Williams, 2009).

Although most researchers agree that sport specialisation should increasingly occur from 12 years onwards, and is essential from 16 years onwards, there are disagreements about what should happen in younger age groups (e.g. 6-12 years). Arguments for *early specialisation* suggest that young player engagement in sport-specific practice predicts the development of sporting expertise (Ericsson et al., 1993; North, 2012a). As noted earlier in the report, if the peak performance age is in the mid-20s, then consideration must be given to how individuals achieve the requisite number of practice hours.

Arguments for *sampling* suggest that players should experience many different sports in the development pathway is also consistent with expertise development, but that it may provide additional PPSTT benefits and leads to lower levels of burn-out and drop-out (Côté et al., 2007; Côté, Erickson, & Abernethy, 2013). Advocates of sampling agree that expert performance can occur through specialisation, but argue (from a humanistic, holistic perspective) that specialisation is too risky when sampling can also provide these benefits

but does not lead to negative effects. In a more recent development, Ford et al. (2009) argue for a third developmental pathway referred to as *early engagement* with low levels of diversification in younger age groups but higher levels of sport-specific play as well as practice as a suggested predictor of elite performance success.

There is a limited amount of existing research on badminton with regard to these issues, however, the research generally suggests that badminton is a late specialisation sport with a reasonably high degree of sampling (e.g. Abernethy et al., 2005; Mitchell and Oslin, 1999, Rosalie and Müller, 2012; Storm et al., 2012).

### **8.2.2. Specialisation and sampling in badminton**

There was a general consensus identifiable from the wider system characteristics and specific commentary that, although participation in badminton can begin at a very young e.g. 5-6 years, it does not suggest early specialisation similar to sports such as gymnastics. As noted, selection decisions were often undertaken later on, with the first filter around 12 years, and most important decisions being made after this.

However, beyond this, there was something of a mixed picture across the countries. For example, in Korea there was a tendency toward early engagement, with limited sampling: “basically once you select the sport when you’re young, pretty much you’re just playing the sport for the rest of your life as an elite athlete” (3). In Spain there was a tendency toward early engagement but also some early sampling: “there is an early practice, not an early specialization. I believe that the emphasis is on the early start of practice, but that does not mean that there is a specialization ... they (the players) practice multiple sports and that’s interesting and compatible” (7). In both Indonesia and Denmark there was more evidence of later specialisation and sampling and that it was encouraged.

### **8.2.3. Practice structure**

#### **Structured practice versus unstructured play**

Within the context of debates concerning specialisation and sampling are equally important debates about the nature of practice environments. Should practice be formalised and structured for the purpose of skill development and performance improvement, for example, by a coach? Or should it be informal and unstructured with the participants making their own rules and expressing their individuality but with skill development potentially resulting from them?

The debate on the relative merits of structured practice and unstructured play has been championed by Jean Côté and colleagues. As the next section shows in more detail, there are different types of structured practice environments (which range from the traditional skills/drills model to more tactical game-orientated approaches). This section simply contrasts broad notions of structured practice with an unstructured play-based approach (drawing specifically on the work of Côté and colleagues).

Côté and colleagues contrast *deliberate practice* (borrowing from Ericsson et al. (1993)) with *deliberate play*. Deliberate practice is seen as “highly structured ... requires effort, generates no immediate rewards, and is motivated by the goal of improving performance rather than its inherent enjoyment”, and is normally organised by an adult coach (Côté, Erickson, et al., 2013, p. 10). Deliberate play is seen as “physical activities that are intrinsically motivating, provide immediate gratification, and are specifically designed to maximise enjoyment. Deliberate play activities, such as street hockey or backyard soccer, are regulated by rules adapted from standardized sport rules and set up and monitored by the children or an adult involved in the activity” (Côté, Erickson, et al., 2013, p. 10).

Côté and colleagues argue that the mainstream and exclusive reliance on structured practice and the under-utilisation of unstructured play-like activities is detrimental to children and young people’s development in sport (Côté, Erickson, et al., 2013). Structured practice activities are associated with the specialisation approach which is focused primarily on ‘rationalised’, organised and efficient skill and performance development. This is seen to be useful for certain purposes, such as working on specific technique. However, structured practice is seen to miss out on important developmental advantages provided by playful child-led activities. For example, play-like activities are seen to provide more opportunities for youngsters to develop tactical intelligence and creativity (Greco, Memmert, & Morales, 2010; Memmert, Baker, & Bertsch, 2010).

Play activities are also important in developing important psycho-social skills, such as emotional development, responsibility and self-reliance, adaptability and cooperation (Côté, Erickson, et al., 2013; Lester & Russell, 2008).

Although Côté and colleagues' work could initially be seen as an attempt to restate the importance of play-like activities in children and young people's sporting development (often questioning the importance and impact of other practice approaches) their more recent work has recommended a mixture of approaches, with different types of structured practice and unstructured play all contributing (Côté, Erickson, et al., 2013). This more mixed approach is supported by other research (Memmert et al., 2010; North, 2012a).

Finally, Côté and colleagues' work appears to take the view that children and young people's play is almost unconditionally beneficial and self-regulating (e.g. Côté, Erickson, et al., 2013). Although we support enthusiastically the value of playful activities in children's development in sport there are also problems. For example, as practitioners we have experienced un- and semi-supervised unstructured play in younger age group football that have a number of negative consequences.

### **Skill-based versus game-based practice**

Within the context of more structured coach-led practice environments, the research suggests a range of options open to coaches and players. A contrast is typically made between 'traditional' skills/drills approaches (focusing on technique development) and more game based approaches (focusing on tactical development – though with contextualised technique also being developed as a by-product) (Muir, Morgan, & Abraham, 2011).

The specific content, structure and rationale for the *skills/drills approach* are generally not well articulated in recent academic treatments, and the approach tends to be treated somewhat pejoratively (as the bogeyman that needs to be chased away by newer better game-based approaches). We suspect that the use of these ideas and practices have been given theoretical and practical justification by existing educational approaches (e.g. Bloom's Taxonomy) and from older contributions from the motor skills learning literature. Ericsson's theory of Deliberate Practice (Ericsson et al., 1993) is also often associated with a skills/drills approach (Côté, Erickson, et al., 2013). However, regardless of the specifics, the skills/drills approach is generally conceptualised as focused repetitive practice of technical tasks and done in isolation from other components of the game. The skills/drills approach is argued to lead to the acquisition of specific technical skills at the expense of perceptual-cognitive skills, such as anticipation and decision-making (Ford, Yates, & Williams, 2010).

There are a variety of *game based approaches* to practice structure, with many citing Bunker and Thorpe's Teaching Games for Understanding (TGfU) approach (Bunker & Thorpe, 1982) as an important mobilising contribution. These include the Tactical Games Approach (Griffin, Oslin, & Mitchell, 1997), Play-Practice (Lauder, 2001) and Game Sense (Light, 2004) amongst others. The game-based approach has also often been associated with ideas emerging from the skill acquisition literature on the benefits of random, variable and distributed practice (when compared to blocked, constant and massed practice typical of the skills/drills approach) and more recently a constraints-based (dynamic systems) approach (Williams & Hodges, 2004).

Game-based approaches replicate game-related conditions (i.e. small sided games, conditioned games and phase of play activities) and are more tactically focused. Although there are different ways of thinking about game-based approaches, the following stages are useful: modified game play exaggerates a tactical issue encountered within the game, the development of tactical awareness/decision making within the game context, and the development of technical skills within the tactical context (Griffin et al., 1997).

Central to this approach is the development of game understanding (perhaps around specific principles or constructs), problem solving and decision making within an authentic or slightly moderated playing environment. Thus the game, its rules, and the player involvement and reactions are central to this approach (Muir, Morgan, & Abraham, 2011). This approach puts significant pressure on coaches to design games to meet an individual or team development need. The coach sets up the activity and then typically uses questioning and problem solving techniques to elicit players' tactical and technical understanding and execution.

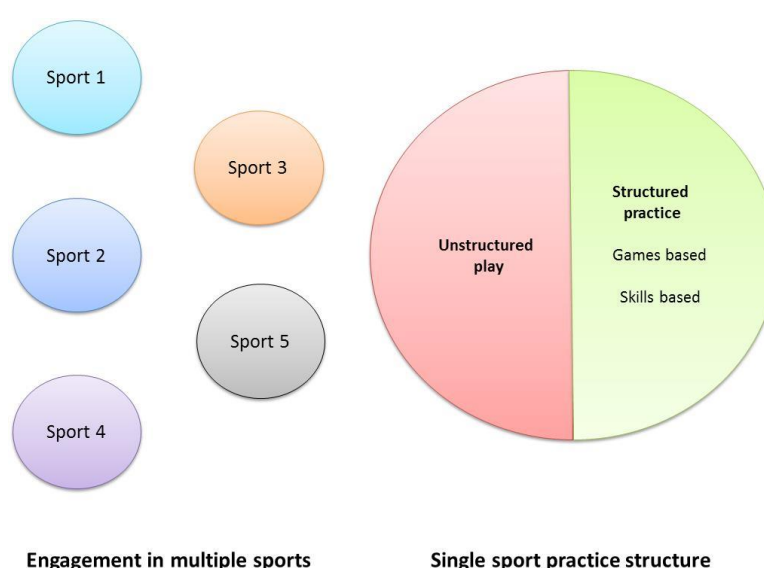
Others, however, have recognised that skill- and game-based practice structures are not mutually exclusive and can be used together for different objectives within the coaches' tool-box (Côté, Erickson, et al., 2013; Light, 2006; Muir, Morgan, & Abraham, 2011). Indeed, though there has been historical rivalry between models and approaches, a number of more recent commentaries are now stressing the importance of a more blended approach to reflect the wide range of goals in player development environments as well as context (e.g. Côté, Erickson, et al., 2013; Muir, Morgan, & Abraham, 2011).

We find this more pragmatic approach very sensible. From a coaching perspective, these approaches should be seen as a range of options open to the coach working with players, each with their own rationale, benefits and disadvantages. National systems and particular coaches will have their preferences, but finding the right approach for the task, player(s), and context under consideration appears to be the key.

Research within a badminton context has suggested that more random and game based practice allows for higher levels of retention and learning of both cognitive and motor skill learning than within traditional skill based approaches (e.g. Blomqvist, 2001, Blomqvist et al., 2001; Hastie et al., 2009, Huynh and Bedford, 2011a; 2011b; McMorris, 1999; Singh, 2011).

Likewise, Goode and Magill (1986) researched the use of contextual interference in badminton, findings suggested that the higher variability of practice and randomness of skills used within a representative tactical setting allowed for significant learning and retention rather than the use of blocked skill based practice (Williams and Hodges, 2005). It is widely expressed that within badminton, practice should be representative of the competitive environment to ensure the development of decision making, expressing that there is too much reliance on skill-centred instructional forms of practice (Macquet and Fleurance, 2007).

**Figure 8.2: Diagrammatic summary of different practice approaches**



#### 8.2.4. Practice structures in badminton

Before presenting the data, it is important to qualify that in some countries, it was easier to discern the situation with regard to practice structure in player development systems than in others. For example, in Korea, the expert had more immediate experience with the high performance level. In Indonesia, language and interpretation difficulties meant it was difficult to explore differences in practice approach. Therefore, the data presented must be seen as indicative not definitive.

## Unstructured play

There appeared to be more unstructured play in Indonesia and Denmark. In Indonesia, the culture and availability of courts meant that unstructured play occurs informally between sessions. In Denmark, a conscious effort had been made by senior administrators to make more court time available for players to play informally. There was a recognition that this activity contributed importantly to player development. Even training session/coached time was being made available for unstructured sessions. In Korea it was a different story. There was very little opportunity for unstructured practice 'because coaches are paid they need to be seen to be doing something' (3).

## Game based approaches

There was evidence of modified game based approach across the European countries and notably in Denmark:

### A games based approach in Denmark

"I think some coaches, unfortunately, are using 90 per cent of this multi-feed system. Some coaches are using 90 per cent of the teaching games system. And it's a constant process of motivating and inspiring the coaches to use this teaching game concept. So I don't think I can give you a better answer than that. (Int: But as far as the Federation is concerned, this movement towards a more game-based, constraints-based training approach is the way forward, is it?) Yes. That is absolutely one of our key messages. It's (about) complex exercising. It's not simple structures. The majority of the work is complex things, more things in one - moving, hitting, everything. And some of the stuff is also combined too" (5)

In Denmark, modified games appeared to utilise the well-known STEP principle:

- Changing the **(S)pace** i.e. making the playing area bigger or smaller
- Altering the **(T)ask**
- Changing **(E)quipment**, playing with a balloon or a shuttlecock, increasing or lowering the net
- Changing the number of **(P)eople**.

### Some examples from Denmark with the modification marked in parenthesis:

"You will have like three on one court and two on the other court (P), and they'll be playing - the two pairs, they will be playing a game, and I will be standing at the net, not active. Until this pair, they succeed to get into the offence (T). Then the other pair will be penalised, because suddenly there will be three hammering down. But otherwise those two pairs, they will try to play the short game, the flat game and try to avoid to lift (T). They are allowed to lift, but they know what the consequences are. I come up, so this is the 'Jack in the box', or whatever, out of the box, sort of thing" (5)

"I invented what we call BadminPlay, which is another way of playing badminton. It consists of instead of playing the best of 3 games. (In it) we play 4 different teaching games. I have constructed and selected the teaching games in a way that they develop and they demand that you master some basic competences. Which means that when you play that... When we put it together, there are four different teaching games, and you play best of 4, which means that you play one game... One game you play one set to a level, then you get 1-nil. Then you are either 2-0 or level the score. Then it comes to 2 more then you select one of the four players and play this again. The teaching games, they are very different too. They are constructed in such a way where you lower the net... some of them 10 centimetres (E). You are putting some tape on the court, and then you are limiting the court, for instance, to the front part (S) – or you are... and to the side parts, and all that stuff. So *we have different competences that we want to develop*. What we do then is to say that we play tournaments where you can earn points to the grading system. And we also, from the next season, the Danish national in BadminPlay, along with the normal badminton, so to speak. And thus try to combine the best from this playing tournaments. As far as we know, the first time in the history of badminton that we have constructed a different game, with a purpose that makes it both easier and fun, and you develop certain competences. What I'm saying with all that is that we're trying to bridge the gap between the development potential and to develop the competences there. On the one hand you have too much competition, and on the other..." (5)

In accordance with the STEP principle, every game modification attempt brings out a different learning point with the idea, as the Danes call it, of targeting the development of particular ‘competences’ (or as we have called the expert characteristics).

### **Impact of constraints in training**

#### *A nice anecdote about the unintentional use of constraints in training*

“In Korea, there’s a Seoul physical education high school where they cover most of the sports. And their multi-purpose gym... I mean, the height of the multi-purpose gym was not really ideal for badminton. So those players who were representing the Seoul physical education high school, those guys have very good drive skills. Their clearance is much lower than the players who are used to practising at the higher height... I mean where the stadium has a higher height of roof” (3)

### **Skill based practices**

Without doubt, most attention was focused on skill based practices in a badminton context across the four countries. Denmark may be encouraging the use of game based practice but still use a lot of skill based practices also (indeed, one of their goals is to ‘have the best feeders in the world’).

The experts generally linked skill based practice to multi-feeding i.e. where a coach has a rack of shuttlecocks on his/her arm and quickly ‘feeds’ them to the player using a racket to encourage particular body movements and/or shots. Multi-feeding is used both for physical and technical tactical development:

### **Multi-feeding in Denmark**

“We use multi-feeding at the centre once a week. And it’s physical training mainly. Of course, it’s physical training in an appropriate way. When I came in I started saying ‘Why do we do multi-feeding like this? Is it speed we’re trying to achieve, is it conditioning? What sort of conditioning are we working at?’ So we started to create multi-feeding in a different way. So that sort of thing. So if you look at the national level we will have a lot of conditioned exercising” (5)

“Now we’re down to how we’re working on court, because the last 20, 30 years, this way of training, we call multi-shuttle, where you have a feeder, a coach, standing with a tube of shuttles and firing away. Then the player on the other side is repeating, repeating... that’s the style we learned from China. But when you are doing this block training you are not thinking, you are just hitting. And we are teaching games where we define the rules on the court, where to play the shuttle, how to play; we try to encourage players to find new ways and new solutions within a game situation. So on a daily basis in every training session, you try to bring these tactical teaching games into play.” (5)

### **8.2.5. Constructive alignment in badminton**

What was evident from the work across the four countries, is that although specific countries may have preferences with regard to the approaches and activities they used to structure learning environments and practice activities e.g. a games based approach in Denmark, that most utilised a combination of methodologies to achieve particular training tasks. Thus, unstructured play, games based approaches, skills based multi-feed approaches were all live options for all countries depending on the goal, the player, and the context. There was always a need for balance – tactical development through games, technical development through repetitions.



### 8.3. Developmentally appropriate competition

#### 8.3.1. Underpinning research

Although competition is often seen as the finishing point of development, the theatre where the knowledge and skills developed in practice are executed as a performance, the act of engaging in competition itself is highly developmental. At the performance level, elite players often talk about gaining experience of playing in the big events as a means of developing the expertise for later performance success. Lyle (1997) acknowledged the importance of competitions for the structural development of athletes/players within the United Kingdom sport context. Studies in Australia have also reported that competition experience is fundamental to athlete advancement and international success (Sotiriadou et al., 2008).

In lower level age groups, competition might be seen as a more rarefied extension of the games-based development approach to practice highlighted above. Coaches might de-emphasise winning in games, but suggest a particular developmental priority or focus. At even younger age groups, and at the beginner phase, competition is still seen as an important developmental feature if it is appropriately managed because it is motivating and engaging (Côté, Hancock, Turnnidge, & Vierimaa, 2013). Amongst a study of expert coaches, competition was used to evaluate existing training and to plan for future training activities (Salmela, 1995).

Key here are the constructively aligned, or developmentally appropriate aspects, of competition. Very often competition is used inappropriately in the player development system, with an over-emphasis on winning, linked to inappropriate behaviours from coaches, parents and others (Côté, Hancock, et al., 2013), with the risk of long-term physical and psychological damage, burn-out and drop-out (Fraser-Thomas et al., 2008a, 2008b).

Competition is a very important part of the learning environment (and an individual and teams' developmental experiences) and has to be appropriately managed within the embedded system context – players, parents and coaches. This means pragmatism and flexibility are necessary in the set-up of competition to reflect individual and team development needs, and the social context. There could be flexibility in selection year, in team rosters between and in games to prevent one-sided games, and the appropriate behavioural standards from coaches and parents (Côté, Hancock, et al., 2013; Musch & Grondin, 2001).

#### 8.3.2. Developmentally appropriate competition in badminton

All four countries in the study noted the importance of competition across all age groups as a development experience.

The most common reasons for this were as follows:

- Motivation for players to train harder
- Players gaining competitive game experience
- Players gaining competitive experience against better players
- Players experience winning and losing
- Coaches have a chance to look at players under competitive situations and to make assessments
- Providing evidence for selections to squads.

#### The importance of competition in Spain

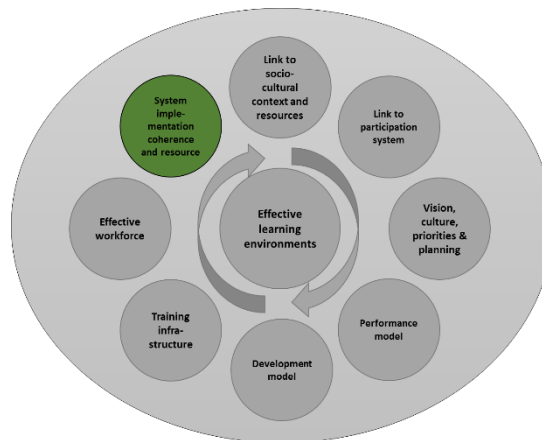
"I think the competitive component in badminton is an important factor in all the developmental stages. It's not like other sports where you can accumulate competitive experience even during training, and you can show it in competition. In badminton, this is not possible, even in inferior categories. If that competitive experience is not existent... the level of game and effectiveness that you show during competition, from the bottom down in age, it needs some practice time until it is relatively similar to the level of training" (8)

**Table 8.1: Competition approaches across the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• The Korean Sport for All organisation managed badminton community and district level competition – with one of either event every weekend</li> <li>• The federation devote considerable resource to organising domestic and overseas tournaments – there is a very full competition calendar</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• There is an extensive competition structure in Indonesia with 10 national ‘circuits’ covering U12, U14, U15, U17, U19, U21, and open age</li> <li>• There are also six national ‘private competitions’</li> <li>• At each event there are typically around 1000 competitors</li> <li>• The PBSI estimate there are around 150,000 players engaging with the higher level competition structure in Indonesia</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• There are club tournaments available every week for players (indeed, twice a week) all year round</li> <li>• Quality club competition is argued to be crucial to the success of Danish badminton</li> <li>• Four division domestic structure</li> <li>• The standard of Danish club competition is seen as being very high (indeed, sometimes higher than some international tournaments)</li> <li>• International experience is also seen as very important</li> <li>• Players are sent to junior and senior international tournaments</li> <li>• “when they get out of Europe they will see German players, or Eastern European players not having that deceptive stroke, just knowing a few, using a few strokes, but they do that very well so they look like simple players, and they are thinking ‘ha, ha, I can beat them easily’ but they will find out they cannot beat them easily. And they have to learn to compete against players with that way of playing and also those mental strengths, the way they appear on court, and so on, can be different. Then when you move into under-19, it’s imperative for the best players to get some experience against Asian players, because they also play differently” (5)</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Spain has a specific competition strategy and plan</li> <li>• Local organising committees organise tournaments</li> <li>• National age group competition – U11, U13, U1, U17 and U19 etc. – at the national championship</li> <li>• There is debate in Spain about how much resource should be allocated to building participation and domestic competition, and how much should be invested in sending elite athletes abroad to international competition</li> <li>• One side wants to strengthen domestic competition, similar to Denmark, the other would like to see resources invested in international competition opportunities</li> <li>• National club competition structure still relatively weak – this is seen as an important development area</li> </ul>

In all the countries a considerably amount of effort and resource was expended on establishing and managing domestic competitions, as well as finding the resources for international competitive experiences.

## 9. System implementation, coherence, and resource



### 9.1. Underpinning research

Research suggests that underpinning effective player development systems is a clear understanding, and appropriate sense of roles and responsibilities around the key elements – philosophy and culture, playing style, player characteristics, and development approaches – amongst the key stakeholders (Larsen et al., 2013; Woodman & Hardy, 2001).

This includes, for example, gaining clarity concerning roles between development and performance environments and ensuring that pathways and transitions are smooth (Relvas, Littlewood, Nesti, Gilbourne, & Richardson, 2010). System architects might have contradictory ideas about roles, responsibilities, connections, and clarity between environments. For example, research by Relvas et al. (2010) reported a number of questionable practices in the positioning of youth development and first team environments in one football club, such that transitions were made more difficult.

Research on effective player development is increasingly recognising the importance not just of the underpinning ideas but also how these ideas are resourced, implemented and monitored. The weakness of the English football system has at least been attributed to a lack of prioritisation and investment in youth development (Green, 2009).

Furthermore, stakeholders in the system also need to ‘buy-in’ to these ideas and then align their behaviours (Martindale et al., 2005). They need to bring the principles to life through their decision making and action. This constitutes the embedding of a successful philosophy and culture into the player development environment.

In UEFA study of European football player development systems ‘system implementation, coherence, and resource’ was identified as one of the most important factors underpinning player development success. Those countries who had a clear vision and strategy, communicated it effectively, with buy-in a support from all (or most) stakeholders were often the countries that achieved the most player development and elite success (North et al., 2014).

## 9.2. System implementation, coherence, and resource in badminton

As might be expected from interviews with a group of individuals who are, in effect, the main system architects and implementers across the four countries, the research extracted some interesting detail about the implementation process.

The respondents' comments covered the following areas:

- The importance of system implementation, coherence, and resource
- The delivery system
- Support mechanisms
- System coherence

### 9.2.1. The importance of system implementation, coherence, and resource

During the interviews, we asked one of the Danish experts: 'how important do you think this kind of system embeddedness and system integration is?'. The expert respondent: 'it's very important. It's very important, I think, to bring us to the next step. All about values and how to practise, and what to do. Yes, it's very important.'

The development and implementation of a coherent and workable system was also a clear feature of the Indonesian and Spanish systems – albeit from different contextual bases, and access to different types and levels of resources. The Indonesians were attempting to change a very established and traditional system. The Spanish were trying to build one from scratch. The Korean expert also recognised a need to adopt a more systemic long term approach as a result perceptions of a gradual comparative decline of Asian approaches.

#### Buy-in

"The big, big thing for me, for us, is to implement these principles, change these principles in all the badminton clubs. You see, when I have my national junior coaches, I can tell them what to do because I pay them. But when we get to the trainers in the local clubs, the clubs are paying them, so they are doing basically what they think is the right thing to do. And if I want to change something I need to convince them, with stick and carrot - mostly carrot! Yeah" (5)

"getting buy-in and crucially action from the clubs is essential" (6)

### 9.2.2. Delivery structures

Developing an effective coherent system is about recognising and building on the contextual resources that are already in place. This starts with the staffing in the federation. Spanish successes were attributed by the experts to having a plan, but also having a staff with passion, ownership and dedication to deliver it:

#### The importance of quality staff in Spain

"I was lucky, honestly, to have a very good team with a lot of passion, a lot of dedication. It was a very personal project for all of us. So we worked very hard for many years together with the same goal. We convince everyone around us also with this kind of passion and finally everybody had the vision that we really can transform badminton in Spain" (6)

"Paper can't support everything. You can write whatever you want but if you don't have the people who are going to implement the paper at the end it's going to be nice to put on the wall but if you don't have the people that have to implement all this in a practical way, that's believing that that's the way is not going to be very useful." (6)

There was also a sense amongst the four countries of having a understanding of, and connection with, the strategic directions and resource opportunities of the major sport funding stakeholders – such as government departments, Olympic committees, ‘sport for all’ organisations and sports institutes. This very evident in Korea, Denmark and Spain.

Finally, and importantly, the countries implicitly worked with their existing sport delivery networks e.g. clubs, schools, universities, private providers. This was very different across the countries:

**Table 9.1: Dominant sport delivery networks across the four countries**

Country	Detail
South Korea	<ul style="list-style-type: none"> <li>• School and university delivery system</li> <li>• Universities working with federation to develop and deliver sport science support</li> <li>• Almost no clubs in Korea</li> <li>• This limits the BKA’s option for influencing local/community coaching (through coach education only, coaches need a Level 3 minimum (lowest qualification) to draw a salary</li> </ul>
Indonesia	<ul style="list-style-type: none"> <li>• Club delivery system</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>• Club delivery system (over 550)</li> <li>• “The clubs are very well organised compared to other systems. I am born to this (club) system, so from my point of view it’s a natural thing, but when you get around the world and see what happens, it’s a unique system. And I think that’s one of the key reasons why we as a small nation – we are just now the size of London, something like that, or the Hamburg area. We are 5.6 million people in Denmark (and we do so well)” (4)</li> <li>• ‘Club system essential to Danish success’</li> <li>• 20-30 clubs with an international perspective</li> <li>• The player development system links into the clubs and then into the regional and national structure</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• Emerging school system (‘Fly with Badminton’) supported by a growing club base</li> <li>• From this base ‘talented performers’ are identified and moved into the clubs through the ‘Looking for a Champion’ programme</li> <li>• The clubs are encouraged to work together to develop local club networks</li> <li>• School PE and other teachers are given training, and work with FESBA coach mentors</li> <li>• Coaches are trained to work with teachers</li> <li>• One coach will often work with 3-5 schools</li> <li>• Both programmes are supported by FESBA ‘regional coordinators’</li> </ul>

All the country federations worked with what they had, attempting to make the best of existing delivery system resources:

#### **Tailoring programmes to the existing delivery system in Spain**

“I believe that during the implementation of the programme we were very careful in terms of adapting it to the reality of badminton in Spain at that time. Because sometimes we’ve found that fantastic programmes have not worked in Spain because they were not well accepted in the implementation phase. So, what we had to do is to make those 50 technical coaches of the clubs ‘Seeking for a Champion’ interested in the product. We wanted them to believe that our programme was good for them, for their clubs, it would provide them with training, it would make them improve, their players would get better in the longer term, etc. We are now starting to have athletes who were black grip in ‘Seeking for a Champion’ and they are now in the junior category, and they are some of the best players in Europe.” (8)

There was also a strong sense from the countries that any vision, strategy and plan they were proposing to implement should be high-level and flexible enough to work with different and changing contextual conditions. For example, in Denmark: 'I think that it (the programme/project) is quite flexible. If you respect the broad concept of the project. But the most important is that all the coaches are also involved in the development of the concept and the improvement that we have brought to the concept' (6). There must also be scope for experimentation at the local level around common principles, it was argued. It also appears that larger and more complex delivery structures require a lot more forethought, management, and indeed luck!

### 9.2.3. Supporting mechanisms

As noted above, the four countries recognised the importance, indeed, centrality of system implementation, coherence and resource, and offered a number of mechanisms to support this.

First, before designing/re-designing systems/system components, the federations engaged in a large amount of *data gathering and consultation*. Denmark, for example, consulted heavily on the development of its central BATK development document. In Spain, consultation was seen as a means of providing voice to important stakeholders: "the only way to really move forward with everybody behind us is to give them the opportunity to express themselves and to give feedback, to give their input. So we need to hear people here. We need to hear everyone and try to get the good things and the good input and feedback and to try to put it into the system, and to guarantee that they will feel also that they are part of the system" (6)

Second, at all stages of the system development and implementation process, and with all stakeholders, the countries engaged with extensive communication considering all aspects: *content, channels and frequency*. The countries talked about a 'concerted effort to communicate key message', and 'guidelines to support action' using a tailored strategy that were appropriate to the wants/needs of the stakeholder (nothing too complex), using a range of formats including newsletters, websites, documents, summary documents, dvds, seminars, conferences, and camps.

Third, there was a recognition of a need to work much more closely with stakeholders and to build healthy, trustful relationships. The Danes spoke about the 'traditional tensions' between federation and clubs, the Spanish noted the 'difficulties of being in a big family'. These federations worked with stakeholders to put in place joint initiatives to break barriers and build understanding. Indeed, it was noted that some stakeholder groups often require specific targeting, for example, 'finding the carrot' for 'coaches to accept new ideas' (both Denmark and Spain).

Ultimately, all the federations were aware of the difficulties developing a complete understanding and buy-in all of time. There will always be issues with staff, funders, coaches, clubs, schools and parents it was suggested. For example, in Korea there was still pressure for young players to win competitions at the elementary level from clubs and parents, despite BKA advice. Also in Korea, it was initially difficult to get buy-in from high performance coaches about the sport science programme. In Denmark, the use of rankings at U13s had become an issue between federation and club. In Spain, there were issues about where spending should be prioritised. The federations with these problems operating a kind of 80% rule: "if 80% do not complain about what the organisation is doing, then we're pretty much satisfied. I'm sure each association has a problem for a lot of different matters, but just because 20% of the crowd is complaining about... whatever reason. If more than 50% complain about the same reason, then maybe we should consider changing the format" (3).

### 9.2.4. System coherence

Another crucial factor underpinning effective player development systems both in the UEFA research and in badminton concerns the idea of 'system coherence': that all the components of the system are working together to mutually reinforce the same goals and processes. There were several examples of this to emerge from the research. The most important was the notion that 'effective learning environments', where system meets players are steered by or nested in the broader performance and development models. If, for example, the Danes have decided that their best chance of beating Asian competition is through developing tactical players (because they would also struggle to compete with the physical rigours more permissible/acceptable in Asian countries), the development model, and in turn learning environments need to reflect this.

"From a training point of view, we cannot beat the Chinese by training more or training harder or training longer: we have to train smarter. The way to train smarter is that we need them to be their own coaches, so to speak. They need to bring their mind focus and mental abilities on court both when they are playing and also when they are training" (5)

Aligned with this, it is important the coaches all understand the development model, the goals, the players and the implications for learning environments, and crucially, their role in it. In Korea, these difficulties were noted:

"Sometimes these guys (the players) get very confused, because they have their own coaches at the school, there are different coaches at junior level, and there are also different coaches at national level. So yes, they do get really confused by the method and the different... because all different coaches have a different style of coaching. So they do get confused, and they think they are facing a slump just because three different coaches are giving them three different instructions, and they don't know which one is right" (3)

The Danes identified a similar problem but put in place a system to deal with it:

"One of the side-effects about our club system is that one player can have a high number of coaches involved in their whole training schedule. For instance, if you are an under-15 year old good player, you will have one or two coaches at your normal training in your club. But on top of that you will have what we call an elite training in the club, which gives one or two other coaches. Then you will take part in regional training sessions in the local training centre, or when other organisers are doing elite training. And then you have two more coaches. Then some clubs offer their players [the opportunity] to take part in the senior training, which is good for their playing development. And so it's not unusual for a Danish elite player to have 10 to 12 coaches involved in their training on a weekly basis. Therefore we have encouraged... we are using a system where we say that each player has to appoint, so to speak, their own main coach. And when we are having the players at the training camps at weekends or for longer periods of time, our national junior coaches are communicating with those main coaches. And those main coaches then have to make sure that all the coaches within the player's training environment will know about 'What direction will we go? Where are we focusing the training right now?' You will, of course, have the training that belongs to your age group, or your stage of development at the moment, but on top of that we have the primary focus area, which is defined, based on the individual player, their physical, mental, tactical and technical characteristics. We have established a system there where we try to ensure effective communication, but it is difficult, I can tell you. We have no computer-based system to keep track like that, but we have discussions with the players and you have it kind of written down, the agreements you are working on this. And when they move from one age group to another, these papers are handed on, they are given to the next coaches." (5)

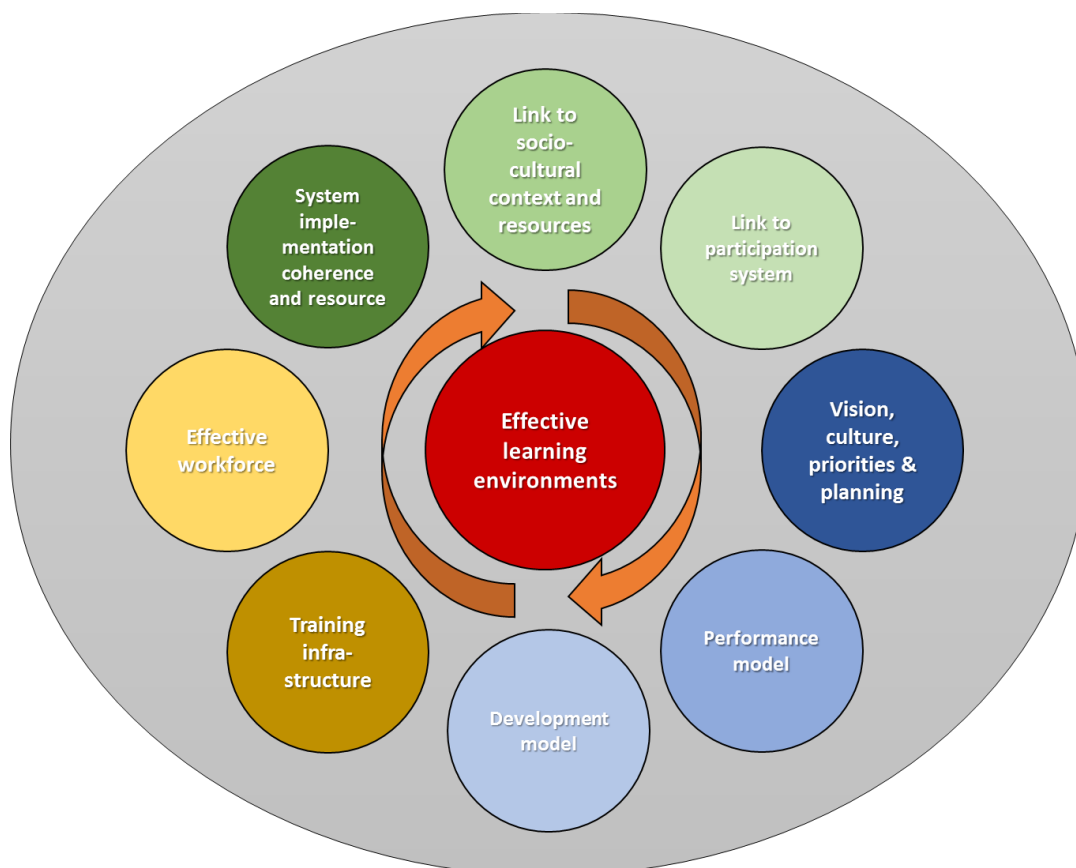
The alignment of design principles and implementation through action is a crucial ingredient of effective player development systems.

## 10. Conclusions and recommendations

In the introduction to this report, we noted the research aims included identifying and examining good practice in player development and coaching in four world leading badminton nations, identifying key principles, and opening this up in terms of models and case studies.

This work has been undertaken in the main body of the report – the job here, in this final section, is to try to pull the work together at a high level and offer some reflections.

A model of the main components of effective player development systems was offered to make sense of the results:



The model was based on an extensive literature review work and data collected on football player development systems in Europe.

The model provided an effective framework to situate the data on badminton from the four countries. The implication of this is that other countries looking to build successful player development systems should consider these components and their interrelationships when building/refining their own systems.

Given the detail and length of the report, it is difficult to make sense of how the four country systems map onto these components 'at a glance'. This summary work is provided on the next pages (Table 10.1).



**Table 10.1: A comparison of player development system components across the four countries**

	<b>South Korea</b>	<b>Indonesia</b>	<b>Denmark</b>	<b>Spain</b>
<b>Link to contextual resources</b>	<ul style="list-style-type: none"> <li>• System built on extensive participant base and established school club system, as well as wider resources available from the education system in terms of student attitudes and academic services</li> </ul>	<ul style="list-style-type: none"> <li>• System built on extensive participant base and extensive, established and productive club and coach system</li> <li>• Club and coach system tends to produce a rich seam of players with different playing styles</li> </ul>	<ul style="list-style-type: none"> <li>• System built on extensive participant base (for a small country) and notably a very well developed club system</li> <li>• Danish socio-cultural attitudes provide important context for coach-athlete relationships</li> </ul>	<ul style="list-style-type: none"> <li>• No extensive resources</li> <li>• Built on the ideas and energy of a small number of creative and dedicated staff</li> </ul>
<b>Vision, culture, priorities and planning</b>	<ul style="list-style-type: none"> <li>• No extensive player development vision currently</li> <li>• Main focus on high performance and the increasing use of sports science</li> </ul>	<ul style="list-style-type: none"> <li>• An emerging player development vision based around an adaptation of long-term player development, and more formal coach education</li> </ul>	<ul style="list-style-type: none"> <li>• An establish but continually evolving vision and plan based on the club structure, clear pathways, and high quality coaching</li> </ul>	<ul style="list-style-type: none"> <li>• A new but strong vision and plan based on increasing participation, building delivery capacity, clear pathways, and coaching</li> </ul>
<b>Performance model</b>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success – although a list of expert performer characteristics developed by Korean Institute of Sport</li> <li>• Emphasis on physical characteristics, discipline, determination, and ‘fighting spirit’</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• Performance model determined by players and coaches in club context</li> <li>• Federation provides physical and psychological preparation support</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• Danish game focused on tactical variation, improvisation, deception, and ‘beautiful shot making’</li> <li>• Players encouraged to develop great technique and tactical understanding, make own decisions on court, and take responsibility for development</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit (written) model of performance success</li> <li>• The Spanish game focused on incorporating elements from Asia (i.e. physical preparation) and Denmark (i.e. tactical appreciation), but with a Spanish ‘hue’</li> <li>• Players encouraged to develop great technique and tactical understanding, and be self-managed independent learners</li> </ul>
<b>Development model</b>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Stages built on school types (elementary, middle and high school) and centralised programme for U13, U15, and U17 and U19</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection to centralised resources based on competition results, the ‘coaches’ eye’ and test data</li> <li>• Selection typically starts about 12 but no definitive decisions until later</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Explicitly influenced by Balyi and Côté</li> <li>• Stages identified for 6-9, 10-12, 13-15, 16-17, 18-19, and 20 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection based on competition results at 16 years; successful players invited to trial at national centre</li> <li>• Emphasis on long-term patient approach</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Concerns about over-interpretation of 10,000 hours rule, and more emphasis on quality in development environments</li> <li>• Stages identified for 6-9, 10-12, 13-14, 15-16, 18-19, and 20 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection into regional programmes about 12 years, selection on to national programmes at 14 years</li> </ul>	<ul style="list-style-type: none"> <li>• Long-term, age-staged, PPSTT holistic approach</li> <li>• Stages identified for 4-7, 8-11, 10-14, 15-18, 19 years and over</li> <li>• Follows broad engagement, technique development, tactical development and competition exposure approach</li> <li>• Selection is based on PPSTT characteristics (although technical/ tactical markers are prioritised)</li> <li>• Selection starts slightly younger in Spain</li> </ul>

	South Korea	Indonesia	Denmark	Spain
<b>Training infrastructure</b>	<ul style="list-style-type: none"> <li>• Extensive facilities based in schools and universities (open to public)</li> <li>• Three national facilities for centralised programmes</li> <li>• Extensive sport science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive facilities based on club system (there may be over 500,000 clubs!)</li> <li>• One national centre, Pelatnas</li> <li>• Emerging sports science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive facilities based in dedicated badminton clubs</li> <li>• Some clubs provide regional hubs</li> <li>• Two 'power centres' and a national centre in Brøndby</li> <li>• Sport science programme</li> </ul>	<ul style="list-style-type: none"> <li>• Growing number of facilities in schools and clubs</li> <li>• 8 regional centres including a national centre in Madrid</li> <li>• Sport science programme</li> </ul>
<b>Effective workforce</b>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (although the lower levels of the pathway appear to have been somewhat neglected)</li> <li>• Coach development and education programme in place – 3 level system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching</li> <li>• Coach development and education programme in place based on BWF system – extended to a four level system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (youth coaching prioritised)</li> <li>• Coach development and education programme in place – 'coaching roles' based system</li> </ul>	<ul style="list-style-type: none"> <li>• Central importance given to coaching (youth coaching prioritised)</li> <li>• Coach development and education programme in place based on dual HE/BWF 3 level approach</li> </ul>
<b>Effective learning environments</b>	<ul style="list-style-type: none"> <li>• Still rather coach centred</li> <li>• Often group rather than individualised plans</li> <li>• Emphasising player development over winning (but not easy to enforce in Korean community sport)</li> <li>• Use of a range of practice structures – but mainly structured skills based multi-feed</li> <li>• Sampling not typically encouraged</li> <li>• Managed competition an important contributor to development</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Early sampling encouraged</li> <li>• Managed competition an important contributor to development</li> <li>• Most player development work delegated to coaches and clubs</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Individualised and group planning and review</li> <li>• Emphasising player development over winning, although challenge through competition is very important</li> <li>• Use of a range of practice structures but emphasis on games based approaches and manipulating constraints</li> <li>• Early sampling encouraged</li> <li>• Managed competition an important contributor to development – strong domestic competition, but international experience also available</li> </ul>	<ul style="list-style-type: none"> <li>• Player centred</li> <li>• Individualised and group planning and review</li> <li>• Emphasising player development over winning, although challenge through competition is very important</li> <li>• Use of a range of practice structures</li> <li>• Early sampling encouraged (although players tend to specialise more in Spain)</li> <li>• Managed competition an important contributor to development – attempting to build domestic competition</li> </ul>
<b>System implementation coherence and resource</b>	<ul style="list-style-type: none"> <li>• System appears very stable, although there are some policy changes expected</li> <li>• Possible attempt to drive through a more systematic long-term planning approach for player development system i.e. further down age-groups</li> </ul>	<ul style="list-style-type: none"> <li>• New system emerging</li> <li>• Federation has experienced some resistances from clubs and coaches and their 'traditional approaches'</li> <li>• Communication over such a large country is a problem (although being addressed through an extranet)</li> </ul>	<ul style="list-style-type: none"> <li>• System is well established, but there is a constant job to consult, communicate and work with clubs and coaches</li> </ul>	<ul style="list-style-type: none"> <li>• A new system is being built on the back of an energetic federation staff</li> <li>• The federation are keen to build relationships and maintain a positive approach based on consultation, communication and joint working</li> </ul>
<b>Key success factors</b>	<ul style="list-style-type: none"> <li>• Large number of participants</li> <li>• Schools programme</li> <li>• Sports science programme at high performance level</li> </ul>	<ul style="list-style-type: none"> <li>• Large number of participants and strong club structure</li> <li>• Considerable variety of players and playing styles</li> <li>• Emerging systems approach based on sports science</li> </ul>	<ul style="list-style-type: none"> <li>• Very strong club system</li> <li>• Clear, coherent vision and plan based on existing expertise, consultation and sports science</li> </ul>	<ul style="list-style-type: none"> <li>• A clear, coherent vision and plan, with energised but realistic implementation based on existing expertise, consultation and multi-disciplinary sport science</li> <li>• The good fortune of having a world number 1 and Olympic gold medallist</li> </ul>

The results suggest the four countries have clear ideas and structures against each of the main components. However, there are some interesting inter-country differences, and some interesting contrasts with what has come to be expected from the wider research and what we have found in football.

### **Inter-country differences**

Perhaps the most obvious difference between the four countries is a split between Asia and Europe in relation to systems. The European countries appear to have more considered, comprehensive and embedded player development systems based on clear 'systems models' (e.g. age-stage models, coaching models etc.), informed by consultation and research. This is perhaps a little unfair to Indonesia, because it is attempting to make changes albeit facing considerable challenges given the scale and diffuseness of the country. South Korea is currently more invested in high performance although, during the research, started to consider the possibility of more detailed work the use of system models.

The crucial lesson from previous work in other sports is that successful world level nations – other aspects being equal - tend to think, plan and implement very carefully their player development systems. In the future it is likely that elite level success will depend on more than just having a large participant base, or doing what has always been done. Player development systems will need to be clearly and thoughtfully designed, developed and implemented with reference to latest good practice, and research.

There were others: different performance models, particular coaching approaches or emphasis in practice structure and different delivery structures but it is remarkable how much similarity there is across Asia and Europe, and all four countries against the main components.

### **Differences with the research and football**

One of the most obvious differences with the previous research on football is how much less interest badminton nations have in performance models. These were very important in football but it was difficult to discuss them with the experts in a badminton context. An explanation was offered by one of the experts – they matter less in individual sports than team sports where there is a need to define a collective identity.

Another difference was there appeared to be less awareness of/attention to models of practice structure in badminton compared to football. At times in football, there were very heated debates between skill and game based approaches, for example. Once again, with the exception of Denmark and possibly Spain, it was difficult to engage the experts in debates about different types of practice structure. All the countries appeared to use a mixture of approaches – there were preferences for skill based approaches in Asia and games based approaches in Europe (but we would not want to overstate the case).

Finally, another difference with football notably in Europe was the scale of the implementation issues. Both Denmark and Spain showed in a badminton context that it is feasible for a centralised federation to have a big impact on player development systems. There are footballing federations around Europe that would be very jealous of this.

### **Final word**

It is perhaps worthwhile leaving on a note of caution - systems are complex and offer no guarantees.

As one of the experts suggested:

"It's very hard to lay precisely what is (the component that is) doing things... When I think back of those eleven years here in office, I would say sometimes I am surprised by the effectiveness of simple things, and sometimes I have great expectations for 'now we are doing this, this will have a great impact', and almost nothing happens. You talked about the simple things, and also I must admit that the simple things, like putting up training criteria for how much and what should be the best players, how much should they train and what should they practise at different age groups was a simple thing to do and has had a huge effect. Just a simple thing" (5).

Systems are inevitably complex, and small changes have big consequences. Systems do not provide a panacea but well put together systems appear to provide stakeholders with a better chance.

## **Some recommendations**

There are some brief recommendations for the BWF and for the federations:

### **The BWF**

A 'systems' based approach is a useful way of thinking about player development – the proposed framework could be promoted in educational materials and as a development tool.

The Player Pathway Programme (PPP) corresponds with many of the issues in this report - a direct mapping has been undertaken - suggesting the programme is a good place according to the data we have collected.

Further research could be undertaken to either analyse player development systems in more countries, and/or to explore in greater detail some of the specific components. For example, there is a potentially interesting study to be conducted on coach-athlete interaction styles across different cultural contexts.

### **The federations**

The conceptual framework overviewed in the report provides a checklist of good practice features of effective player development systems – federations could benchmark their systems against this framework.

The detail of the individual components also provides a benchmarking opportunity and information source.

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