A Multidisciplinary Approach to Establish a National Strategy for Talent Identification and Athlete Development in Trinidad and Tobago.

by

Joel PAUL BSc (Hons), MSc.

Thesis (inclusive of recommended corrections) submitted in part fulfilment of the requirements of Kingston University for the degree of Doctor of Philosophy (PhD)

School of Life Sciences
Faculty of Science, Engineering and Computing
Kingston University

January, 2016.

Supervisors:
Professor Andrea Petroczi
Professor Declan Naughton

Abstract

Recognising the importance of sport as a major political and economic tool as well as a lucrative avenue for boosting its international sporting image, the government of Trinidad and Tobago (T&T) has increased its interest in elite sport over the past 20 years. This has ranged from the enactment of policies at the parliamentary level to the establishment of state agencies geared towards promoting and enhancing the delivery of sport. While this has positively impacted the performance of athletes at the Olympics and other international events there exists considerable room for improvement so as to maintain and improve the country's competitiveness. This would prove a challenge in the long run given T&T's limited available resources. Current research has suggested that investment into state–run elite sporting structures (NTIDs) can help maximise state resources and reduce costly errors by effectively identifying and developing talent.

Considering the above, the aim of this thesis was to construct an NTID system capable of being successfully introduced in T&T. To achieve this, a multipronged approach involving a mixture of empirical research and secondary data analysis was used. Firstly, a novel anthropometric and physiological testing battery was used to develop reference data and discriminate between junior male cricketers of differing playing abilities. This was followed by a retrospective analysis of the career histories of successful athletes in an effort to identify a suitable development pathway for nurturing future players. Considering that research has suggested that culture has a major impact on the structure of NTIDs, the last study compared the architecture of NTIDs in cultural context.

The results of the above tests were successfully used to generate a hypothetical NTIDs for T&T. It is important to note that this thesis only represented the initial stages of the construction of the NTIDs and future follow research is required to test its efficacy.

Keywords: national sports systems, talent identification, talent development, athlete career history, physiological testing, model building

ACKNOWLEDGEMENT

Firstly, I would like to express my gratitude to God for providing me the strength and commitment over the past 4 years to complete this research thesis. I would like to say thanks to the Government of Trinidad and Tobago and in particular the Ministry of Public Administration of Trinidad and Tobago for having faith in me and funding my PhD.

I would also like to extend a special thank you to my supervisors Professors Andrea Petroczi and Declan Naughton. They have been always accessible when needed and were continual sources of support and guidance along my journey.

I would like to acknowledge all the participants that took part in the study as much of my research would not be possible without them. Thank you to the staff and students of the University of Trinidad and Tobago for their assistance during data collection for my physiological study.

Lastly, I would also like to acknowledge my family and friends who have always been there to pick me up when things were not going as well as I would have liked, to lend an ear and bring a smile to my face when I needed them. Moreover, you all helped me to persevere on many occasions when I faced challenges and my motivation waned.

TABLE OF CONTENTS

CHAPTER 2: REVIEW OF THE LITERATURE

CHAPTER 3: PHYSIOLOGICAL TESTING AS A METHOD FOR DISCRIMINATING BETWEEN ELITE AND NON–ELITE ATHLETES: A CASE OF JUNIOR MALE CRICKETERS

CHAPTER 4: DOES A RELATIONSHIP EXIST BETWEEN THE BASE AND CURRENT SPORT IN COMPETITIVE ATHLETES? A COMPARISON OF SPORT CAREER HISTORIES OF TALENTED ATHLETES IN TRINIDAD & TOBAGO AND THE UNITED KINGDOM

CHAPTER 5: COMPARING STATE – RUN TALENT IDENTIFICATION SYSTEMS IN CULTURAL CONTEXT

LIST OF FIGURES

LIST OF TABLES

LIST OF ABREVIATIONS

DM: Diversified Model
DMGT: Differentiated Model of Giftedness and Talent
DMSP: Developmental Model of Sports Participation
FMS: Fundamental Movement Skills
LM: Linear Model
NTID: National Talent Identification and Development
NTIDs: National Talent Identification and Development Systems
PHU: Push Up Test
PLU: Pull Up test
RAE: Relative Age Effect

ST:	Sprint test
SLJ:	Standing Long Jump
T&T:	Trinidad and Tobago
TD:	Talent Development
TI:	Talent Identification
UK:	United Kingdom
$\dot{V}O_{2max}$:	Maximal Oxygen Uptake

LIST OF APPENDICES

APPENDIX A: PHYSIOLOGICAL TESTING IN ELITE AND NON–ELITE JUNIOR MALE CRICKETERS

APPENDIX B: IDENTIFICATION OF BASE SPORTS IN TALENTED ATHLETES: A RETROSPECTIVE ANALYSIS

APPENDIX C: BASE AND CURRENT SPORT IN COMPETITIVE ATHLETES

CHAPTER ONE

INTRODUCTION TO THE THESIS

1. Introduction

Sporting annals on occasion have chronicled performances so great that they seem to transcend the extremes of human limits, oftentimes baffling even the most learned researchers. The exploits of Lionel Messi, Michael Phelps, Jenny Thompson, Usain Bolt, Michael Jordan, and other recent paragons of sporting grandeur, often beg the question – what are the origins of exceptionality? Considering the rarity of such extraordinary achievements, understanding the developmental basis of athletic talent (Simonton, 2000) has been the idée fixe of copious research (Gabbett, Georgieff & Domrow, 2007; Henriksen, Stambulova & Roessler, 2010; Hoare & Warr, 2000; Jones, 1998; Keogh, 1999; Pearson, Naughton & Torode, 2006; Reilly, Williams, Nevil & Franks, 2000).

Identifying and developing athletic talent remain key areas of concern in sport, evidenced in part by a growing number of studies in the field and are being afforded a separate section in the Journal of Sport Sciences. The primary objective of talent identification and development (TID) is to discover exceptional young athletes and initiate them into a specialised programme capable of developing their gift (Vaeyens et al., 2009). While increasing investigations into TID has considerably contributed to the flourishing knowledge in the area, in reality a salient mismatch between the number of individuals taking up competitive sport and those that go on to excel at the highest levels exists (Pankhurst & Collins, 2013; Vaeyens et al., 2009). Talent identification and development programmes in many countries are for the most part fractured, esoteric arrangements (Green & Oakley, 2001), largely attributed to an inadequate comprehension of TID procedures and the apparent dissonance between key players in the system (Pankhurst & Collins, 2013). Coaches, sporting bodies and other localised institutions are often entrusted with recognising and nurturing gifted individuals (a duty usually unwittingly forced upon them), however their efforts are routinely restrained by limited funding, stymying their ability to produce champion athletes. Unsurprisingly, the effect of this is a mediocre showing of many countries at the Olympics and other major international games.

Success in international sporting events possesses the ability to stimulate national pride and enhance a country's global image (Elling, Van Hilvoorde & Van Den Dool, 2012). The achievements of Australian athletes, for example, have gained the country an international reputation as being the sporting nation, an honour it unreservedly celebrates (Stevenson, 2002). Given the exiguity of talent, any mechanisms capable of expediting its acquisition would prove beneficial to athletes, coaches and other stakeholders (Vaeyens et al., 2009). Hence, in an effort to improve the performance of their athletes (and by extension the overall standing and international prestige of the country) at various senior world sporting events, there is a growing trend towards centralisation of the national sporting apparatus (De Bosscher et al., 2009).

The Olympics (and to a marginally lesser extent other World games) are considered major defining moments for every country regarding their elite sports policies (De Bosscher et al., 2011). The success of their athletes is deemed reflective of the performance of the national apparatus (De Bosscher et al., 2006). Medal counting at major championships is prevalent, and has been consistently employed to juxtapose national accomplishments (De Bosscher et al., 2006). Increasing competition occasioned by an augmenting number of nations partaking and winning medals has only served to drive up the demand for success (De Bosscher et al., 2011). As a result the pervasive notion is that in order for a country to maintain and improve their international competitiveness, they must invest in sophisticated TID structures (Green & Oakley, 2001).

National talent identification and development systems (NTIDs) are meticulously composed structures that offer a range of talent detection and other support geared towards hastening the development of the athlete including coaching, medical, funding and counselling (Vaeyens et al., 2009), These services are normally unavailable to sports coaches and clubs. The past three decades has witnessed a frenetic mushrooming of state controlled talent identification and development systems (TIDs) globally as each country seek to announce their presence in the international sporting arena (Du Randt, 2008). Australia (Böhkle & Robinson, 2009), Brazil (Reilly et al., 2000), The Netherlands, Norway (De Bosscher et al., 2010), China (Hong et al., 2005), South Africa (Du Randt, 2008), Qatar (Vaeyens et al., 2009), Canada and the United Kingdom (Green & Houlihan, 2004) are representative of an expanding collection of NTIDs in existence.

Large scale state intervention and investment in sport, an area customarily viewed as a concern primarily for volunteer amateurs rather than the state, has often attracted criticism (Hoye et al., 2006). Unsurprisingly, the chief lamentable issue is the amount of funding being diverted to these sporting programmes, particularly in light of the fact that health, education, defence and social welfare remain leading concerns, even in larger, more developed economies (Hoye et al., 2006). Indeed, a study by Hogan and Norton (2000) examining the ‘Price of Olympic Gold’ in Australia revealed that the federal government spent approximately Australian $37 million per gold medal. Furthermore, it is argued that not everyone takes part in sport merely for competitive reasons (Koivula, 1999). In fact, improving health, increased competence, physical appearance and fun have been advanced as significant motivators for sporting participation (Koivula, 1999). Hence, this investment in NTIDs benefits the small minority of elite performer at the exclusion of the non–elite majority.

Nevertheless, the success of these systems is undeniable, and a significant positive correlation between government investment and medal tally has been incontrovertibly demonstrated (Hogan & Norton, 2000). For example, the Soviet Union and the German Democratic Republic consistently churned out international sporting champions in the 1970s and 1980s (Hoye et al., 2006). Both China and Australia realised a 37% and 22% increase in gold medal haul respectively (IOC, 2009) in the Games following the implementation of their state run systems. While this may be partially explained by the host country effect (both countries hosted Games in the cycle immediately after their governments took control of their TID programmes), their continued success in subsequent games serves as compelling support for NTIDs.

It has been suggested that the favourable outcomes offered by NTIDs are the result of a larger, more efficient, targeted investment of funds limiting the amount of wastage (Vaeyens, 2008). These centralised systems provide for a more methodical approach to athletic talent identification and development. It introduces a more focussed direction ensuring that all involved parties, including coaches, national governing bodies for sports and sports practitioners are collectively working towards a common goal. This greater systemic unity sets the stage for a smoother developmental process for the identified young, gifted performers – permitting a more structured transitioning from the raw, identified product to the refined elite athlete. National TIDs also furnish implementing countries with a wider talent identification net, allowing for a greater number of previously unrecognised individuals to be discovered (Vaeyens et al., 2009). The authors assert that this may be particularly beneficial to countries with smaller populations, like Trinidad and Tobago (T&T), for example, which possesses a population of just 1.2 million people (CIA, 2014).

1.1. Sport in Trinidad and Tobago

The value of sport in T&T is not unlike any other country. Inextricably woven into the national fabric of the twin–island Republic, sport has long been a source of national pride and a major unifying factor. Despite being a small nation, T&T has produced a number of world–renowned athletes in a variety of sporting disciplines including Hasely Crawford (Olympic gold, 1976), Kershon Walcott (Olympic gold, 2012), Ato Boldon (4–time Olympic medallist), Brian Lara (cricket) and Dwight Yorke (football). Trinidad and Tobago was also joint World Cup netball winners in 1979 and the national football team made its first and still only appearance at the World Cup in 2006. Despite its sporting successes, sport was not always on the front burner in T&T.

After gaining independence from the UK in 1962, the government of the day embarked on a path to shaping T&T's national identity. Blessed with large oil and natural gas reserves, health, education, infrastructural development and poverty eradication were considered key policy concerns (McCree, n.d.). Sport was a peripheral issue, viewed as a means of maintaining a healthy society (McCree, n.d.). Successive governments continued this trend, adopting a voluntarist approach where financial support for participation in competitions was provided to elite level athletes only. This system, however, favoured the fortunate few affluent members of society who already possessed the means to purchase equipment, pay for coaches and participate in events that allowed them to excel in their particular sport.

The introduction of the White Paper on Sport (1988, cited by McCree, 2009), signalled the emergence of competitive sport and athlete development as national priorities for the government of T&T and a series of policies would follow in its wake (Table 1.1.). All of these schemes would advocate an increasing investment in high performance sport. The National Sport Policy of 2002 established the Elite Athlete Assistance Programme (EAAP; GOTT, 2002). The EAAP implemented a system of elite athlete funding based on a three–tier system (Figure 1.3.) which was intended to cover training, coaching fees, nutritional, medical, accommodation and travelling expenses (GOTT, 2002; MYSA, 2008).

The Sports Company of Trinidad and Tobago was later established in 2004 (SPORTT, n.d.). This company was fashioned after UK Sport and the Australia Sports Commission, mainly providing financial support for the training and participation of elite athletes at regional and international competitions and would eventually merge the EAAP into its system (SPORTT, n.d.). Since its inception, SPORTT has allocated in excess of $140 million T&T dollars (approximately £13 550 000) for funding various sport programmes (TTN, 2008).

Table 1.1. Government of Trinidad and Tobago elite sports policies

Year	Policy/Institution	Key features
1998	White Paper on Sport	– establishment of a National Sporting Authority – construction of new and upgrading existing sporting facilities – promote of athlete education and development – monitoring the performance of NGBs
2002	National Sports Policy	– high performance sport becomes a priority – promotion of excellence in sports at the highest levels – establishment of an Institute of Sport and National Sport Academy
2004	Sports Company of Trinidad and Tobago (SPORTT)	– key areas of responsibility included elite athlete development, sports development and performance, construction and maintenance of sporting facilities
2009	Vision 2020: Draft Strategic National Plan	– focus on sport as a tool for improving the health of the nation, contributor to gross domestic product (GDP) and advancing T&T as sporting superpower – establishment of modern sporting facilities – training of personnel involved in the development of sport – introduction of sports scholarships – promotion of sports as a viable career

Sources: GOTT (2009); McCree (2009); SPORTT (n.d.)

In 2002 the Ato J Boldon Sports Scholarship was introduced by the government of T&T (GHRS, n.d.). Tenable worldwide, the purpose of this scholarship was to provide undergraduate training to nationals in management, medicine and scientific aspects of sports. It was envisioned that these qualified citizens would then return and contribute to the development of sport locally.

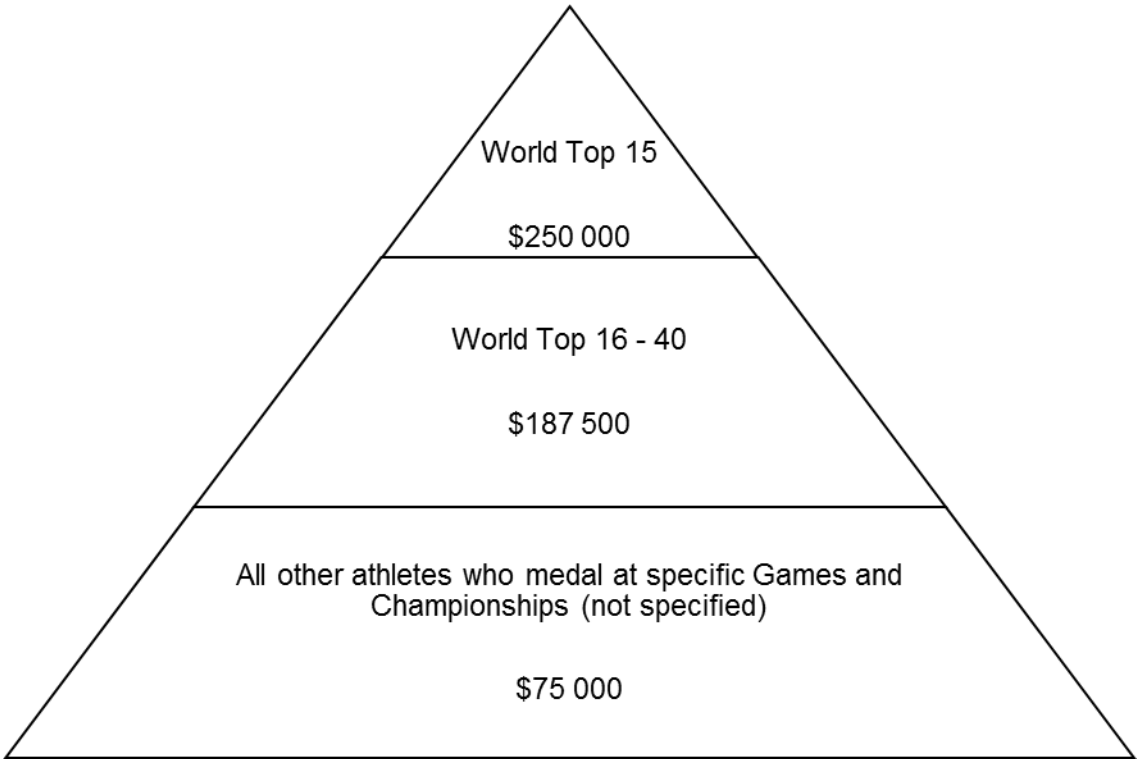


Figure 1.1. Elite Athlete Assistance Programme funding structure.
Source: Ministry of Sport and Youth Affairs (2008).
Figures are shown in T&T dollars. T&T $10.33 = £1 at time of writing thesis.

Table 1.1. highlights T&T's performance at the Olympic Games post–independence. Trinidad and Tobago first competed as an independent nation at 1964 Olympic Games. Interestingly, T&T has medalled in all of the Olympic Games since the government began investing in high performance sport in 1988. The table also illustrated that with the exception of 2004, there was an upward trend in the quantity and quality of medals and positioning on the Olympic Table. This positive linear relationship in performance is consistent to that which occurred

in China, Australia and the United Kingdom (please see Chapter 3 for a more in depth discussion on this relationship).

Elite sport is currently undergoing a state of transition in T&T and the current trend is encouraging. Predominantly led by the government, there is a greater thrust towards establishing T&T as the sporting powerhouse of the Caribbean and subsequently major contenders on the world stage. Greater government investment has occasioned a subsequent increase in the performance of T&T athletes at the Olympic Games. Ultimately, T&T’s performance and continued ascension up the Olympic table would eventually be constrained by its small population relative to the Games' superpowers China and the United States. The results, however, provide further support for state investment in elite sports.

Table 1.2. Medals won by the Trinidad and Tobago National Team at the Olympic Games 1964–2012.

Year	**Gold**	**Silver**	**Bronze**	**Total**	**Rank**
1964	0	1	2	3	28
1968	0	0	0	0	DNP
1972	0	0	0	0	DNP
1976	1	0	0	1	26
1980	0	0	0	0	DNP
1984	0	0	0	0	DNP
1988	0	0	0	0	DNP
1992	0	0	0	0	DNP
1996	0	0	2	2	68
2000	0	1	1	2	61
2004	0	0	1	1	71
2008	0	2	0	2	59
2012	1	0	3	4	47
TOTAL	**2**	**4**	**9**	**15**	

*KEY: DNP = Did Not Place

Sources: Wikipedia (2013) & IOC (2009).

Increased government funding alone, however, cannot ensure improved performances and sustained success for T&T athletes. This system still favours the few that can afford to fund their development to the national level where they can make their talents known. To ensure that a greater number of potentially talented individuals are afforded similar opportunities to succeed, particularly those from the larger grassroots communities who are often overlooked, there exists a pertinent need for a carefully assembled, coordinated NTID programme in T&T. Talent identification and development are considered crucial components of any progressive, multistep elite sports programme (Vaeyens et al., 2009) as they afford a clear, coordinated system for nurturing and progressing recognised talented individuals. The efficacy of NTIDs has been definitively demonstrated in several other countries (Hogan & Norton, 2000). Moreover, an effective NTID programme increases the likelihood of discovering young, gifted individuals, minimises costly errors and ensures limited funds can be invested in those that show the greatest promise (Abbott & Collins, 2002; Mohamed et al., 2009). Considering T&T's population stands at just over 1 million people and resources are equally limited, the country stands to benefit greatly from making TID an integral component of its high performance sport programme.

1.2. Problem Statement

Talent identification is a continuous process which involves prognosticating performance over various periods of time through the measurement of several variables including anthropometric, physiological, psychological and motor skill attributes either in isolation or in combination with each other (Mohamed et al., 2009; Williams & Reilly, 2000). Talent development entails providing players with the most appropriate environment to realise their potential (Vaeyens et al., 2008; Williams & Reilly, 2000). Talent identification is regarded as a requisite precursor to talent development as it ensures that only those individuals exhibiting the greatest potential to achieve international success are ushered into progressive training programmes specifically designed to nurture their gifts (Abbott & Collins, 2002).

The benefits of TID in sport is well articulated in the literature (Abbott & Collins, 2004; Baker et al, 2009; Pearson et al., 2006; Vaeyens et al., 2008; Vaeyens et al., 2009). There is still rife belief that early and effective talent identification and development methods afford a more efficient use of resources to ensure optimal talent development, retention and ultimately successful athletic performance (Bullock et al., 2009; Abbott & Collins, 2004). In order to minimise the risk and maximise return on investment, sport organisations tend to focus on dedicating resources to developing a smaller number of athletes with the potential to achieve success at the senior level (Bullock et al., 2009). There is a growing body of evidence suggesting that early identification and specialised talent development may not be a pre-requisite to athletic success at the adult stage (Vaeyens et al., 2009; Baker et al, 2009). Career histories of many highly successful athletes show wide variety of early specialisation, late start, a change in main discipline or even success in more than one sport. The need for a more holistic approach is underscored by the fact that many influencing factors are, in fact, unreliable predictors when the projection crosses the boundary between adolescents and adulthood (Pearson et al., 2006). A more comprehensive discussion on TID, its benefits and demerits is provided in the succeeding Chapter 2.

Traditionally the preserve of coaches, there is an increasing movement towards centralisation of the TID appliance. This trend lends credence to the assumption that in order for an athletic team and by extension a nation to succeed in sport at the international level, there is a requirement to construct and maintain sophisticated, systematic approaches to identify, nurture and develop potentially elite players (Vaeyens et al., 2009). This approach is predicated on the belief that early and effective talent identification and development methods afford a more efficient use of resources to ensure optimal talent development, retention and ultimately successful athletic performance (Bullock et al., 2009; Abbott & Collins, 2004).

Sport in T&T has been increasingly on the state radar within the past 17 years and there have been clear, positive signs of improvement. The introduction of several national policies propelling elite sport into the national spotlight and increased funding has resulted in improved performances by athletes representing the country at the Olympics and other major World Games. Despite the successes, several issues abound which can impact the efficiency of the system.

1.2.1. Funding

As previously outlined, SPORTT was entrusted with the responsibility of financially supporting elite athletes. The monies disbursed are meant for athlete development but the existing funding structure typically caters for those who are already performing above the national level. The expenditure of SPORTT per athlete compares favourably to that of UK Sport. Elite athletes from T&T receive between £7260 to £24 201 (Table 1.1.) per athlete based on competitive level compared to the £13 689 - £27 737 spent by UK Sport (UK Sport, 2015). Considering so much is being spent on athletes, one may question why T&T does not perform better at the Olympics and other games.

Several reasons may explicate the above. Firstly, sport, and in particular elite sport still remains a luxury available to those who possess the means. Equipment and coaching are costly, and more finance is required the higher one vertically progresses the competition ladder. Hence, the less affluent members of society which constitute a considerable proportion of the population are excluded from benefiting from SPORTT funding. A prominent example of this is Kershon Walcott who won a gold medal in javelin at the 2012 Olympic Games. Walcott, who comes from a small, relatively poor village in northern Trinidad, approached SPORTT seeking financial assistance for training and competition (Baptiste, 2013). His application was refused because he did not meet the listed requirements which also included his nonparticipation at major international events in the years preceding the upcoming Olympics (Baptiste, 2013). Fortunately for Walcott, he would eventually receive assistance from the National Association of Athletics Administrations of T&T and go on to win the country’s first ever javelin and only gold medal at the 2012 London Games (Baptiste, 2013). Several other athletes who participated at the 2012 Olympic Games participated as a result of funding from their parents or private sponsors (Baptiste, 2013). Baptiste (2013) bemoans Walcott's situation, stating that it was not an isolated one but a fate that has befallen many underprivileged yet gifted T&T athletes who are denied the opportunity of representing the country because of their poor background (Baptiste, 2013).

Running counter to SPORTT is the Ministry of Sport Trinidad and Tobago which funds NGBs, community groups and other (non–elite) individuals and activities (MOSTT, n.d.b). The funding is intended for community, sport and athlete development programmes. There are, however, very few controls, checks or balances after the funds are disbursed to the relevant parties. This leaves the system open to impropriety as there have been reports of money being used for purposes for which it was not originally intended (Baptiste, 2013). For example, Tariq Abdul Haq who won a silver medal in boxing 2010 Commonwealth Games retired early from the sport citing a distrust of the Trinidad and Tobago Boxing Association and their funding process for elite athletes (Baptiste, 2013). There have also been public disputes between the Minister of Sport and the NGBs which eventually resulted in their funds being withheld from these organisations as a result of their discord (Baptiste, 2013).

1.2.2. Talent Identification and Development

A notable omission from the sports policies introduced by successive governments is a clear cut TID plan. This could be the result of several reasons. Policies enacted and funding intended for athlete development usually cater for those who are already performing at the elite level. There may be a lack of understanding on the meaning, involved processes and benefits of TID.

The previously mentioned issues effectively contribute to the limited talent pool available for selecting, developing and representing the country. With a population of approximately 1.3 million, however, the country does not have the luxury of depending on a trial and error approach which permits only a minute number of athletes to attain elite status (Mohamed et al., 2009). This Darwinist method would result in many talented children remaining undiscovered and their gifts undeveloped. Consequently, the country is presented with a smaller talent pool from which to select and nurture for international competitions.

1.3. Project Objectives

Sport in T&T is currently undergoing exciting change. The recurrent reference to "elite" and "high performance" sport in successive government policies has signalled augmenting state interest outlined. This increasing state investment in sport has led to a corresponding increase in medal tally at the Olympics and other major sporting events (please see Table 1.2.). For example, since the introduction of the White Paper on Sport (1998, cited by McCree, 2009) T&T's performance at the Olympic Games has improved, and with the exception of 2004, the country has continuously climbed up the Olympic table (Table 1.2.).

Yet, despite the promising array of policies introduced, the extent to which the majority of the population benefits is still uncertain. The EAAP, for example, provides funding to elite performers who are currently competing at the regional levels and above (SPORTT, n.d.) with strict exclusionary criteria exempting those at the lower levels (Baptiste, 2013). Sport is considered a cost intensive pursuit and the ability to ascend the highest echelons of performance or merely take part in sport are constrained by one's financial situation (Kirk et al., 1997). For example, Jones, Millward and Buraimo (2011) found that sports participation amongst persons living in housing estates in the UK was 36.8% compared to 64.8% for those who purchased their own homes. Costs associated with elite sport includes training, uniform, transportation to and from facilities, competing in regional and international tournaments for the purpose of grading (Kirk et al., 1997) and the purchase of equipment, none of which are produced in T&T or the wider Caribbean (McCree, n.d.). Hence, the minority of athletes that progress to the elite levels would typically constitute those with the financial means to meet the financial demands of their respective sport.

Based on United Nations Development Programme report (2014), approximately 38% of T&T's population live below the established poverty line of US $2 per day. This translates into a considerable proportion of the population being precluded from accessing elite funding as they do not possess the financial resources to ascend the performance ladder. Ultimately, this weakens the available talent pool as the majority grassroots and economically underprivileged do not benefit from the increased state investment. The example of Olympic gold medallist Kershon Walcott mentioned earlier draws this stark reality to the fore and may encourage one to question as to the true number of potential elite athletes missed as a result of the restrictive practices and funding structure of SPORTT and the Ministry of Sport. There is a wealth of potential available in T&T (TTConnect, 2015) but the current system does not allow for their discovery and development. Coaches and teams have routinely cited a lack of funding for sporting programmes (Trinidad Express Newspapers, 2015; Trinidad Guardian, 2015b) which when juxtaposed with inadequate facilities (Trinidad Guardian, 2015a) and a lack of opportunities translates into less youngsters, gifted and otherwise, being involved in sport. Furthermore, the absence of a clear cut TID system only serves to further exacerbate the situation. Given T&T's relatively small population, there exists a compelling need for a NTID system which would provide greater sporting access to the nation's children and would eventually augment the amount of talent on offer.

The fundamental purpose of this research paper, therefore, was to provide a potential blueprint for a NTID system capable of being effectively introduced in Trinidad and Tobago. Considering that athletic talent is a multifactorial construct affected by a complex interaction of biological and environmental factors (Baker, 2003), it is imperative that any meticulously constructed, progressive TID programme take these factors into consideration. Hence, a multidisciplinary approach was employed in this study.

The overarching research question was addressed by means of the following sub–goals:

i) a critical review of the au courant literature on talent and TID in sport so as to provide a firm grounding upon which this discourse is structured

ii) to empirically investigate talent identification and talent development processes in practice using empirical investigations

iii) to critically examine the structure of successful NTIDs existing in several countries around the world, with particular focus on the extent to which their indigenous cultures impact the adopted form

iv) develop a NTID model for T&T that takes into account the information generated by the above and to contribute to the existing body of knowledge on NTIDs.

The data derived in this project will be utilised for the development of a NTID system that could be successfully introduced in T&T.

1.4. Methodology

There is an expanding body of research into NTIDs in the extant literature. While these studies have sought to examine the efficacy of national structures, none have endeavoured to provide a working model capable of being introduced at the national level. This study sought to contribute to this using a mixture of proven and novel qualitative and quantitative inquiries. This thesis is composed of a series of independent studies tailored towards achieving the desired outcome. Given the level of detail and variety in each, it was not possible to provide an exhaustive description of the methodology for each study here. Instead, the methods outlined below serves to provide a preliminary insight into procedures adopted to complete each research project.

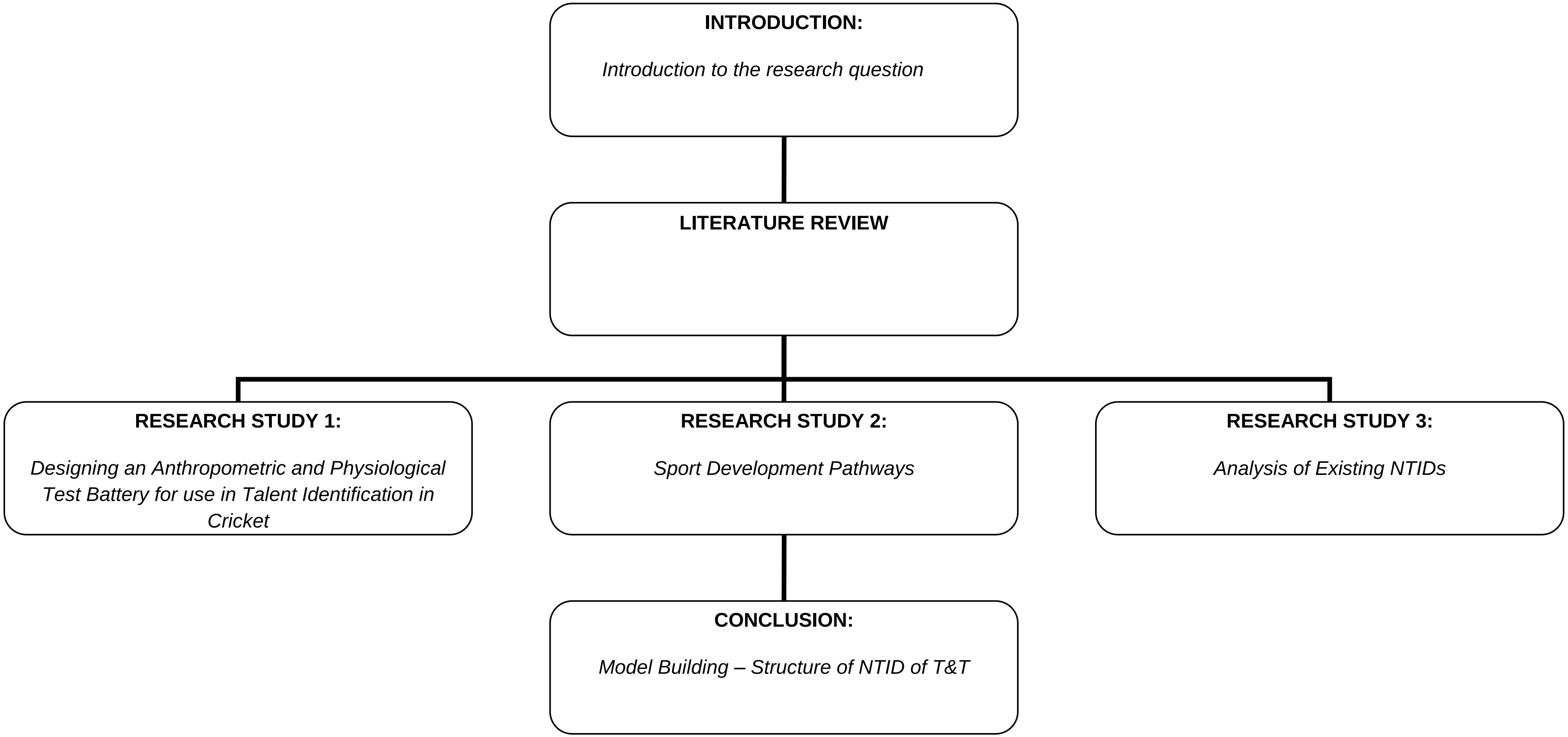


Figure 1.2. Diagrammatic depiction of the design of the research thesis

Figure 1.2. offers a schematic illustration of the design of this which guided the development of this research thesis beyond this chapter. It was hoped that this would allow for a logical progression of the studies in an effort to answer the research question in the concluding chapter.

1.4.1. Literature Review

According to Boote and Beile (2005), a good researcher has effectively failed in their duty to undertake meaningful research without first endeavouring to obtain a comprehensive understanding of what has been previously done in the field, with particular emphasis on the strengths, weaknesses and ramifications of is existing studies. Pursuant to this, the thesis begins with a review of the existing literature on talent, talent identification and development in sport. The aims of this were twofold. Firstly, it provided the reader with an understanding of this fundamentally important variable and how it relates to sport. Secondly, and more importantly, the literature review was used to offer a theoretical schema upon which the thesis was constructed. In order to design any system capable of effectively recognising and nurturing gifted individuals, one must first fully understand the antecedents of talent.

1.4.2. Experimental Inquiries

Chapters 3 and 4 provided a practical look at talent identification and development in action. While not entirely novel in their approaches, they offered new perspectives of work that currently exist in the field.

1.4.3. Physiological testing in junior male cricketers

Chapter sought to design and validate a physiological testing protocol that can be used to identify talent in cricket. Cricket, despite its long history and growing international interest, has failed to attract significant research interest outside of historical, sociological and psychological studies. Apart from the paucity of physiological studies, the choice of sport was based on the fact that cricket remains the number one sport in T&T. The study included a series of anthropometric and physiological tests in an effort to distinguish between elite and non–elite junior male cricketers. The tests were considered to be specific to the physical demands of cricket and included the following:

Anthropometric

- stature (cm)
- mass (kg)
- arm span (cm)

Physiological	*Parameter Measured*
➢ standing long jump (cm)	Power
➢ push up test	Strength
➢ pull up test	Strength
➢ 20–m sprint test (sec)	Speed
➢ 505 agility test (sec)	Agility
➢ 20–m shuttle run test ($ml \cdot kg^{-1} \cdot min^{-1}$)	Aerobic endurance

It was hoped that this study would provide a fitness battery that could be productively used in cricket. A copy of the final protocol is provided in Appendix A (p. 213).

1.4.4. Talent development in sport: A retrospective analysis

In Chapter 4, the focus switches to talent development. Using a retrospective study, the researcher attempts to explore the development pathway of currently performing elite athletes (males and females; 18 years and above) in an effort to identity prerequisites for a successful developmental system. The study elicited information regarding their previous sporting history, sports currently played, reasons for participating in their current and previous sports, and parents' sport participation history. The aim was to identify common patterns that aided (or hindered) the athletes' development so as to establish a list of factors that are considered necessary for talent development programmes. A secondary aim was to determine whether major differences or similarities existed in the developmental patterns between developed and lesser developed countries. Therefore, this study employed a cross–national comparison design, drawing its sample from both T&T and the UK. A copy of the questionnaire is provided in Appendix B (p. 235).

1.4.5. Review of National Talent Identification and Development Systems in Cultural Context

While research into talent identification and development systems has burgeoned within recent times, these studies have often steered clear of cultural ramifications, instead focusing on, inter alia, the economic costs and successes. When constructing systems at the national level, many policy generators often seek out successful, existing systems on which to model their own. While these systems may display some level of homogeneity, numerous factors may be attributed to their differences including population size and finance. Studies, particularly in the management and social sciences have demonstrated that the indigenous culture of these countries may exert a more dominant effect on the structure and functioning of systems borrowed from other countries.

This qualitative study sought to redress this gap by examining the effect of national culture on the organisational structure of NTIDs using Hofstede's 6 Dimensional Model of National Culture. This study proved the most challenging due to difficulties in obtaining information on NTIDs. Nevertheless, it is probably the most critical chapter as it provides a framework for building the NTIDs of T&T. Should Hofstede's model successfully explain structural differences, the results will factor in the format of T&T's NTIDs.

1.4.6. Data Analysis

A variety of data analysis methods are highlighted here reflecting the variety of studies used to complete this thesis. Data analysis methods usually involved collecting the data manually or by a recording device and transferring them to a password protected personal computer. The data were then ordered and compared. For the questionnaire and physiological studies this usually involved calculating the frequencies, minimums, maximums, means and standard deviations of the variables. Considering that both studies employed two samples, further analyses were conducted using non–parametric tests to compare the samples. All statistical analyses were conducted using Statistical Packages for the Social Sciences (SPSS).

1.4.6. Conclusion and Model Building

The final chapter firstly summarises and collates the information gathered in Chapters 2–4. A proposed National Model of Talent Identification and Development was then constructed using the information generated. In the end two models will be presented. The first model illustrates the TID pathway for T&T athletes, taking into consideration the multidimensionality of talent. The second model is that of an organisational structure of the NTIDs for T&T outlining the role and positioning of various stakeholders and taking into consideration the effects of the indigenous culture of T&T.

CHAPTER 2

REVIEW OF THE LITERATURE

2. Introduction

"…for a society concerned about survival, no issue is more important than cultivation of its talented young, no outcome more devastating than the loss of talented individuals."

Gardner (n.d., cited by Tranckle & Cushion, 2006)

While ostensibly glum in its delivery, the preceding quote paints a succinct yet cogent picture of the paramount importance of talent to society. Considered an indispensable prerequisite for the ontogenesis of any nation (Kock & Burke, 2008; Strenze, 2013), any event that impedes the development of talent can result in acutely pernicious ramifications (Wolfle, 1960). Yet in a world faced with a rapidly expanding population, talent remains a scarce, valuable commodity (Tranckle & Cushion, 2006; Vaeyens et al., 2009) in quite possibly every field. Institutions mandated to train individuals are routinely failing to produce sufficient quantity and quality of skilled personnel (Kock & Burke, 2008). This situation is further exacerbated by the fact that a considerable amount of this highly covetable commodity is wasted or lost every generation (Tranckle & Cushion, 2006) primarily due to poor development or simply a failure to recognise the gifted members of society. The need to identify and nurture talented individuals remains a key area of concern in sporting and other establishments worldwide.

For numerous years the tocsin has been sounded over the critical shortage of skills in various sectors of society around the globe and a growing number of states have finally started to heed its call. For example, both the governments of the United Kingdom (see the Leitch Review of Skills, 2006) and the United States (see The Committee on Science, Engineering and Public Policy Report, 2007) have commissioned review of skills within recent times. The fundamental objectives of these inquiries were to identify skill deficits in their respective countries and to propose measures for buttressing the gaps. The burgeoning incidence of sports NTIDs provides further evidence of state intervention in recognising and developing talent.

Nevertheless, as a precursor to undertaking any worthwhile inquisitions into talent in sport or indeed any other sphere, the initial step should be a delineation and operationalization of the involved nomenclature. Whilst research into talent in sport has progressed considerably, its meaning remains a contentious issue (Tranckle & Cushion, 2006). According to Meyers, Van Woerkom and Dries (2013), many researchers have failed to present a definition of talent as there seems to be the perception that it was universally understood. Moreover, the often undifferentiated use of supplementary terms in the literature, including talent identification and talent development alongside talent has served to further complicate its definition (Tranckle & Cushion, 2006). These inconsistencies contribute to the existing obscurity and provide clear evidence of the need to carefully clarify talent. Ultimately, this would afford a strong theoretical basis for the development of the discourse contained in the succeeding chapters.

The purpose of this review is to provide an overview of talent and its sub–terms talent identification, talent development as presented in the literature and which are deemed relevant to this project. This will be achieved by analysing existing studies which examined these important variables, taking into account the disparate views. Several models of talent development are also presented. A secondary objective of this chapter is to offer a working definition of sport as it pertains to the goals of this study. An effort will be made to demonstrate the importance of sport to society and indeed the nation so as to highlight the need for NTID systems.

2.1. Talent Identification and Development: Clarification of terms and concepts

2.1.1 Talent

Several authors have offered varying definitions of talent. For example, Meyers, Van Woerkom and Dries (2013) have defined talent as a “high potential, ability or competency”. Brown (2002, cited by Tranckle & Cushion, 2006) described talent as a “special, natural ability….a capacity for achievement or success”. In diverting from the previous, Csikszentmihalyi, Rathunde and Whalen (1997) contended that though there is an innate basis to talent, its true definition lies in society’s perception of this variable. This concept is hinged on the respective requirements and values of the prevailing culture (Csikszentmihalyi et al., 1993). While undoubtedly vague, Csikszentmihalyi et al. (1993) exposed the inconstancy of this variable and the fact that the meaning of talent is largely dependent on the context it is being used and the perception of those involved.

Howe, Davidson and Sloboda (1998, pp. 399–400) adopted a different approach to delineating talent, instead offering a collection of tenets that they believe characterise this construct. These include:

1) *“It originates in genetically transmitted structures hence is at least partly innate*
2) *Its full effects may not be evident at an early stage, but there will be some advance indications, allowing trained people to identify the presence of talent before exceptional levels of mature performance have been demonstrated*
3) *These early indications of talent provide a basis for predicting who is likely to excel*
4) *Only a minority are talented, for if all children were, there would be no way to predict or explain differential success*
5) *Talents are relatively domain–specific.”*

Gagné (2008), in his effort to define talent developed his Differentiated Model of Giftedness and Talent (DMGT; Figure 2.1.). The DMGT proposes a narrower definition of talent, identifying it as independent and distinct from terms such as natural abilities. According to the DMGT, gifts or natural abilities are partly dependent on genetic endowment (Gagné, 2008). These gifts can be readily recognised in tasks as a result of organised learning and interaction with the environment, for example, physical abilities in sport (Gagné, 2008). An important indicator of giftedness is the relative ease and speed of obtaining and mastering new skills (Gagné, 2008). At the opposite end of the DMGT is talent, which gradually develops from the conversion of the aforementioned gifts into the sufficiently trained skills applicable to a particular sport (Gagné, 2008). Talent is also considered to be flexible and is manifested in different ways based on the field in question. For example, manual dexterity can be applied to the skills of a pianist, painter (Gagné, 2008) or sportsperson.

Gagné (2008) provides a clearer understanding of talent while departing from the one size fits all definition provided earlier (Tranckle & Cushion, 2006). While the above provides some insight into talent, the general lack of consensus as to its precise meaning demonstrates the need to formulate a universal definition which would set the groundwork for this and future studies. Though this may not be forthcoming in the near future, Gray (2010) contends that given the widespread disagreement, a useful launch pad is to supply evidence proving the existence of talent. Much of the research into talent emanates from Francis Galton's oft repeated nature versus nurture theory (1874, cited by Baker et al., 2003; Krebs, 2009; Tranckle & Cushion, 2006). These disparate views are explicated below.

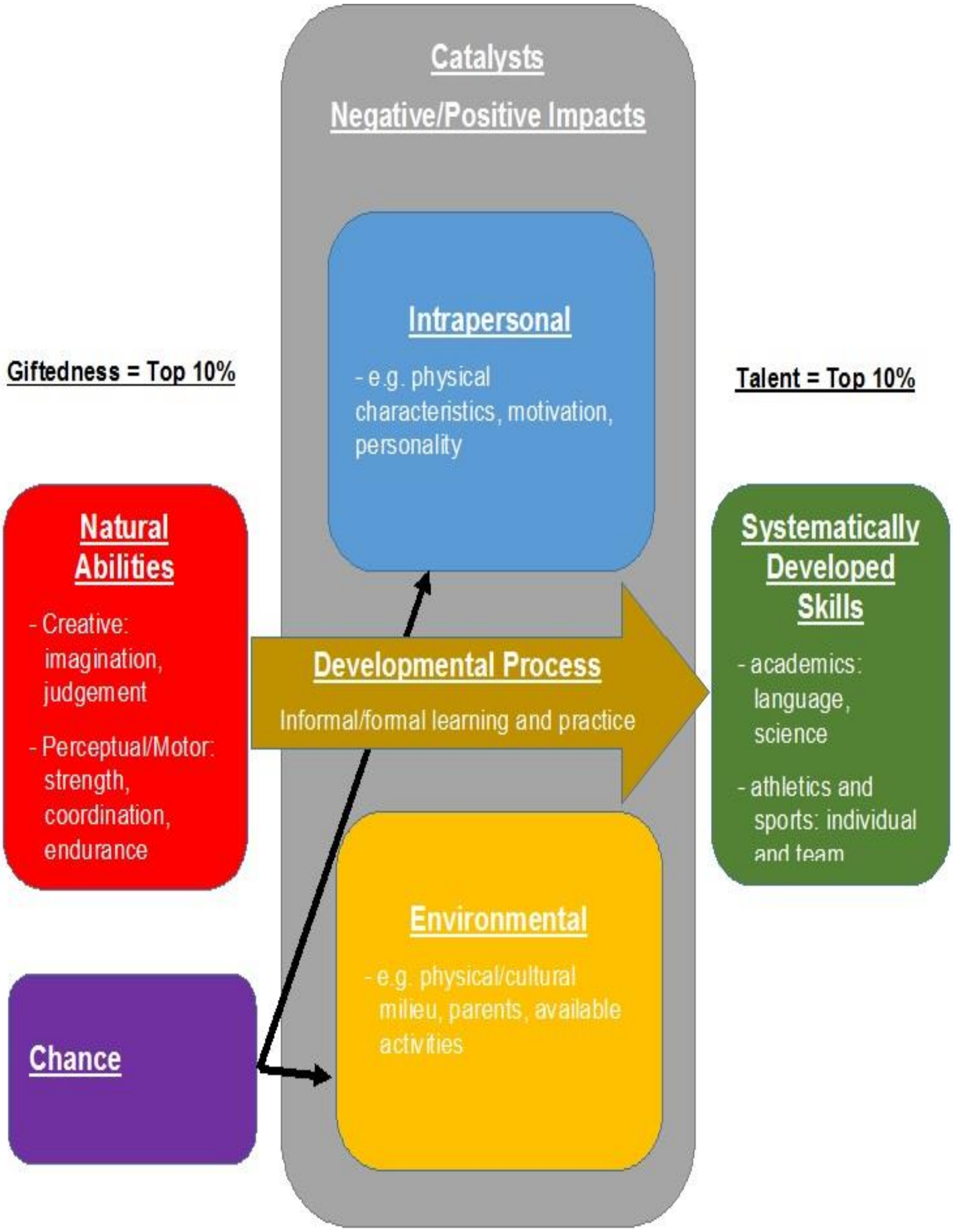


Figure 2.1. Simplified version of Gagné's Differentiated Model of Giftedness and Talent. Adapted from Gagné (2008).

2.1.2. Nature

Proponents of the nature theory have proposed that talent is an innate ability (Bouchard, 1997 cited by Hoare & Warr, 2000, Lippi et al., 2009; MacArthur, & North, 2005), suggesting that an athlete's capacity to ascend the heights of elite stardom is constricted by and responsive to their genetic predisposition. Hence, an individual's biological makeup does not only determine their personality but more importantly their eventual capacity to be successful in sport and other domains (Baker & Horton, 2004).

Tucker and Collins (2012) suggest that biological systems are individualistic structures composed of an intricate arrangement of diverse cells, proteins and macromolecules. Inherent protein coding and non–coding of genes situated along the length and breadth of the genome supply the genetic schemata for each system (Tucker & Collins, 2012). Genetics impacts, inter alia, the musculoskeletal and central nervous systems, height and maximal oxygen uptake and a person's maximal biological traits exhibit a strong element of sport specificity (Tucker & Collins, 2012). At present, no single gene has been associated with superior athletic performance (Tucker & Collins, 2012).

Much of what is known about genetics today has been a direct result of the Human Genome Project (Lander et al., 2001; Venter et al., 2001). It is believed that 99.9% of the genetic sequencing of mankind is identical with each person possessing a human genome consisting of roughly 3 billion deoxyribonucleic acid (DNA) letters (Roth, 2012). These letters determine the development of all our physical and mental attributes or phenotypes (Roth, 2012). What differentiates one person from the next, however, are divergences in DNA letters resulting from differences in genomes (Roth, 2012). Even a minor deviation in the sequencing of DNA letters for a particular genome can lead to different development patterns for traits controlled by that genome (Roth, 2012). For example, variations in genes that influence the growth of bones will ultimately affect one's height.

With regards to sports, genetic profiling is viewed as a lucrative tool for identifying persons that possess physical and mental characteristics that lend to success in particular sports (Breitbach, Tug & Simon, 2014; Roth, 2014). An individual's genetic framework experiences little change throughout their lifetime (Breitbach et al., 2014). Genetic tests seek to identify DNA variants or polymorphisms related to sports specific skills (Breitbach et al., 2014). Unlike conventional TI methods, genetic testing is not limited by an athlete's age, training cycle or state of health, time or place (Breitbach et al., 2014). Moreover, a single genetic test would offer coaches and sports practitioners a multidimensional approach to TI – a feature not available in traditional TI testing (Breitbach et al., 2014). This would represent an optimum utilisation of economic resources for sports clubs and governing bodies (Breitbach et al., 2014).

Two approaches to genetic profiling has been used in the literature. The first method is known as heritability studies (Breitbach et al., 2014; Roth, 2012). Heritability studies are based on biometrical theory which asserts that the expression of physical and mental traits in persons are influenced by genetic inheritance (Medland & Hatemi, 2009). Commonly explored through twin and other family studies, researchers are able to provide a quantitative approximation of the significance of genetic factors (by examining the extent to which genetics impact variance around the population mean) to a particular phenotype (Medland & Hatemi, 2009; Roth, 2012). It is important to note here that the result of heritability studies do not provide information pertaining to the particular gene (or quantity of that gene) influencing the phenotype or the direction of the effect (Medland & Hatemi, 2009).

Heritability studies have reported genetic impacts on phenotypes ranging from 0–100% (Roth, 2012). With regards to sports, performance related traits have been shown to fluctuate between 15–65%, suggesting a small to moderate genetic influence (Roth, 2012). Evidence of the effects of genetic inheritance were provided in the HERITAGE Family Study (Baker & Horton, 2004; Tucker & Collins, 2012). This study, amongst other things, examined the role of the genotype on cardiovascular, metabolic and hormonal responses to aerobic exercise training

(Baker & Horton, 2004). The results demonstrated an association between genetics and sub–maximal aerobic performance (23–57%; Pérusse et al., 2001), maximal aerobic performance (approximately 50%; Bouchard et al., 1998), resting systolic (approximately 46%) and diastolic blood pressures (approximately 31%; Gu et al., 1998) and heart rate (approximately 32%; An et al., 1999). A later study by Beunen and Thomis (2004) found a 55–65% skeletal muscle heritability. The most heritable phenotype is stature with reported reaching a maximum of 80% (Silventoinen et al., 2008). Other studies have also highlighted the influence of genetics on the adaptation of skeletal muscle to endurance exercise (Hamel et al., 1986), vertical jump height (Maes et al., 1996), anaerobic capacity and explosive power (Calvo et al., 2002) and on several measures of muscular strength and their response to training (Thomis et al., 1998).

The second approach to genetic profiling involves the identification matching of a gene(s) to a particular phenotype (Breitbach et al., 2014; Roth, 2012). Explorations into performance related genes typically explore 4 traits – aerobic fitness and endurance, and muscular mass and strength (Roth, 2012). Findings of recently published research associating genes with performance related phenotypes are summarised in Table 2.1.

Table 2.1. Performance related traits and their associated genes

Performance related trait	**Associated gene**
Aerobic endurance	ACE (I/I genotype; Puthucheary et al., 2011) PPARGC, IL6, HIF1, ADRB2, BDKRB2 (Bray et al., 2009)
Muscle strength	ACTN3 (Yang, Garton & North, 2009, cited by Roth, 2012) ACE (D/D genotype, DIO1, VDR (Bray et al., 2009)

While genetic profiling does show great potential and has certainly advanced knowledge in the area, it is still a long way off from becoming an integral part of programmes geared towards recognising talented athletes. Roth (2012) laments that given the intricacy of traits linked to sports performance, the identification of genes that contribute to the heritability of these traits has been advancing slowly. This situation has been further exacerbated by the paucity of research groups in the field (Roth, 2012). For example, despite having the highest heritability, cataloguing of genes that contribute to body stature has achieved only minimal success with physical measurements during early childhood still proving to be a more successful test of talent (Roth, 2012).

The bulk of research into performance related genes have generally failed to establish the strength of the correlations between the genes and their associated traits (Breitbach et al., 2014; Roth, 2012). For instance, the study by Bray et al. (2009) only itemised the genes linked to specific performance trait, neglecting to elucidate the strength of the association. A more in-depth literature review is required in order to present a clearer picture of the strength (or lack thereof) of these associations.

Breitbach et al. (2014) asserts that the fundamental shortcoming of previous studies that sought to cipher the genetics of particular performance related traits (e.g., Bray et al., 2009) was their fixation on linking a single gene with each trait. In fact, determinants of these traits are polygenic (Breitbach et al., 2014). For example, physical traits such as stature tend to exhibit continuous variations rather than belonging to a specific group (Breitbach et al., 2014).

While genetic studies thus far have sought to unearth physical and motor genes related to performance, a noticeable absence is any research seeking to identify genes related to mental characteristics (Roth, 2012) including confidence and motivation. Identifying genes associated with mental attributes is considered to be more complex than physical traits as while they are similarly heritable, they are significantly impacted by the environment (e.g., parental and societal influences; Roth, 2012). This is referred to as the ‘gene–x–environment interaction’ which in essence highlights the complex interplay between genes linked to mental attributes and the unique environmental effects (Roth, 2012). This has served to restrict incursions into genetic profiling for psychological characteristics (Roth, 2012).

The importance of and difficulty of establishing the contribution of performance related genes and the environment to performance was highlighted in a study by Klissouras et al. (2001). The authors investigated the career histories of training and competition matched identical twins. They had both competed in the 20 km event in the Olympics but with different levels of success – one was a multiple Olympic medallist while the other was less successful. The authors found that while they both possessed near identical physical characteristics necessary for elite level performance they exhibited dissimilar mental attributes which may have resulted in their differing levels of success. The authors concluded that while genetics, training and a suitable environmental were necessary for becoming an Olympic athlete, success was largely influenced by psychological traits.

2.1.3. Nurture

Conversely, nurturists completely discounted the genetic provenance of talent instead arguing that it is the product of the amount of deliberate practice one accumulates (Ericsson et al., 1991). According to Ericsson's theory of deliberate practice (1991), practice must be geared towards performance enhancement – enjoyment and rewards must not be factored in. In order to be successful an athlete must accrue a sufficient amount of linear, specialised training in their respective sport. As a guide, 10 000 hours (Ericsson et al., 1991) over 10 years was considered adequate (Simon & Chase, 1973, cited by Baker & Horton, 2004).

Originally conducted with musicians, Ericsson et al. (1991) have argued that their talent development paradigm is similarly applicable to the sporting arena, however there exists a paucity of research to corroborate this claim in sports (Baker & Côté, 2003). Helsen et al. (1998) tested the theory in a group of male soccer players (25 ± 0.87 yr) who were competing at the international, national and provincial levels. All of the participants initiated soccer playing at age 5 and began team practice approximately 2 years later. International players practiced a minimum of 10 years before being selected to the national team. Analysing the aggregate number of hours of practice yielded significant results. International, national and provincial players practised approximately 9332, 7449 and 5079 hours respectively. The authors noted the positive relationship between the number of years playing and practice and achievement in soccer and concluded that deliberate practice plays a leading role in the attainment of expertise. In like manner, a review by Helsen et al. (2000) found that wrestlers, skaters and those in karate practiced on average 24.9, 28 and 26.2 hours per week respectively. These results compared favourably with the musicians in Ericsson et al.'s (1991) study who practiced around 25 hours per week. Research in figure skating (Starkes et al., 1996), karate (Hodge & Deakin, 1998), wrestling (Hodges & Starkes, 1996), soccer (Helsen et al., 1998), field hockey (Helsen et al., 1998; Baker et al., 2003), basketball and netball (Baker et al., 2003) have also lent support to the deliberate practice theory.

While research supporting these dichotomous views is important, sitting exclusively on one side of the fence can be detrimental as each has failed to comprehensively elucidate talent as it pertains to sport. Questions abound over the applicability of the genetics research to athletic populations. In the HERITAGE Family Study, for example, participants used were typically drawn from the general population and the results extrapolated to other groups (Baker & Horton, 2004). Similarly, the latter paradigm is subject to its own issues. Baker and Horton (2004) argue that the deliberate practice theory was examined using retrospective studies and despite its usefulness it fails to demonstrate causal relationships due to the absence of a control group. The inflexibility of Ericsson et al.'s (1991) model has also been called into review with Côté et al. (2007) criticising its rigidity. Recent research into elite Australian athletes has demonstrated that on average, these individuals practiced their main sport for 7.5 ± 4.1 years (Gublin et al., 2006 cited by Vaeyens et al., 2009). This result is in direct contravention of the 10 year rule espoused by Ericsson et al. (1991).

Contemporary research has introduced new perspectives of talent (Krebs, 2009). Scientists have started paying greater attention to the role of extra–individual factors including culture, socioeconomic status (Grandjean, 1989), availability of resources, extrinsic motivation (Baker & Horton, 2004), coaching and family support (Araújo et al., 2010). Some of the potential predictors of talent are diagrammatically presented in Figure 2.2. below. This list is far from exhaustive but it demonstrates that any research into TID must take into account its multifaceted nature.

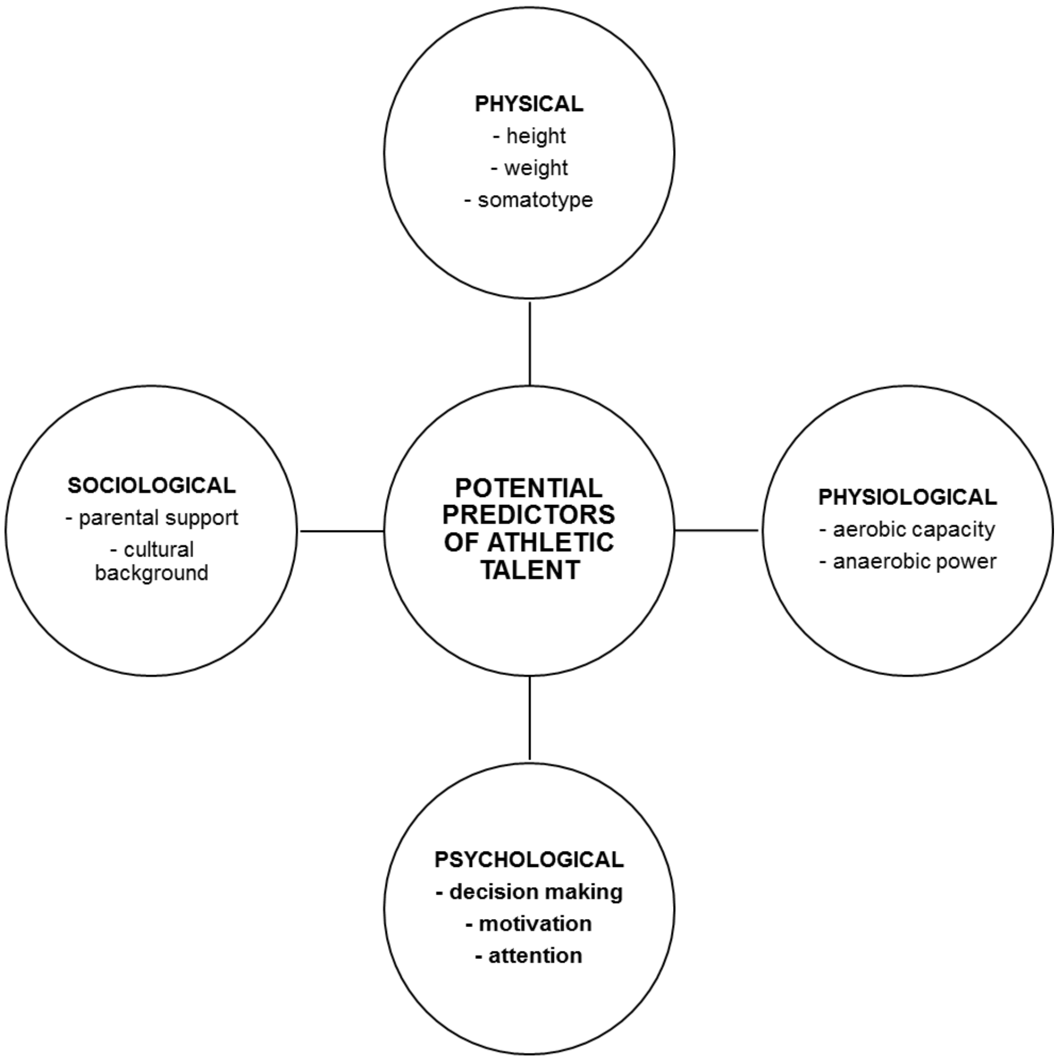


Figure 2.2. Potential predictors of talent.
Sources: Baker & Horton (2004) & Gagné (2008)

2.2. The Identification and Development of Athletic Talent

Appropriate identification and development of talented young individuals are considered critical elements of any multi–stage elite athlete training programme (Burgess, Naughton & Hopkins, 2012). Given the difficulties in delineating the term talent, it would hence come as no surprise that understanding talent identification (TI) and development (TD) are similarly appreciably complex processes. The aim of this section is to provide an overview of TI and TD, outlining advances made in the field as presented in the extant literature.

2.2.1. Talent identification

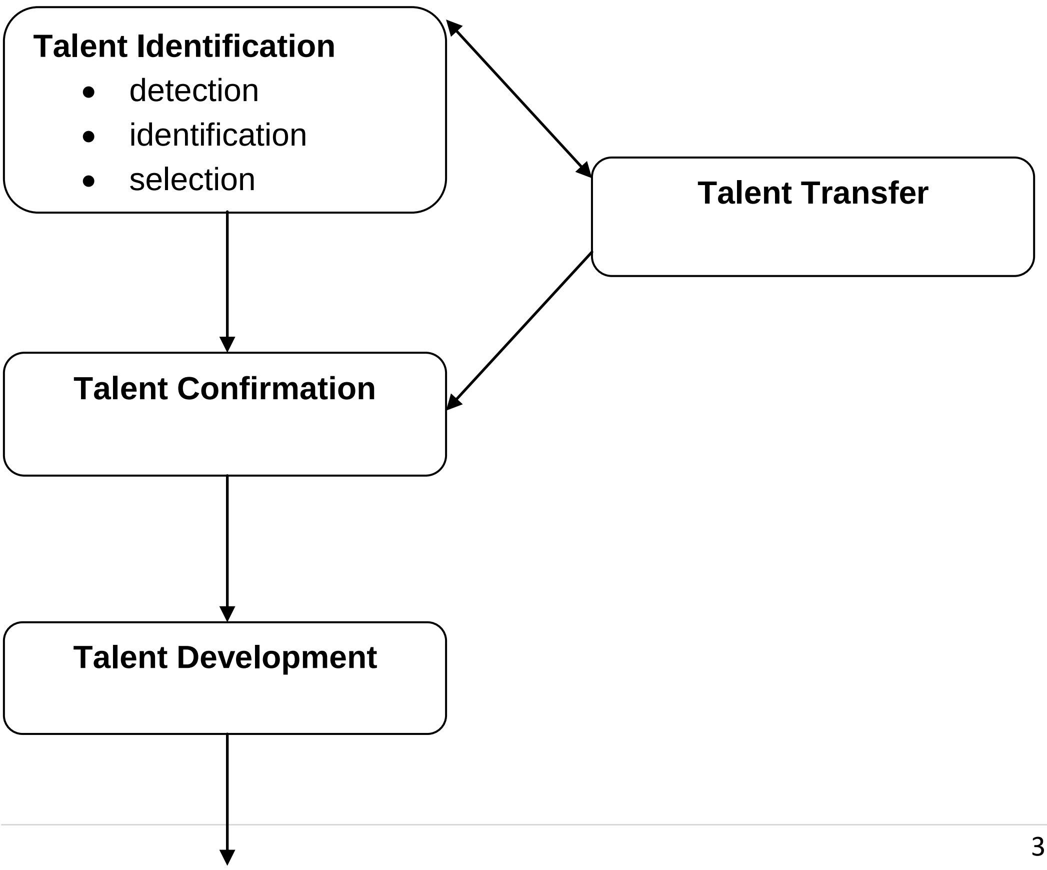


Figure 2.3. Important stages in the development of the elite athlete
Adapted from Bailey & Morley (2006) and UK Sport & EIS (n.d.)

Talent identification (TI) represents the initial stage in the eventual production of the elite athlete (Figure 2.3.). It is an umbrella term which can be further subdivided into 3 components including talent detection selection. Talent detection is the process of unearthing potential gifted youngsters not presently participating in sports (Mohamed et al., 2009). Talent selection describes a continuous process whereby current participants who have achieved the required performance criteria for a specific sport are screened at several stages using a series of physical, physiological, psychological and motor skills tests (Mohamed et al., 2009; Williams & Reilly, 2000; UK Sport & EIS, n.d.). Talent identification involves recognising current individuals displaying the potential to succeed (Burgess, Naughton & Hopkins, 2012; UK Sport & EIS, n.d.; Vaeyens et al., 2008). For the rest of this discussion talent identification will be used to represent both talent detection and talent selection.

Talent identification is an age–old process which emerged from the field (Vaeyens et al., 2009). Increasing investment in sport within recent times, however, has only served to pique interest in TI (Vaeyens et al., 2009). Whilst research into methods of recognising talented youngsters has made substantial progress, prognosticating the future performances of an individuals based exclusively on the outcome of an isolated testing schedule can prove a difficult challenge (Vaeyens et al., 2009). Some of the inherent issues associated with TI are highlighted below.

Although the multidimensionality of talent has been consistently repeated in the literature, the preponderance of existing TI models is predicated on one–dimensional measures (Abbott et al., 2005; Abbott & Collins, 2004). Much of the work on TI has been concentrated on biophysical testing (Abbott et al., 2005;

Burgess & Norton, 2010; Vaeyens et al., 2009), the validity of which has been demonstrated in several studies (Burr et al., 2008; Till et al., 2011; Vaeyens et al., 2006; Veale, Pearce, Koehn & Carlson, 2008). Keogh, Weber and Dalton (2003), for example, found that percentage body fat, sprint speed, agility, aerobic and lower body muscular power were effective in distinguishing between regional representative and club level female field hockey players. Likewise, Mohamed, Vaeyens, Matthys and Multael (2009) reported that elite Under 16 male handball players performed significantly better on standing long jump, hand grip, sit ups, 10 x 5m shuttle run, endurance shuttle run, vertical jump and 5 x 10m shuttle sprint tests.

Contrariwise, several studies have demonstrated the poor predictability of physiological tests. Pyne, Gardner, Sheehan and Hopkins (2005) found a negligible correlation between 20m sprint, agility, vertical jump and multistage shuttle run test between successful and non–successful Australian Rules Football players Reilly, Williams, Nevill and Franks (2000) discovered that the inclusion of psychological and soccer specific measures improved the discriminative ability of their TI protocol. The same was reported by Hoare and Warr (2000), Nieuwenhuis, Spamer and Van Rossum (2002). Gabbett, Georgieff and Domrow (2007) completely discounted the efficacy of physiological testing indicating that skills tests alone were able to effectively differentiate between successful and unsuccessful talent identified junior volleyball players.

The unreliability of biophysical testing has largely been attributed to the effects of maturity (Abbott et al., 2005; Abbott & Collins, 2004; Vaeyens et al., 2009). During adolescence which typically occurs between 13–18 years of age, variations in hormonal activity cause a series of dynamic changes in variables known to affect performance (Fernández–Río & Méndez–Giminénez, 2014; Pearson, Naughton & Torode, 2006). These include physical and physiological parameters including height, body composition, aerobic capacity and strength (Fernández–Río & Méndez–Giminénez, 2014). This therefore makes it difficult to prognosticate the mature result of these genetically affected variables due to the instability of development processes (Abbott et al., 2005, Pearson, Naughton & Torode, 2006).

In their study on the stability of anthropometric and performance measures in junior soccer players, Buchheit and Mendez–Villanueva (2013) lamented the inconsistency of results throughout adolescence. This was validated in a study by Aleksanda et al. (2007) which found that during puberty, there was a dramatic increase in muscle strength, vertical jump, standing long jump, tapping, 10 x 5m runs and sit ups in junior soccer players. In contrast to these arguments, Gonaus and Müller (2012) found that speed and upper limb tests successfully discerned future playing status in 14 to 17 year old Austrian soccer academy players. Fernández–Río and Méndez–Giminénez (2014) contend that the success of the players described by Gonaus and Müller (2012) may solely be the result of the researchers using the “right assessment procedures and tests”.

2.2.2. Talent development

Talented development follows talent confirmation [i.e., the verification of talent characteristics (UK Sport & EIS, n.d.)] and describes the intervening processes where the raw material (identified youngster) is guided and transformed to the finished product (world class athlete). For this to be actualised, it is imperative that young performers be provided with the most suitable environment (Vaeyens et al., 2008). To emphasise the importance of this stage, Reilly et al. (2000), UK Sport and EIS (n.d.) have stated that in light of all the advancements in TI methods, progression to world class athletes would not be possible without the availability of expert coaching, high quality practise, competition and other opportunities and support provided during the developmental stage.

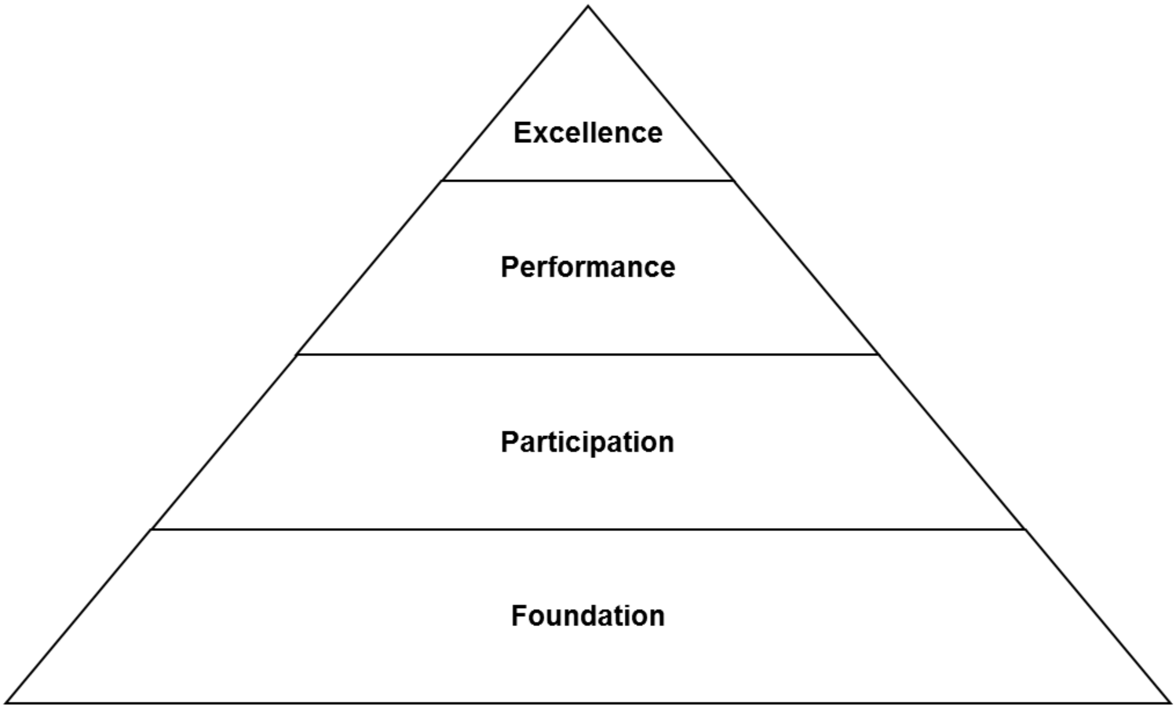


Figure 2.4. Basic model of talent development in sport
Source: Wolstencroft (2002)

Figure 2.4. depicts the generic pyramid model of talent development which offers a universal approach to cultivating athletic talent (Wolstencroft, 2002). Though simplistic, it identifies the typical talent development trajectory of athletes from initial introduction at the base to world class performances at the apex. At the base of the model is the “Foundation” where participants are introduced to basic movement skills through physical activity (Wolstencroft, 2002). During the “Participation” stage, participants take part in physical activity, recreation and sport purely for fun and enjoyment (Wolstencroft, 2002). When the participant enters the “Performance” phase, they begin more specialised training relative to their sport of interest (Wolstencroft, 2002). The main focus is the development of their talent through coaching, competition and training (Wolstencroft, 2002). At the top of the model is “Excellence” where participants strive to attain and succeed established national and international standards of performance (Wolstencroft, 2002).

Unlike TI, there is limited data available on TD programmes (Vaeyens et al., 2009) as they are often heavily guarded secrets. One approach to TD proposes that athletes may flourish in the sport they currently play via a gradual achievement of expertise (Burgess & Naughton, 2010). That is, they progress to elite status via the traditional route as enshrined in the pyramid model (see Chapter 5). In essence, this refers back to the deliberate practice theory of Ericsson et al. (1991) where an athlete must train for a certain number of hours and years before they can be successful. Many TD programmes are designed to identify gifted athletes at a young age before initiating them into an extended period of development (Vaeyens et al., 2009). The belief is that early recruitment and a prolonged period of sport specific training is necessary to guarantee success at the elite level (Burgess & Naughton, 2010; Vaeyens, 2009). Many of the examples and problems that plague this model were previously identified during the discussion on Nurturists. Malina (2010) goes on to further criticise the rigidity of the model by highlighting its exclusivity. He states that during the period of Eastern bloc dominance, a mere 0.14% of the 35 000 Russian athletes based at designated sports schools and 2700 from select schools progressed to high level sports mastery. Further, only 192 of 11 287 athletes emerging from the elite sports schools in Germany during that time would gain a medal in international sports competitions (Malina, 2010).

Several negative outcomes have been attributed to early specialisation. Malina (2010) argues that the level of time needed to be invested in sport leads to social isolation and other non–sport developmental experiences (e.g., being independent). Many of these athletes also suffer burnout or premature drop out due to the real or perceived unrealistic physical or psychological requirements of the sport (Malina, 2010). A commonly recurring problem resulting from early specialisation is sport related injuries in paediatric populations (Malina, 2010). These are predominantly overuse injuries, a chronic injury typically caused by repetitive actions (Malina, 2010).

A second TD method presented in the literature suggests that it is possible for athletes to progress by being transferred or reallocated (talent transfer) to a sport with related or transferrable features (Burgess & Naughton, 2010; UK Sport & EIS, n.d.). For example, a footballer may transfer to a sport with similar movement patterns and techniques such as hockey. In this approach, athletes are permitted to participate in a variety of sports before eventually specialising much later than would be the case with the deliberate practice model (Baker, 2003; Burgess & Naughton, 2010; Vaeyens et al., 2009). A study by Oldenziel, Gagné and Gublin (2004, cited by Burgess & Naughton, 2010; Malina, 2010) found that 28% of elite Australian athletes had developed via the "quick" route (≤ 4 years) and specialised at 17.1 ± 4.5 years of age compared to 7.9 ± 2.5 years for those that progressed through the "slow" pathway. The "quick" athletes also participated in 3.3 ± 1.6 sports before participating compared to the 0.9 ± 1.6 sports of the "slow" athletes.

Martindale, Collins & Daubney (2005) has offered guidelines to aid the construction of an effective TD framework:

1) the need to identify long term objectives and methods
2) the importance of broad, understandable messages and support
3) forgoing early selection in favour of appropriate development and mastery
4) development should be individualised and continuous
5) development should be integrated, carefully planned, holistic

Other models have sought to take into consideration the dynamic nature of talent development. Gagné's (2008) Differentiated Model of Giftedness and Talent (DMGT) advocates the progressive development of gits to athletic talent. Moreover, he acknowledges the important role that factors such as health, the environment, motivation and personality play in the development of the world class performer.

The Developmental Model of Sports Participation (DMSP) presented by Côté, Baker and Abernethy (2007) promotes the idea of early play and recreation during the early years. Individuals take part in numerous sports during the "sampling years" which are slowly whittled down between ages 13–15 when specialisation begins. "Investment" starts at around 16 years of age where participation shifts to focusing on a single sport. These models have been supported in principle but to date there is insufficient research to substantiate them (Burgess & Naughton, 2010).

2.3. Sport

Talent identification and development in sport is an ever expanding industry (Abbott et al., 2005) and are considered indispensable in the quest of sporting supremacy (Vaeyens et al., 2008). Researchers, sports clubs and national federations amongst others are increasingly devoting copious amounts of funds and effort in an attempt to discover the most effective system for recognising and nurturing gifted youngsters exhibiting the greatest potential to achieve (Abbott et al., 2005; Vaeyens et al., 2008). Yet while the importance of TID is usually more readily acceptable in fields such as education and medicine, its significance in sport may be less easily digestible given that the considerable investments benefit only a minuscule minority. The purpose of this section is to provide an insight into sport presenting a case for the importance of TID in this field.

2.3.1. Definition

Sport, like talent, is a relatively difficult term to define and several interpretations of this construct have been found in the literature. Compounding this is the fact that dynamic popular culture, changing political and economic climates can considerably impact one's comprehension of this discipline (Levermore & Beacom, 2008; Pink, 2008). Pink (2008), for example, has described sport as any

"…activity that involves physical exertion, skill and/or hand–eye coordination as the primary focus of the activity, with elements of competition where rules and patterns of behaviour governing the activity exist formally through organisations."

Levermore and Beacom (2008) provided a less constricted description, referring to sport as a broad range of physical activities established by culture and with a sizable array in the extent and type of organisation and competition. Presenting a more comprehensive definition, the Council of Europe (2001) describes sport as

"…all forms of physical activity which, through casual or organised participation, aimed at expressing or improving physical fitness and mental well–being, forming social relationships or obtaining results in competition at all levels."

Though the augmenting institutionalisation and increased focus on rewards (primarily financial in nature) has changed the face of sport over time, a noticeable consistency in the previous definitions is the continued emphasis on the physical, competitive and institutional aspects (Levermore & Beacom, 2008). Each of the preceding elements is developed below.

2.3.2. Physical aspects

All sports require participants to exhibit some measure of physical power, skill or hand–eye coordination (Pink, 2008). The necessary level of these abilities to be considered a sport varies and can range from the low intensity, highly hand–eye coordinated darts to the more physically demanding rugby. As Pink (2008) points out, while a considerable amount of dexterity is necessary to be a good piano player, the focus is more on playing and interpreting music instead of a show of physical aptitude.

2.3.3. Competitive aspects

This aspect of sport has been a source of contention amongst researchers. Pink (2008) contends that sport is competitive by nature, even when played in social settings. He divides this competitiveness as being both extrinsic (competing against another individual or team, to win a medal or gain a professional contract) and intrinsic (trying to establish or exceed a personal goal). Contrary to this, health, social status, fitness and enjoyment have been identified as motives for participating in sport (Levermore & Beacom, 2008; Pink, 2008). Hence, the desire to compete is not the only catalyst for participating in sport. For this discourse, however, the accepted definition of sport is for competitive purposes, that is, the desire to take part in sport purely for the purpose of winning.

2.3.4. Organisational (Institutional) aspects

Throughout history, sport has gradually evolved from impromptu challenges and sporadic entertainment towards more established, organised structures (Levermore & Beacom, 2008). There exists an expansive network of national governing bodies for sports and sports teams in quite possibly every country worldwide. Each sport also possesses an established system of guidelines that dictate the format of play (Pink, 2008). These rules are strict in competitive environments and may be adapted in more informal settings (Pink, 2008). Sporting organisations are typically responsible for ensuring the rules of the sport are adhered to during competitions (Pink, 2008).

Considering the above aspects, there seems to be several activities that may fulfil some of the elements of sport raising questions over its lack of inclusion within the discipline. Poker, for example, can be competitive and has an established set of rules but it does not require the execution of a physical skill. It is not considered a sport, however, as it lacks a combination of the three basic elements needed to be considered a sport.

Sports are inconstant and tend to change over time, impacting its relation to the society it finds itself situated in (Levermore & Beacom, 2008; Pink, 2008). Popular culture plays a major defining role in the sporting preferences in a particular country or region (Levermore & Beacom, 2008). New sports are created, some are diminished and others eventually disappear altogether over time (Pink, 2008). For example, cultural and historical attachments make cricket the most popular sport in Trinidad and Tobago and the rest of the Caribbean while football's wide appeal has made it the most beloved sport in Europe.

2.3.5. Sport and society

The erstwhile South African President Nelson Mandela once stated that

“ Sport has the power to change the world. It has the power to inspire….to unite people…to create hope where once there was only despair.”

(cited by Shearer, 2014)

Although one may be at pains to disagree with the above sentiments, the reality is that sport has long been a maligned field within academia (Allison, 1998; Washington & Karen, 2001). This was based on the gratuitous assumption that sport was an autonomous area – its causes and consequences were strictly restricted to the discipline (Allison, 1998). Nevertheless, it was not until the arrival of modern sport in the nineteenth century accompanied by its distinctly moral, social and eventual economic objectives and consequences that perceptions of its importance began to alter (Allison, 1998). It is now universally acknowledged that sports play a crucial role in contemporary society (Xu, 2006) and has been consistently utilised to effectuate a number of political, social and economic aspirations (Allison, 1998) in many countries globally.

Sport has long been exploited by politicians to achieve a variety of local, national and international objectives. In 1934 an all–star American baseball team took part in a goodwill tour of Japan in an effort to reduce tensions brewing between both countries (Shearer, 2014). Later in 1972, table tennis was used as vehicle for cooling China–US relationship, an event that would coin the term “ping pong diplomacy” (Xu, 2006). Studies have demonstrated that sporting outcomes can also have a considerable impact on political developments (Fellay, 2014). Researchers have found that the success of a local Loyola college football team in the 10 days prior to elections resulted in an upsurge in the votes received by the current officeholder (Fellay, 2014). A similar trend was also observed at the national level. Districts with victorious football teams during March Madness typically secured higher approval ratings for U.S. president compared to those with unsuccessful teams (Fellay, 2014). Sport has often been used as a unifying force in countries with diverse populations, and as a method for defining national identity and improving international (Frey & Eitzen, 1991).

More importantly, sport is strongly emerging as an effective tool for improving economic status. Sport was highlighted as the sixth most significant industry in

Europe in 1998 (Allison, 1998). A recent report by the European Commission (2014) stated that sports contribute 2% to Europe's global gross domestic product. Furthermore, it creates 7.3 million or approximately 3.5% of the European Union's total employment (European Union, 2014). In America, sport's contribution is calculated under the "gross national sports product" (Frey & Eitzen, 1991). In 1998 the GNSP was computed to be US$ 63.1 billion, ranking sport 22nd in industry contribution to gross national product (Frey & Eitzen, 1991). This also placed sport firmly above the automobile and petroleum industries (Frey & Eitzen, 1991).

Hosting sporting events is also big business and sports teams, facilities and events can be a major source of income for a locality or nation (Baade, Baumann & Matheson, 2011). An All–Star Major League Baseball game generates in the range of U.S. $75 million annually and this rises to U.S. $250 million for the World Series (Baade, Baumann & Matheson, 2011). The National Football League usually receives around U.S. $400 million annually from the Super Bowl (Baade, Baumann & Matheson, 2011). A 30 second advertisement during the Super Bowl averaged around U.S. $1.6 million (Washington & Karen, 2001).

Sport's inescapable importance is evident daily – it commands its own section in the dailies, receive continuous broadcasts on radio and television, stadia are filled on match days, numerous leagues at various levels have emerged in numerous sports (Washington & Karen, 2001). Monetarily, sports benefit from tremendous advertising revenues, ticket sales and other related investments (Washington & Karen, 2001). Sports' position in public policy is also increasing significantly at the local, regional and national levels (Washington & Karen, 2001).
Much of sports increasing clout have been attributed to the effect of the media (Washington & Karen, 2001).

2.4. Conclusion

In conclusion, despite its widespread usage in the literature, there exists no universally accepted definition of talent. Much of the incursions into talent have been predicated on the nature versus nurture, however neither has presented a complete picture of this variable. Gagné’s (2008) DMGT has proven to be a more acceptable approach to understanding talent as it takes into consideration not only the polar views but integrates a number of affects into the model including deliberate play and the environment.

The incongruity surrounding the exact meaning of talent has filtered into TI and TD introducing similar levels of confusion. Talent identification is a complex procedure which can be discombobulated by a myriad of factors including previous sporting experience, the relative age effect and maturation. Failure to take these factors into consideration can lead to the non–recognition of new athletic talent or the early removal of talented individuals from elite performance pathways (Abbott & Collins, 2002). Hence, it is advised that TI measurements should be used purely as a yardstick for assessing the attributes of performers rather than an exclusive prerequisite for admittance to an elite sports training scheme (Burgess & Naughton, 2010; Reilly et al., 2000). Several models of TD have been offered in the literature, testimony to the dynamic nature of this construct. The DMGT and DMSP have presented themselves as worthy examples of comprehensive models of TD but further research is required to ascertain their validity.

Like talent, sport has a variety of definitions. Despite any existing ambiguities, sport today is considered a preeminent civic establishment in the majority of societies around the world (Frey & Eitzen, 1991). Sport has been consistently used to achieve a variety of social, political and economic objectives and it is its growing influence that increases its significance to society. As highlighted above, sport can significantly add to the national coffers, increase employment, it can be used in international bargaining and promote national fervour. Sport can also improve the overall health and productivity of a nation provided it is made more accessible. However, a nation cannot benefit from sport unless there are individuals talented enough to be successful. In order to do this there must be systems in place to unearth and nurture talent – supporting the need for TIDs.

CHAPTER 3

AN EVALUATION OF A PRE–SELECTED ANTHROPOMETRIC AND PHYSIOLOGICAL TESTING BATTERY IN JUNIOR MALE CRICKETERS FOR USE IN THE DEVELOPMENT OF A TALENT IDENTIFICATION MODEL FOR TRINIDAD AND TOBAGO.

3. Introduction

Effective talent identification is of critical importance to a variety of sports. Well–timed and appropriate TI can promote successful sporting careers and enhance a country's global prestige (Ahamad, Naqvi & Beg, 2013). Though research has acknowledged that talent is the outcome of an intricate interplay of acquired endogenous and exogenous factors (Ahamad, Naqvi & Beg, 2013; Baker, 2003), physiological testing remains an important component of multidimensional approaches to athletic TI programmes internationally. The efficacy of physiological testing in TI has been established in several sports including soccer, handball and volleyball (Hoare & Warr, 2000; Keogh et al., 2003). Cricket, however, has failed to attract similar levels of empirical scrutiny even in light of its burgeoning popularity. Considering that cricket continues to be the premier sport in T&T, any efficacious method would ultimately help in recognising and developing junior players and ensuring a continuous supply to the national team.

Talent identification in sport is a continuous process and longitudinal research is necessary to ascertain the veracity of physiological and other sports specific tests (Mirkolaee, Razavi, & Amirnejad, 2013). After initial testing, follow up studies using the same protocols and samples to examine its stability over time (i.e., will its discriminative capacity change as the participants age in response to the effects of maturity and training) should be conducted to validate the effectiveness of selected sport specific tests in identifying future talent (Mirkolaee, Razavi, & Amirnejad, 2013). However, before an effective TI model can be developed, the initial approach should be to design a valid and reliable screening protocol capable of establishing profiles of athletes of differing abilities.

This study sought to address the previously mentioned gap in the literature on cricket by examining the effectiveness of a pre–selected field–based physiological testing protocol in distinguishing between junior male cricketers of differing playing abilities using a cross sectional design. This represents the first step in the construction of a TI model for cricket in Trinidad and Tobago.

The physiological tests utilised in this investigation are by no means unique. Rather, it includes a collection of proven tests that were chosen purely because they captured, as much as possible, the movement and fitness patterns specific to cricket.

It should be noted that this is not a TI model for cricket but rather an attempt at profiling the characteristics of more successful players and verifying the capacity of the tests used as an effective discriminator of elite and non–elite cricketers. Owing to time and resource constraints, this study was limited to the initial aspect of the TI model building, that is, the development of an anthropometric and physiological test. For the tests to be confidently used in a TI programme, repeated testing must be conducted to establish the efficacy of the selected protocol in identifying talent in cricket (i.e. its ability to select those who would eventually go on to be selected to the national and eventually the West Indies teams). It is hoped that this study would ignite interest in the field and encourage further investigations into TID in cricket. The author also intends to conduct a longitudinal study, time and finance permitting, to verify the effectiveness of the test battery.

3.1. Chapter Outline

Subsequent to the introduction, the first part of the chapter is dedicated to a review of the existing literature on physiological testing in sports. This is followed by an insight into cricket, its relevance to T&T and results of limited physiological studies in the sport. The final part of this chapter is devoted to the physiological testing study which was designed using the information generated from existing physiological studies. The testing protocol is outlined and analysed. The results are then presented followed by a discussion.

3.2. Physiological testing in junior sports

Anthropometric and physiological profiling have become a major aspect of any carefully constructed, multi–pronged talent identification system. These tests often include, but are not limited to height, weight, aerobic capacity, anaerobic power, speed and strength tests (Pearson, Norton & Torode, 2006). Despite its widespread usage, numerous authors have challenged the capacity of fitness testing to effectively identify young gifted athletes (Abbott & Collins, 2002; Pearson, Norton & Torode, 2006; Sherar et al., 2007; Vaeyens et al., 2008). Researchers have suggested that maturation has a major confounding effect (Abbott & Collins, 2004; Pearson, Norton & Torode, 2006; Sherar et al., 2007; Vaeyens et al., 2008) which can ultimately render the results of any carefully composed physiological testing battery counterintuitive.

3.2.1. Maturity

Adolescence represents a period of dynamic biological and physiological changes in the body of a child (Abbott et al., 2005; Pearson, Norton & Torode, 2006; Sherar et al., 2007; Vaeyens et al., 2008). Puberty, which typically occurs between 13–18 years, changes in hormonal activity promotes the development of secondary sex features and rapid increases in physical size and stature (Fernández–Rio & Méndez–Giménez, 2014; Vaeyens et al., 2008). For example, during puberty adolescents can gain approximately 17–18% and 40% of adult height and weight respectively (Pearson, Norton & Torode, 2006). Individual increases in strength (+150%), anaerobic capacity (+200%) and $\dot{V}O_{2\,peak}$ (+70%) also take place (Pearson, Norton & Torode, 2006). Furthermore, given that chronological age, and the onset and velocity of puberty infrequently coincide (Sherar et al., 2007; Vaeyens et al., 2008), it is imperative that the effects of maturity are considered when analysing the outcomes of physiological test in TI (Pearson, Norton & Torode, 2006). Nevertheless, it is difficult to fully ascertain the impact of maturity during a discrete testing session. In as much as researchers acknowledge its effect, controlling for these in TI remains problematic (Abbott & Collins, 2004). It is necessary to conduct a series of tests and follow the progress of the athletes over an extended period of time but Abbott and Collins (2004) contend that this may be impractical as funding agencies are less likely to fund such ventures.

Delaying TI testing till post–puberty may prove counterproductive as it means that training opportunities are missed and the athlete may not benefit from a sufficient period of development in the sport they are selected to. Further, it is antithetical to contemporary models such as the DMGT which propose that specialised sport training should begin during adolescence (usually 14–16 in males).

3.2.2. Physiological testing in junior team sports

Despite the above, several studies have examined the efficacy of physical testing in the identification of athletic talent in a variety of team sports including handball (Mohamed et al., 2009), Australian Rules Football (Keogh, 1999), female field hockey (Keogh et al., 2003), rhythmic gymnastics (Douda et al., 2008), male (Reilly et al., 2000) and female soccer (Hoare & Warr, 2000). Keogh et al. (2003) examined the effectiveness of an anthropometric, physical and physiological testing battery in identifying talent in regional representative ($n = 35$) and local club ($n = 39$) female field hockey players. The authors found that percentage body fat ($p < 0.05$), sprinting speed ($p < 0.05$), agility ($p < 0.05$), aerobic ($p < 0.05$) and muscular power ($p < 0.05$) were able to discriminate between players of differing playing abilities. Based on their findings, Keogh et al. (2003) recommended that measurement of physical characteristics should be an integral aspect of talent identification programmes for field hockey players.

Reilly et al. (2000) employed a multidisciplinary approach to talent identification in 15–16 year old male elite ($n = 16$) and sub–elite ($n = 15$) soccer players. The researchers utilised a mixture of physical, physiological, technical and psychological tests. Reilly et al. (2000) reported that agility ($p < 0.01$) and sprint time ($p < 0.56$) were amongst the leading discriminatory measures. Furthermore, elite players were found to be considerably leaner ($p < 0.05$), had greater lower body power (vertical jump; $p < 0.05$) and more resistance to fatigue ($p < 0.01$).

3.3. Cricket

"Cricket, Glorious Cricket!"

(TDC, 2014)

The above expression adequately embodies the affection of T&T and the wider Caribbean towards their favourite sport cricket. Emerging out of a colonial past, cricket offered T&T and other Caribbean nations that comprise the West Indies cricket team a chance at ethnic and national atonement against the former Empire (Yelvington, 1990). Cricket, as one the most successful, organised team sports in T&T (TTCB, 2011) has produced a number of internationally renowned sports men including Sir Learie Constantine, Sonny Ramadhin, Deryck Murray, Ian Bishop and Brian Lara. Cricket's significance to T&T, however, vastly exceeds its entertainment value. It has been referred to as the "glue" the holds the twin island Republic's multicultural populace together (NALIS, 2015) and has, over time, become intricately interwoven into the social, political and national infrastructure (Yelvington, 1990).

A lack of recording during the early days of the sport has rendered the origins and history of cricket obscure (Besson, 2011; NALIS, 2015). Nevertheless, it is still regarded as one of the oldest and most organised sports in existence today (Christie, 2012). Cricket is a field–based game where two teams composed of 11 players each compete against each other (Stuelcken et al., 2007). There are currently three competitive formats of cricket at the elite level. The first to be introduced was Test cricket (MacDonald et al., 2013; Noakes & Durandt, 2000; Parker, Burns & Natarajan, 2008). Played over 5 days this is the only format that doesn't guarantee a winner as it has been known to end in draws (Parker, burns & Natarajan, 2008). In an effort to maintain and expand cricket's global appeal, shorter versions were slowly developed (Parker, burns & Natarajan, 2008). In the 1970s One day international cricket was introduced (Parker, burns & Natarajan, 2008). More recently Twenty20 cricket was added to the list (Orchard et al., 2010; Petersen et al, 2008). Typically lasting less than three hours, this is currently the shortest format available (Parker, burns & Natarajan, 2008).

3.3.1. Physiological assessment in cricket

In contrast to other team sports such as football and hockey, empirical incursions into cricket are limited (Christie, 2012; Noakes & Durandt, 2000). Only a modicum of research endeavouring to assess the anthropometric and physiological requirements of cricket was found in the extant literature (Christie, 2012; Christie, Todd & King, 2008; Duffield, Carney & Karppinen, 2009; Noakes & Durandt, 2000). A major criticism levelled against cricket is that its key demands, batting, bowling and fielding are intermittent by nature (Christie, Todd & King, 2008; Noakes & Durandt, 2000) which Christie (2012) argues makes it arduous to secure meaningful results. The majority of team sports are continuous and usually typified by short bouts of activity followed by even shorter bouts of recovery (Christie, Todd & King, 2008). Cricket on the other hand is characterised by brief, acute bouts of activity followed by protracted periods of low effort (Christie, Todd & King, 2008), the level of which is dependent upon the version of cricket being played.

Historically, cricket has always been considered a gentle game (Noakes & Durandt, 2000) and the level of physical training was thought appreciably lower than athletes competing in other team sports (Christie, 2012). Fletcher (1955, cited by Noakes & Durandt, 2000) conducted what is probably the first investigation into the physiological demands of cricket. The researcher found that the average cricketer expended 86.4 kcal $\cdot$ min^{-2} $\cdot$ h^{-1} during a five match Test series in 1953. Fletcher (1955, cited by Noakes & Durandt, 2000) stated that energy requirements of cricket was only marginally higher than standing but lower than walking at 6 km $\cdot$ h^{-1}. Additionally, Fletcher (1955, cited by Noakes & Durandt, 2000) estimated that 46 hours and 4 hours of play was lost due to inclement weather and when the ball went out of play respectively. Confirming this stereotype was a report on the level of conditioning amongst players selected to an Australian State team (Payne, Hoy & Carlson, 1986) which found that 50% were overweight, 20% had unacceptable levels of aerobic power, 33% had mediocre endurance and 40% displayed sub–standard flexibility (Payne, Hoy & Carlson, 1986). The Lord Taverners Cricket (1986, cited by Noakes & Durandt, 2000) proposed the following training guideline:

1) players should run, skip or cycle for 10–20 minutes during sessions to enhance their endurance
2) players should do push ups, sit ups and 'swing the cricket bat' so as to gain strength
3) to increase their mobility, players were encouraged to do wide stride sitting, toe touching, and circling of the head and shoulders.

These recommendations were not unlike those proposed by Sir Leonard Hutton of the Marylebone Cricket Club who 30 years earlier had stated that physical fitness was the responsibility of each player (Noakes & Durandt, 2000). They were to avoid overstrain by exercising very gently during non–playing days and they were to shun midday sun (Noakes & Durandt, 2000).

However, changing physiological requirements primarily due to the introduction of shorter, more intense formats, increasing the frequency of Test matches and the rise of professional leagues globally has driven up the demand for cricketers to maintain higher levels of physical fitness. Players are now, more than ever, required to be quicker, more agile, possess good reaction and concentration skills, strength, aerobic and anaerobic endurance, and to recover faster from games (Noakes & Durandt, 2000). The success of the 'West Indian Eleven' (Payne, Hoy & Carlson, 1986) and the later dominance of the Australian team (Christie, 2012) demonstrated that concentrating on physical conditioning can positively impact performance.

Evidence supporting the improved fitness profiles has been presented in the literature. Noakes and Durandt (2000) compared fitness results between elite South African cricketers and rugby players (a sport perceived as markedly more physically demanding than cricket). The authors found that cricketers and rugby players obtained similar results on the leg press, bench press and 35m sprint tests. Apart from differences in morphology between the two groups, cricketers performed significantly better in the shuttle run test ($p < 0.03$) and achieved a higher maximal oxygen uptake (Noakes & Durandt, 2000). Though the results are promising, more studies are required in both senior and junior populations to confirm the validity of physiological testing in cricket.

Understanding the physiological requirements in junior cricket offers a number of benefits. Firstly, it can aid in the establishment of performance indicators, monitor progress, track recovery from injury and for assessing fitness levels for those currently playing and competing (Payne, Hoy & Carlson, 1986). Secondly, and more relevant to this thesis is that testing may provide a crucial launch pad for the identification of talented players (Payne, Hoy & Carlson, 1986). Therefore it is important that any testing protocol must have the ability to accurately discern between players of differing abilities.

3.4. Aims

There exists no established criterion for selecting junior male players to the national cricket team of T&T. Payne, Hoy & Carlson (1986) argue that the fundamental issue in employing physiological testing in junior cricket is the absence of relevant published research in the sport. Testing protocols are typically applied to only senior elite athlete cohorts (Payne, Hoy & Carlson, 1986). Hence, there exists no established physiological standards for junior cricketers in T&T. Considering that cricket is the main sport in T&T, it would assist clubs and the national association in appropriately recognised talented players and devoting limited resources to their development.

This aims of this novel study are outlined below:

1) Keogh, Weber and Dalton (2003) stated that it is necessary to obtain a greater understanding of the physical requirements of the sport under

consideration before an appropriate testing battery can be designed. Hence, using the information on the anthropometric and physiological requirements of cricket presented in the literature review, the first aim of this study is to design a testing battery which reflects the requirements of the sport.

2) to investigate and compare the anthropometric and physiological characteristics of elite and non–elite junior male cricketers

3) to establish the effectiveness of the pre–selected testing battery in distinguishing between elite and non–elite junior male cricketers

4) to use the information derived from this study to develop a TI model for cricket in T&T. As outlined in the introduction earlier, this aspect of the study was not completed due to time and finance restrictions. However, it is the author's intention to conduct a longitudinal study in the future using the data generated here.

Field testing was chosen as it offers a much cheaper alternative to laboratory–based research (Payne, Hoy & Carlson, 1986). Laboratory tests require expensive equipment, and highly trained staff which limits their availability (Payne, Hoy & Carlson, 1986). Additionally, there exists no laboratory in T&T that offers physiological testing. Field tests, on the other hand are easy to administer, requires less costly equipment and less complex technical knowledge (Payne, Hoy & Carlson, 1986). For example, aerobic capacity testing requires expensive equipment such as the Douglas Bag system, a treadmill or bike and computer software which can easily exceed £10 000. In the field, however, this can be achieved by the way of 20m Shuttle Run Test which only needs a compact disc and player, cones and a demarcated hall.

3.5. Methods

3.5.1. Participants and recruitment

Emails outlining the study were sent to the coaches of the National Junior Cricket Team of Trinidad and Tobago and selected cricket clubs in the vicinity of the National Cricket Centre, Trinidad inviting them to participate in the study. A pack containing the Information Sheet, Parental and Child Consent Forms, Letter to Parents and Medical Questionnaire was forwarded electronically to clubs to be distributed to the parents of interested participants.

All participants and their parents or legal guardians were fully appraised of the experimental procedures involved prior to completing a medical questionnaire and providing informed written consent. The study was reviewed and approved by the Science Faculty Ethics Committee, Kingston University. Additional approval was provided by the Trinidad and Tobago Cricket Board.

Fifty–nine young, active male cricketers from T&T were invited to participate in the study. It is difficult to control for the effects of maturity when assessing physiological variables in adolescents (Abbott & Collins, 2004). In an effort to limit the effects of maturity the elite and non–elite participants were age–matched. The absence of a female cohort can be explicated by the relative unpopularity of the sport amongst the female population. Despite the continued growth in participation and popularity of the sport, cricket is still a male dominated game. While there are several age–groupings ranging from the 'kiddies' to senior levels for males, the same is not available for the female players, save for a solitary secondary schools cricket competition and a women's professional league (TTCB, 2011). The lower standard of play amongst the females would have made it difficult to attract a sufficient quantity and quality of junior female cricketers to take part in the study.

The study cohort was split into two sub–groups – cricketers and non–elite cricketers (n = 29; 14.69±0.81 yrs). The cricketers were categorised as those that were competing at the national level and above. Non–elite cricketers were classed as those who were not selected to state or national teams but had been playing at the club/school levels. To facilitate effective test administration, the participants were further subdivided into 5 groups of 10 and 1 group of 9. A randomised design was utilised whereby participants were assigned to one of the sub–groups regardless of playing ability, i.e., each of the 4 groups consisted of a mixture of elite– and non–elite players.

3.5.2. Participant protection

Unlike the UK and several other developed nations, persons working with children in T&T are not yet legally bound to undergo criminal history checks (called Criminal Records Bureau clearance in the UK). Despite this the researcher adhered to strict procedures given the young age of the participants. Parents, guardians and coaches were invited to attend the testing session. Only group testing was conducted, and neither the researcher nor his research assistants were allowed to be alone with any of the participants at any time.

3.5.3. *Experimental design*

All tests were completed on the same day in an indoor gymnasium located in the National Cricket Centre of Trinidad and Tobago, Couva, Trinidad. Given the limited time to conduct the study and the relatively large sample size, the researcher recruited undergraduate sports science students attending the University of Trinidad and Tobago. The students functioned as research assistants, helping the lead researcher to set up the test area, gather information and administer tests. The research assistants were emailed a copy of the testing protocol providing information on the administration of each test. On the day preceding testing day, an educational session was held where research assistants practiced administration of each test and any questions were answered.

Participants were advised to avoid high intensity training on the day preceding testing. Participants performed a standard 10 minute warm up routine which consisted of jogging and stretching before beginning the testing battery. The researcher, with the aid of assistant researchers, explained and demonstrated each test protocol and participants were allowed a trial run of each before any data were collected. All equipment was calibrated according to the manufacturer's guidelines prior to any assessments.

To ensure that tests were conducted smoothly and in the shortest space of time, the testing protocol was set out as stations. Three to four of the recruited research assistants were assigned to each station. While no financial reward was offered to volunteers and participants, they were provided with refreshment and lunches.

The tests used in the study are included below. A more comprehensive description is included in Appendix A (p. 225).

3.5.4. *Anthropometrics*

Stretch stature was measured, without shoes, to the nearest 0.1cm using a free–standing stadiometer (Seca 213 Freestanding Height Measure, Hamburg, Germany). Participants were required to stand against the stadiometer ensuring that their heels, buttocks and back were directly in contact with it. The head of the participant was placed in the Frankfort plane. The researcher then stretched the participant by placing the palms of their hands under the participant's mandible and gently pulling upward during inspiration. The distance from the vertex to the base of the feet was then measured.

Mass was measured without shoes using a digital weighing scale (TANITA HD–32 Digital Scale, Tokyo, Japan). The participant asked to mount the scale and as still as possible while looking straight ahead. Weight was recorded to the nearest 0.1kg.

Arm span was determined using a wall mounted pull down height measure (Cartwright Fitness, UK). The participant was asked to stand against the wall with their heels, buttocks and back directly in contact with it. The participant then laterally and maximally extended both their arms at shoulder height with the palms facing forward. Arm span was measured as the distance between the dactylions of the right and left hands to the nearest 0.1cm. If the participant was too tall or short (arms below or above the tape respectively), a ruler was held up vertically so as to line up between the distance of the dactylions and the tape measure.

Age (yr): The age of the participants was calculated using their date of birth.

3.5.5. Physiological tests

Standing Long Jump (SLJ) was measured using a jump mat (XLR8 Standing Long Jump Mat, UK). The participant was advised to stand stationary behind the 0 line on the mat with both feet flat. Participants were then instructed to jump forward as far as they can. The SLJ was recorded to the nearest 1cm and the best of 3 trials was used.

Push–Up Test (PHU): Participants were instructed to adopt the push–up position – hands were placed under the shoulder, arms straightened, legs together and straight with toes tucked downwards. The athlete was then commanded to lower their body till their elbows reached a 90^{o} degree angle. Participants were considered to have completed a full push–up when they returned to the start position. The number of push–ups completed in 30 seconds was recorded. This test was also terminated on the participant’s request or if they could no longer maintain the correct form.

Pull–Up Test (PLU): The starting position was assumed when the participant suspended himself from the bar using a pronated grip (back of hands facing athlete) and the arms extended maximally. On command, the participant vertically lifted himself till his larynx was centred or above the bar using only his hands. The participant then returned to the start position. The number of pull–ups completed within 30 seconds was recorded. The test was also ended if the participant felt they could no longer continue or if they experienced pain or discomfort.

20m Sprint Test (ST): The 20m course was marked using fluorescent cones and masking tape. Speed was measured using timing gates (Brower Timing TC–Systems, Utah, USA) positioned at the finish line. A fixed timing mat (foot start) which was used to trigger the timing gates was placed at the start line. All sprints were performed from a standing start with the dominant foot in front and the rear foot on the timing mat. On the researcher's "go" command, participants sprinted maximally over the 20m course. The fastest sprint of the 3 was recorded.

505 Agility Test (505): A 15m distance was measured with cones and masking tape placed at the 0m and 15 lines. Timing gates were placed at the 10m line – this recorded the time it took to sprint from the 10m line to the 15m line and back (to the 10m line). Standing behind the 0m line in a stationary position, the athlete began the test on instruction. The participant then sprinted maximally to the 15m line and back. To be considered legal, 1 foot had to be placed on the 15m line. The best of 3 trials was recorded. Participants were instructed to accelerate as quickly as possible through the timing gates, pivot on the 15m line and return to the start line as quickly as possible.

Maximal Oxygen Uptake ($\dot{V}O_{2max}$). The 20m Multistage Shuttle Run Test was used to predict $\dot{V}O_{2max}$. A 20m course was clearly demarcated using masking tape and fluorescent cones. Participants were required to run back and forth between the 2 parallel lines (set at 0m and 20m). Running pace was regulated by signals emitted from a commercially available pre–recorded compact disc player played over a public address system. The test started at an initial speed of 8.5 $km \cdot h^{-1}$ and the velocity (pace at which the 'bleep signal was sounded) increased by 0.5 $km \cdot h^{-1}$ each increment. Each successful run of the 20m course was considered as successful completion of a shuttle. The researcher and assistants stood at either end of the course to monitor the progress of the participants. Participants were verbally encouraged to run maximally during the test. Participants were given a verbal warning if they failed to reach the line in tandem with the signal and the test was terminated if they fell behind on 2 consecutive occasions. Alternatively, the test was discontinued on the request of the participant. The predicted $\dot{V}O_{2max}$ obtained was calculated using the maximal speed in the last completed shuttle and inserted into the following equation: $y = 6.0x - 24.4$, where x is the maximal speed obtained ($km \cdot h^{-1}$) and y is the predicted $\dot{V}O_{2max}$ ($ml \cdot kg^{-1} \cdot min^{-1}$; St. Clair Gibson et al., 1998).

Table 3.1. Comparison of anthropometric and physiological parameters of the elite and non–elite cricketers.

		Cricketers			Non–Cricketers		
		Min.	**Max.**	**M±SD**	**Min.**	**Max.**	**M±SD**
Anthropometric Profile							
	Age (yr)	14	16	14.53±0.82	14	16	14.69±0.81
	Height (cm)	139.60	188.20	168.32±10.92	147.8	181.3	168.83±9.02
	Weight (kg)	27.10	86.10	58.47±14.89	37.7	72.5	58.10±9.71
	Arm Span (cm)	141.90	188.00	172.81±12.24	149.3	185.8	173.38±10.67
Physiological Characteristics							
Power	SLJ (cm)	130	205	166.70±19.20**	116	178	151.79±17.70
Strength	PHU	10	39	24.70±6.90**	12	25	19.38±3.33
	PLU	6	14	9.83±2.05**	4	12	7.52±1.90
Speed	ST (s)	3.13	4.03	3.59±0.22*	3.44	4.19	3.73±0.20
Agility	505 (s)	2.18	2.62	2.37±0.12**	2.32	3.28	2.68±0.25
Aerobic Endurance	Level Completed	3.9	10.11	8.5±1.5	5.4	10.2	8.0±1.2
	$\dot{V}O_{2max}$ ($ml \cdot kg^{-1} \cdot min^{-1}$)	26.33	50.16	41.73±5.30	31.01	47.41	40.13±3.98

***p<0.05; **p<0.01*

3.6. Data Analysis

All statistical analyses were completed using SPSS (version 21, SPSS Inc., Chicago, IL.). Descriptive statistics were calculated for the biographical variables and performance indicators. These were reported as minima, maxima, means and standard deviations (M±SD). A one–way Analysis of Variance (ANOVA) was conducted to determine whether there were any significant differences between the performances of elite and non–elite cricketers on selected physiological tests. An alpha level of $p<0.05$ was used for assessing statistical significance. Cohen's effect size was also calculated for the performance variables. Coe (2002) states that effect sizes (d) are used to gauge the extent of differences between two groups and can be regarded as a true measure of significance. As a general rule 0.2 is considered a small effect size, 0.5 is medium and 0.8 is large (Coe, 2002). Reporting the effect size becomes even more important when sample sizes are small (Coe, 2002).

3.7. Results

3.7.1. Anthropometrics

The non–elite cricketers were found to be older, taller and had a longer arm span while elite players were heavier (Table 3.1.). None of these differences attained statistical significance.

3.7.2. Physiological measures

Analysis of Variance results demonstrated that the cricketers performed significantly better in 5 of the 6 performance measures (Table 3.1.). The cricketers performed considerably better on the SLJ [$F(1, 57) = 9.18$, $p = 0.004$; d = 0.4], PHU [$F(1, 57) = 14.07$, $p = 0.000$; d = 0.4], PLU [$F(1, 57) = 20.18$, $p = 0.000$; d = 0.5], ST [$F(1, 57) = 6.08$, $p = 0.017$; d = 0.3] and 505 [$F(1, 57) = 36.45$, $p = 0.000$; d = 0.6] tests than non–cricketers. While cricketers were found to have a higher $\dot{V}O_{2max}$, no significant difference was found between the groups [$F(1, 57) = 1.71$, $p = 0.196$; d = 0.2]. Cohen's effect size values suggested a range in the practical significance levels of the results. Small Cohen's effect sizes were found for SLJ (d = 0.4), PHU (d = 0.4) and ST (d = 0.3). The strength of the significance between the groups were more moderate for the PLU (d = 0.5) and the 505 (d = 0.6).

3.8. Discussion

The initial aim of this study was to design an anthropometric and physiological testing battery capable of establishing the anthropometric profiles of junior male cricketers in T&T. Secondly, it sought to assess the discriminative capacity of the testing protocol in elite and non–elite junior male cricketers. The outcome of this study would help inform the development of a model for talent identification in T&T.

The results of this study generally supported the efficacy of the anthropometric and physiological testing battery employed as a method for distinguishing between elite and non–elite junior male cricketers in T&T. The physiological parameters and not the anthropometric were found to be more successful in discriminating between the two groups. The following discussion of the findings is separated according to anthropometry and physiological testing.

3.8.1. Anthropometrics

No significant differences in age, height, weight or arm span were found between the elite and non–elite junior male cricketers. As outlined earlier in this Chapter and the Literature Review contained in Chapter 2, maturity has a major confounding influence on the outcome of physiological and other methods of talent recognition in sport. Accurately assessing maturity in the field is a difficult task and it would have been illogical to attempt to assess the level of biological development of the participants in this study. Rather, the two cohorts were matched based on their chronological age. Comparing the mean age and height of the elite and non–elite players decidedly suggested that no practical maturational differences between the groups were present.

3.8.3. Physiological testing

Compared to the anthropometry (height, weight and arm span), the physiological protocol proved a more effective discriminator of playing ability. Distinct group differences in the performance of the elite and non–elite cricketers on 5 of the 6 physiological tests were found. Collectively, the participants in the elite cohort were significantly more agile, stronger, quicker and had greater leg power when compared to those that comprised the non–elite group. Calculation of Cohen's effect sizes showed that strength of the significance for each of the physiological tests ranged from small to moderate.

The results of this study seem to compare favourably with previous research using similarly aged male participants of varying playing abilities in a number of sports (Douda, Toubekis, Avloniti & Tokmakidis, 2008; Hoare, 2000; Hoare & Warr, 2000; Mohamed et al., 2009; Reilly, Williams, Nevill & Franks, 2000). Mohamed et al. (2009), for example, in an effort to develop a TI model investigated the ability of a battery of pre–selected anthropometric and physiological tests in differentiating between elite and non–elite Under–16 handball players. The elite players were significantly taller and performed considerably better on the Flamingo balance ($p < 0.001$), standing long jump ($p < 0.05$), sit ups ($p < 0.001$), bent arm hang ($p < 0.01$), shuttle run ($p < 0.001$) and endurance shuttle run tests ($p < 0.001$) tests.

The elite participants in Reilly, Williams, Nevill and Franks (2000) performed significantly better that the sub–elites on speed (5–, 15–, 25,–, 30 –m sprints) and agility (40–m sprints with turns) tests. While the elite cricketers did obtain higher $\dot{V}O_{2max}$ results, these did not attain statistical significance. These findings in this study are in direct variance to those reported by Reilly, Williams, Nevill and Franks (2000) in a group of elite and sub–elite junior male soccer players. The elite soccer players had a significantly higher maximal oxygen uptake ($F_{1, 29} = 4.47$, $p < 0.05$) than the sub–elite (Reilly, Williams, Nevill & Franks, 2000). The participants in the study by Reilly, Williams, Nevill and Franks' (2000) study also possessed a considerably higher maximal aerobic power (elite = 59.0 ± 1.7 ml · kg^{-1} · min^{-1}; sub–elite = 55.5 ± 3.8 ml · kg^{-1} · min^{-1}) as opposed to those that took part in the current study.

It should be pointed out here, however, that the players used in Reilly, Williams, Nevill and Franks (2000) had a higher mean age and lower age range (elite = 16.4 yr, range = 16.2–16.6; sub–elite = 16.4 yr, range = 15.8–16.7). The same was also true for height (elite = 171 ± 0.05 cm; sub–elite = 175 ± 0.06 cm) and weight (elite = 63.1 ± 1.1 kg; sub–elite = 66.4 ± 2.5 kg), however, the ranges were not reported for either of the variables. When comparing the results of physiological tests for players in this age group, one needs to be cognisant of the effects of maturity. Puberty usually occurs between the ages of 13–18 years (Fernández–Rio & Méndez–Giménez, 2014). The rapid increases in physical size and stature occasioned by changes in hormonal activity (Pearson, Norton & Torode, 2006; Vaeyens et al., 2008) directly impacts performance. For example, height, weight, peak oxygen uptake can increase by approximately 17 – 18%, 40% and 70% respectively during puberty (Pearson, Norton & Torode, 2006). While it is difficult to predict the onset and timing of maturity, their age, height and weight suggest that they may be closer to full biological maturation compared to the groups used in this study. This may explain their higher maximal aerobic power.

Another factor which hinders cross sport comparison is the contrasting nature and physiological requirements of cricket and other team sports. Under 17 cricket in the Caribbean is played over two formats – Two day competition and the One days (TTCB, 2011). While players are required to be active during batting, bowling and fielding, they share similar experiences of senior cricketers whereby a considerable amount of time is spent standing (Noakes & Durandt, 2000). In contrast with other team sports such as soccer and hockey which involves continuous high intensity movement over a short duration, cricket is considered less physiologically demanding (Noakes & Durandt, 2000). While the training programmes of the players were not readily available, it is expected that practice sessions would mirror the intensity of matches. This makes it difficult to compare it with more intense sports that are shorter in duration and may explain why the physiological profiles of the players in this study deviates from those in others.

The current investigation found that elite cricketers performed better on the power, strength, speed and agility tests compared to non–elite cricketers. Cricketers are required to throw the ball over long distances, and sprint back and forth over 22 yards (approximately 20m). In view of the former, these results correlate well with the physical requirements of the sport.

Contrary to the above, a key finding in this study was that although the cricketers exhibited a higher $\dot{V}O_{2max}$ compared to the non– elite cricketers, no significant differences were found between the groups. Cricketers require a fairly robust aerobic system to maintain their play throughout the duration of a match. Given the lower physical demands of the game (intense play is typically punctuated by long periods of standing), cricketers do not require as high a $\dot{V}O_{2max}$ as other sport players. For example, both the elite and non–elite cricketers in this study attained a lower $\dot{V}O_{2max}$ in comparison to the elite and sub–elite soccer players used by Reilly, Williams, Nevill and Franks (2000). Hence a lower emphasis may be placed on aerobic conditioning resulting in a less than distinct difference between the groups. Furthermore, the lack of significance may be explicated by the extra–cricket activities of the non–elite players. If the non–elite players were active in one or more sports outside of cricket a training transfer effect may have occurred culminating in their higher than normal $\dot{V}O_{2max}$.

3.9. Conclusion

Despite inherent limitations including a small sample size and analysing a sport where no available anthropometric and physiological performance data in adolescent populations could be found, the current study has provided strong evidence for the use of physiological testing in cricket for assessing and differentiating between cricketers of differing abilities. The fact that the methods used were field–based allows it to be utilised by clubs and other sporting organisations with restricted budgets. The tests used in this study may also be applied to other sports. The 20m Shuttle Run test has been used to assess the maximal aerobic capacity in a number of other sports including football (Reilly, Williams, Nevill & Franks, 2000) and the anthropometric measures are commonly used in physiological testing. The remaining tests are similarly applicable to other sports such as the sprint test in sports where speed is required over short distances (e.g., hockey, football) and the push up and pull up tests can be employed in sports where upper body strength is important (e.g., lacrosse).

3.8.1. Implications for talent identification in Trinidad and Tobago

The results may have significant implications for a national talent identification programme in T&T as it demonstrated the effective discerning ability of the performance tests. However, in light of the fact that athletic talent is a multifactorial construct, future investigations should include other testing variables including, but not limited to psychological testing, cricket–specific skills tests and coach ratings to assess the efficacy of these measures. Additionally, further studies, particularly those that take into consideration external confounding variables including playing position and other sports played (in addition to cricket) are required.

The fact that field tests were able to effectively differentiate elite and non–elite junior male cricketers also augurs well for T&T. Talent identification programmes are labour and cost intensive systems (Vaeyens et al., 2009). Field tests are relatively inexpensive and requires less trained staff. This would translate into a major cost saving in a country where resources are not finite – funds that can be siphoned to other areas including talent and coach development.

Despite the relative success of this study in elucidating the physiological profiles of junior male cricketers in T&T, its major shortcoming was its cross sectional design. The identification of athletic talent is a difficult process and one–off testing is unable to provide the information required to prognosticate future performance. Considering that the players in this study ranged from 14–16 years and using age 21 as a marker for entry into the senior elite teams (though some players can enter at a younger age), it would take a minimum of 7 years further testing to verify the results of this study. Another consideration will be the inclusion of a test for maturity (e.g. Tanner Staging) to ascertain whether it affected the measurements. Furthermore, sports skills testing (e.g. batting and bowling in cricket) is considered a key element in TI programmes (Vaeyens et al., 2009). Hence, the results of this study was considered the first stage in developing a model for identifying cricketing talent in T&T. Considering the overall success of the selected tests, it can be applied to a longitudinal study where repeat measures are taken to assess its efficacy. This should be coupled with tracking the development of athletes selected by these tests to determine the number that actually progress to the T&T or more importantly West Indies teams – considered the highest point that a player can progress to.

Psychological skills testing, though not included in this study is also a major feature of TI. For cricket in particular, the ability to cope with the stresses of the game (length of matches, being away from family for extended periods of time, learning opponents and understanding playing environment, overcoming ‘sledging’ from competitors), confidence, resilience are considered amongst the most important psychological skills needed to perform at the highest levels (Holt, 2003). Therefore, it is essential that a psychological skills tool be developed capable of testing the skills outlined above and included in future testing programmes.

CHAPTER 4

A COMPARISON OF THE SPORT CAREER HISTORIES OF TALENTED ATHLETES IN TRINIDAD & TOBAGO AND THE UNITED KINGDOM

4. Introduction

The acquisition of expertise from a developmental perspective has long been a hotbed of discussion in the sporting field. While ongoing research has subsequently led to considerable advancement in knowledge, the verdict is still out regarding the most effective approach to harnessing and nurturing the skills of young, aspiring individuals. Pioneering research into expertise development had asserted that the pathway to elite stardom consisted of a minimum of 10 years or 10 000 hours of linear sport training (Ericsson et al., 1993). This often unnatural preoccupation with early specialisation, over simplistic and narrow by its very nature, had steered the discipline to a constricted conception of talent development. Contemporary studies, however, have repudiated the model proffered by Ericsson et al., (1993), instead demonstrating that a varied sporting background succeeded by delayed specialisation can provide for a successful athletic career (Baker, 2003; Côté, 1999). Hence, a more expansive approach to development was offered, previously unavailable under the uni–dimensional paradigm.

The idée fixe of copious research has been the establishment of a more expedient approach geared towards expediting the development of expertise of talented athletes in sport (Vaeyens et al., 2009). Many researchers have endeavoured to decipher the talent development conundrum by retrospectively examining the career histories of successful athletes (Carlson, 1988; Côté et al., 2005; Ford et al., 2007; Hill, 1993; Leite & Sampaio, 2010; Young et al., 2009). This approach posits that by examining the youth sporting background of these exceptional sportspersons, one can gain an insight into the factors that influenced their sporting progression from youth initiation to senior level success (Cobb et al., 2003; Falk et al., 2004; Williams & Ericsson, 2005). Any requisite congruous experiences that these athletes encountered along the developmental pathway (Young et al., 2009) can then be extracted and utilised to formulate a blueprint for the systematically assisted progression of upcoming gifted youngsters.

The success of these late 'specialisers' may be explained by the transfer of learning theory, which contends that positive skills transfer occurs within similar domain sports (Baker, 2003; Smeeton, Ward and Williams, 2001). For example, an athlete with a previous experience in hockey may positively transfer tactical skills to football. Nevertheless, whether a relationship (or lack thereof) between early sports played (base sport) and the sport eventually specialised in in late specialisers exists has failed to attract empirical interest. The paramount purpose of this chapter was to examine transferability of skills between base and current main sport in athletes emerging through the diversified sporting model. It was hoped that this study would offer a broader conception of expertise development and further contribute to the burgeoning multidimensional paradigm.

4.1. Chapter Outline

This chapter examines talent development in athletes using a retrospective approach. While this method is by no means unique, it suffers from a conspicuous sparsity in the literature. Several previously unexplored themes, however, were identified and investigated. These are highlighted below:

1) the relationship between the current and previous sports played by athletes.
2) the relationship between the sport played by the sporting history of the athletes used in this study and that of their immediate family members.
3) participation motives of athletes.

Given that each of these subjects is independent of the other and could each almost constitute a separate chapter, the outline of this chapter deviates distinctly from those of previous. This was done in an effort to present a seamless progression of the chapter and to allow the readers of this discourse clarity. Additionally, this would prevent any of the themes identified above, which were considered current and important in their own right, from becoming lost in the other.

The main discussion opens with the method which was common to each of the themes that were probed. Each theme is then presented a separate section and includes their individual, relevant literature review, aim, results, analysis and discussion. The chapter then culminates in a conclusion which seeks to dovetail the results.

4.2. Methods

4.2.1 Participants

Undergraduate and postgraduate male and female participants, 18 years and above, who were currently enrolled in elite sport performance programmes at universities in the United Kingdom were invited to participate in the study. Initially, UK universities that offered the Talented Athletes Scholarship Scheme were selected (TASS). These universities were identified using the TASS website (TASS, n.d.). The Talented Athlete Scholarship Scheme is a government funded programme geared towards assisting competitive young, talented athletes balance academic life with training and performance (TASS, n.d.). Since the award of the first scholarship in 2004, more than £24 million has been invested in supporting hundreds of athletes (TASS, n.d.). The success of the scheme was illustrated in the fact that 21 of the British medallists in the 2008 Olympics and 55 of the 85 medals won in the 2010 Commonwealth Games were TASS Athletes (TASS, n.d.). Athletes in the programme were chosen as they represent athletes who have or were on the verge of achieving elite success. Thirty universities were selected, however, all universities responded saying that the programme had been discontinued and that no programme was reconstituted in its place. Nine universities indicated that they were offering their own in–house programme and would encourage their athletes to participate.

Athletes in Trinidad and Tobago were recruited from the Sports Scholarship Programme (SSP) based in the High Performance Centre of the University of Trinidad and Tobago (UTT). The SSP run by UTT is the only elite athlete programme run at the university level in T&T and is similar to the now defunct TASS. Athletes that are members of or were on the verge of being selected to various national teams in Trinidad and Tobago are provide scholarships which typically cover the cost of their studies, a living allowance, access to gym, equipment, access to gym, coaches, fitness experts and sports medical staff. The programme which has been in existence since 2005 has experienced considerable success with several athletes representing Trinidad and Tobago at regional and international events (UTT, n.d.).

While one may question the dissimilarity in the countries, their inclusion in the study was a deliberate decision. Trinidad and Tobago and the United Kingdom represent two countries sitting at the opposite end of economic and sport development scales. Hence, investment in sport differs between the countries.

Sport tends to be more organised in developed countries versus developing ones where competing budgetary interests including healthcare and education tend to prevail over “less important” issues such as sports. While a more robust structure exists in the UK, T&T is less organised and structured. However, notwithstanding its relatively small size, T&T boasts of a proud sporting history, producing world famous athletes including Dwight Yorke (football), Brian Lara (cricket) and Ato Boldon (athletics). The distinct nature of the athlete sample pools used in this study would provide a unique opportunity for an external audience to gain an insight into athlete development operating under fundamentally different conditions in two countries with different sporting histories and at different stages of economic and sport development.

The athletes recruited to participate in this study were performing at a range of levels including county, national, regional (e.g., Caribbean, Pan American or European) and international (e.g., World Championships, Olympic) levels.

4.2.2. Survey instrument

A Web–based survey method (www.surveymonkey.com) was selected (over paper or interview) for the purpose of this research. This method was selected for several reasons. Firstly, when compared to interview or print, Web–based approaches allow for a more expeditious conveyance of the questionnaire (Morris, Fenton & Mercer, 2004). Typically reduced completion times improves their attractiveness to respondents and given the popularity of the World Wide Web, (ease of distribution) larger population sizes can be surveyed allowing for a more expansive amount of data to be collected (Morris, Fenton & Mercer, 2004). Further, internet surveys tend to be more economical (though this is dependent upon achieving a study–specific threshold response level/an inverse relationship between response rate and survey cost exists), less time consuming to the researcher, mistakes associated with entry and editing of data can be circumvented and more intricate techniques including skip patterns (which allows for changes in the order of questions as a result of participant response) can be utilised (Morris, Fenton & Mercer, 2004).

Survey monkey was selected as it is one of the leading survey websites and is compatible with the majority of web browsers, provides a variety of templates to suit a variety of needs, allows for easy development and response collection, results can be exported using a variety of options including excel. It is also considered one of the safest, with internet security provided by Norton, TRUSTe and McAfee. Moreover, it offers 24–hour support should any issue arise.

The retrospective survey contained a mixture of 33 structured, open and closed questions and was developed by the author and their supervisor. The survey, on average, could be completed in 10–15 minutes. The survey allowed for a variety of responses including option buttons and text entry boxes to allow for easy responses to questions. The instrument elicited autobiographical data and information on the participant's family sport career history, athlete's current sport participation, including start date and hours practiced. Participants were asked to report on their previous sporting participation (i.e., prior to taking up their current main sport) including start date, length of time played for and hours practiced. A copy of the questionnaire is included in the Appendix B (p. 239).

4.2.3. Pilot testing

The instrument was pilot tested using a convenience sample of athletes and the author's peers to assess its comprehension, validity and reliability of content before dissemination. Design, content and technical issues were corrected before distribution to the target population.

4.2.4. Survey administration

A link to the survey was emailed to the programme director at the various universities to be distributed to their athletes. Participating athletes were advised to complete the questionnaire in one sitting as they would have to restart if they were to prematurely terminate the exercise. The survey remained open for 2 months. To increase the level of response, reminder emails were sent to programme directors at regular intervals (every 2–3 weeks) during the data collection period.

4.2.5. Privacy and confidentiality

An information sheet was included at the start of the questionnaire outlining the purpose and objectives of the study, and the rights of the participants, along with a confidentiality statement. Completion and submission of the questionnaire was considered implied consent to participate. The study was reviewed and approved by the Faculty Research Ethics Committee, Kingston University, United Kingdom.

4.3. STUDY 1: THE RELATIONSHIP BETWEEN THE CURRENT AND PREVIOUS SPORTS PLAYED BY ATHLETES

While the identification of talent has dominated the discourse in elite sport, talent development has remained a pertinent issue. Despite the ever expanding catalogue of investigations in the discipline, a universal model of talent development still seems a long way from being actualised. Several models have been presented in the literature, each presenting their own novel benefits. Early practitioners had often advocated a linear approach to talent development where early specialisation in a single sport was a prerequisite for senior success. Contemporary research, however, has departed from the former instead recommending a model of varied play during childhood followed by delayed specialisation.

The focus of this discussion, though, is on the latter diversified model. In their review of talent development in team sports, Burgess and Naughton (2010) intimated that the athletes used in Bullock et al.'s (2009) study on the transfer of talent to talent in skeleton (a closed skill sport) had previously participated in track and gymnastics (similarly closed skill sports). While this has the potential to significantly contribute to knowledge on the development of talented athletes, the inferred association has failed to progress beyond speculation. Hence this section sought to empirically examine whether there is tendency towards preselection of talented athletes to a particular sport based on their previous sporting history (e.g., team sport athletes transferring to team sports).

This section first concisely introduces available models of talent development and research on talent transfer present in the extant literature. Qualitative data extracted from the comprehensive survey exploring talented athletes' sport career histories were then quantified and used to examine the central phenomenon – "why did these elite athletes participate in their current main sport?"

4.3.1. Models of talent development

This section examines two models of talent development as they relate to this chapter. The models presented here are not the subject of this chapter but rather an adjunct to establishing the underlying theory. As such, these models are only described briefly. Ericsson et al.'s (1993) model of deliberate practice was presented in the Literature Review (Chapter 2) and a more comprehensive overview of the model can be found there.

4.3.2. Linear model

The linear model (LM) of athlete development is sheathed in Ericsson et al.'s (1993) model of deliberate practice. Advancing on the early works of Simon and Chase (1973, cited Vaeyens et al., 2009) and Bloom and colleagues (1985, cited by Côté et al., 2005), the architects of this model theorised that it was almost virtually impossible for an athlete to attain expertise without a minimum of 10 years of planned, deliberate, monotonic practice in their selected sport. Any training the young athlete undergoes must be related to their sensitive biological and cognitive development (Moesch, Elbe, Hauge & Wikman, 2011). Further, this LM model proposes that prior motor skill experience dictates how quickly new sport skills are learnt and children grasp simple movements faster than adults (Moesch, Hauge, Wikman & Elbe, 2013). Hence, to avoid some young participants falling behind their peers developmentally and competitively, it is important that they commence specialised training early (Moesch, Elbe, Hauge & Wikman, 2011). In this model, athletes are recruited typically between the ages of 8–12 and oftentimes as young as 6 years into organised, linear training programmes (Ford et al., 2009; Moesch, Hauge, Wikman & Elbe, 2013; Vaeyens et al., 2009).

This LM of sport development insists that apart from an extended, sustained effort, athletes that emerge through this paradigm must maintain high levels of motivation (Detterman, 2014; Moesch, Hauge, Wikman & Elbe, 2013). Several studies have provided strong positive support for the LM in a variety of sports, indicating a clear beneficial correlation between the numbers of hours practiced and the level of performance (Baker et al., 2003; Baker, Côté, & Deakin, 2005; Helsen, Starkes, & Hodges, 1998; Hodge & Deakin, 1998; Hodges & Starkes, 1996; Starkes et al., 1996). Ford et al. (2007), for example, analysed the participation histories of elite male English and French Under 14 soccer players via a retrospective questionnaire. The researchers reported that the average starting age for playing soccer and systematic soccer specific training started at an average of 5 and 7 years respectively for both groups. A similar pattern was demonstrated by Helsen et al., (1998, cited by Helsen et al., 2000) in a group of senior international, national and provincial Belgian soccer players, who underwent a minimum of 10 years of training before being selected to the national team.

While the above results are encouraging, more recent research has cast a shadow of doubt over its efficacy. Güllich and Emrich (2014) conducted a longitudinal study in 1585 German athletes from an array of Olympic sports. They found that senior world class athletes typically started domain specific training, specialised and competed in their respective sport at a later age compared to their national counterparts (14.4 compared to 12.1 years). Moreover, Güllich and Emrich (2014) found that an early start to high intensity sport specific training, competition and specialisation with no involvement in any other sport favoured success during the junior and adolescent stages but did not contribute to senior success. Similar results were reported by Güllich (2011a, 2011b).

Güllich (2011b) asserts that while the LM presented by Ericsson et al. (1993) may expedite the attainment of adolescent success, it may in actuality restrain participation in other sporting activities. Another major drawback of the model is that it requires a much larger investment of resources including coaching, facilities and equipment – these costs are not only confined to the sport associations but to the child and their family (Güllich, 2011b). Developing via the LM can also negatively affect extra–sport activities (education, family, social life, hobbies), there is also an increased possibility of diminishing emotion and motivation, burnout, injury and even attrition (Güllich, 2011b).

4.3.3. Diversified model

Sitting at the opposite end of the developmental pathway is the diversified model (DM) which suggests that early specialisation may not be a prerequisite for adult success (Baker, 2003; Côté, 1999). The assumptions of the DM are included in the Developmental Model of Sport Participation (DMSP) introduced by Côté et al. (2007) which advocates sampling a variety of sports before finally specialising at a later age (usually towards the end of puberty; Moesch, Elbe, Hauge & Wikman, 2011).

Several studies have investigated the efficacy of the DM. Gulbin et al. (2006, cited by Vaeyens et al., 2009) employed a retrospective analysis design to examine the rate of development of high–performance Australian athletes. Of the 681 athletes assessed, 67% had practised their main sport for 7.5 ± 4.1 years, which is considerably less than the 10 years recommended by Ericsson et al. (1993). Bullock et al. (2009) invited 10 elite and near–elite Australian female athletes (age range: 18–31) competing in a variety of sports to undergo a 14 month intensified skeleton training programme based on their morphology and 30m sprint times. Competing at the end of the programme, one of the athletes qualified for the Winter Olympics, one qualified for the senior World Championships, another won an Under 23 World Championship title and 4 achieved top six individual rankings in their maiden World Cup attempt. Similar results were found in tennis (Carlson, 1988), rowing (Côté, 1999), baseball (Hill, 1993), field hockey, netball and basketball (Baker et al., 2003).

Moesch, Elbe, Hauge and Wikman (2011) state that the success of the DM athletes can be attributed to several factors. Firstly, involvement in a variety of sports furnishes the young participant with a multiplicity of important abilities (Moesch, Elbe, Hauge & Wikman, 2011), most notably fundamental or basic movement skills. These transferred abilities can then positively impact their development of specialised sport specific skills in their main sport at a later age (Moesch, Elbe, Hauge & Wikman, 2011). Secondly, this diversified experience can aid in the development of intrinsic motivation which helps maintain sport involvement till the elite level (Moesch, Elbe, Hauge & Wikman, 2011).

4.3.4. The transfer of learning theory

The success of these late specialisers that emerged through the DM may be explained by the transfer of learning theory (Baker, 2003). This theory asserts that learning a skill in one situation or with a set of materials affects the learning of a skill or the use of related materials in another (Adam, 1987; Perkins & Salomon, 1992). Normally, the context in which the skill is learned (e.g., classroom, tests) is distinctly dissimilar from the context in which it is eventually applied (e.g., at home, on the job; Perkins & Salomon, 1992). For example, when learning occurs within educational settings it is presumed that the knowledge gained can be transferred and applied to other situations external to the classroom such as in the workplace (Adams, 1987).

Before this discussion proceeds any further, it is important that a distinction is made between transfer and learning. According to Perkins and Salomon (1992), an iota of transfer takes place during any learning. Learning is evidenced when individual involved can demonstrate what was learned at a later stage (Perkins & Salomon, 1992). Even if this later setting compares to the situation where the learning occurred, there will be some noticeable differences, for example, different time of the day (Perkins & Salomon, 1992). In an event like this, no clear division between transfer and learning is visible (Perkins & Salomon, 1992).

Transfer, however, only truly takes place in situations where it would not be considered as learning (Perkins & Salomon, 1992). For example, a student is taught grammatical skills in a language which they later demonstrate on a test (learning) but when these skills are later used during every day talk then transfer has taken place (Perkins & Salomon, 1992). In essence, transfer of learning implies that learning in one situation impacts a situation beyond that situation (Perkins & Salomon, 1992).

Transfer of learning, however, is not always positive (enhances performance in another context; Perkins & Salomon, 1992). Transfer can also be negative, that is, learning a skill in one setting can have an inimical impact on learning a skill in a different setting (Perkins & Salomon, 1992). Perkins and Salomon (1992) cited the example of learning a new language to differentiate the two types of transfer. They state that speakers of foreign language typically find it easier to learn a new language that is related (positive transfer). Phonetics and vocabulary can prove significant hurdles as the learners often try to adapt the pronunciation of words in the new language that is similar to their own (Perkins & Salomon, 1992).

4.3.5. *Transfer of learning in sport*

Much of the work investigating transfer of learning in sport is based on the original works of Thorndike and Woodworth (1901 cited by Adam, 1987) who devised 'the identical elements theory of transfer'. This hypothesis posits that identical elements, including perceptual, movements, conceptual and physical conditioning may be transferable between sports (Baker, 2003). Several authors have attempted to investigate transfer of learning in sports. Smeeton et al. (2004), for example, examined whether pattern recognition skills transferred across sports in skilled and less skilled soccer, field hockey and volleyball players. The participants were required to watch structured and unstructured sequences from each sport. It was found that skilled field hockey and soccer players were able to transfer perceptual information between their respective sports. They also recognised structured hockey and soccer sequences faster than the volleyball players. The authors concluded that transfer of learning would benefit the athlete if they engaged in a structurally similar (domain specific) sport (Smeeton et al., 2004).

Another study by Oldennziel, Gagne and Gulbin (2004) examined the rate of development of 681 high performance athletes that progressed from novice levels to national representation. The investigators found that 69% of novice athletes advanced to the senior level in less than 10 years. Oldennziel, Gagne and Gulbin (2004) concluded that athletes may be able to transfer their previous sporting experiences at a later age allowing them to progress to elite representation at a much more expeditious rate. A later investigation by Bullock et al. (2009) in skeleton found that novice female athletes were able to progress to the senior levels (World Cup, World Championships and Winter Olympics) after a 14 month training programme.

4.4. Aims

While the above results examining athlete development in the DM paradigm present significant implications for any talent development scheme, two interesting issues were highlighted. In both studies there was a disproportionately larger population of athletes that played individual sports as their current main sport

(100% for Bullock et al., 2009 and 69% for Oldennziel, Gagne & Gulbin, 2004). Secondly, the overwhelming trend emerging from the research was the transferability of dynamic decision making of participants currently practicing a domain–related sport. In the Bullock et al. (2009) study, 70% of the athletes were involved in closed–skill sports (track, gymnastics) before commencing training in skeleton, a similarly closed–skill sport. No mention of the previous sport experience was made in Oldennziel, Gagne and Gulbin (2004).

These studies lead to the question – what effect does the base sport (the sport the athlete played prior to specialising) played by DM athletes have on their eventual choice and development in their current main sport(s)? Considering that the transfer of skills generally occur within narrow limits as suggested by Rosenbaum et al. (2001), would it be wise to conclude that DM athletes that played closed–skill sports during their earlier years of playing would predominantly transfer to a closed–skill sport at a later stage (or the same for athletes with a previous background of open–skilled sports)? Or is there a tendency for athletes that played individual sports to transfer to individual sports (or similarly for team sport athletes)?

In light of current research, this study had several aims:

1) to determine the age of specialisation of DM and LM athletes from T&T and the UK
2) to determine the number of sports played by DM athletes prior to specialisation in their current main sport
3) to examine whether a correlation existed between the base and current sport of DM athletes using the following criteria:
    - team vs. individual (i.e., how many athletes with a prior experience of playing in a team setting transferred to an individual sport or team sport and vice versa)
    - open– vs. closed–skills sports (i.e., how many athletes with a prior experience of playing open–skilled sport transferred to an open–skilled sports and vice versa)

For the purpose of this study, closed–skills sports describe those sports that occur in a generally fixed, predictable environment (Liu, 2003), for example gymnastics or 100m sprint in athletics. On the other hand, open–skills sports typically describe those that occur in unstable, unpredictable environments (Liu, 2003) such as football and hockey.

It is hoped that the results of this study would meaningfully contribute to the limited data which demonstrated inter–country variances in participation motives by examining differences between elite athletes from T&T and the UK.

4.5. Data Analysis

Information collected on surveymonkey.com was exported as an Excel file and imported to SPSS. All statistical analyses were conducted using SPSS (version 22; SPSS Inc., Chicago, Illinois, USA). Given the design of the questionnaire, the data analysis was quantitative, including categorisation of variables and identification of relationships. Further, the quantitative methods were exploratory, involving summarising data utilising charts, tables, percentages, averages and frequency. Means and standard deviations were calculated for responses to each question. Between groups differences for the cohorts were examined using analysis of variance (ANOVA). Two–sided Fisher's exact–test was used to examine the relationship between the following variables:

i) team vs. individual sports
ii) open– vs. closed–skills sports

Given the small sample size, the Effect Size (Φ) was calculated for each of the above categories and reported along with the relevant test statistics. The significance level was set at $P < 0.05$.

4.6. Results

A total of 67 completed questionnaires were received from 41 T&T and 26 UK athletes. The response rate for T&T was 73.21% (41/56 athletes enrolled on the High Performance Sports Programme at the UTT. Information on the number of athletes enrolled on the programme was provided by its director. A similar completion rate could not be determined for the UK as the nine institutions that offered their own talented athlete scheme did not offer figures regarding the numbers enrolled on their respective programmes.

The results of the qualitative and quantitative analysis of the survey date are presented in the proceeding sections. The results of further descriptive statistical analyses are included in Appendix B (p. 248).

Table 4.1. Athlete cohort characteristics (separated by country and combined)

			Level of Competition			
		Age (yrs)	**County**	**National**	**Regional**	**World Championships**
	Male (N = 32)	21.72 ± 1.99	10	15	5	2
T&T	**Female (N = 9)**	24.11 ± 3.22**	3	0	1	5
	All (N = 41)	22.24 ± 2.48*	13	15	6	7
	Male (N = 15)	21.33 ± 2.92	5	3	1	6
UK	**Female (N = 11)**	20.18 ± 1.83	2	2	1	6
	All (N= 26)	20.85 ± 2.54	7	5	2	12
Groups	**Males (N = 47)**	21.60 ± 2.30*	15	18	6	8
Combined	**Females (20)**	21.95 ± 3.19	5	2	2	11
	Total (N = 67)	21.70 ± 2.58	20	20	8	19

*Significant differences: *P < 0.05; **P < 0.01*

4.6.1. Cohort demographics

4.6.1.1. Age

The characteristics of the athlete cohorts are displayed in Table 4.1. The data is divided by country and combined. Athletes from T&T were significantly older than their UK counterparts ($P < 0.05$). Female athletes from T&T were also found to be considerably older than the males ($P < 0.01$). No significant differences were found between the male and female participants in the UK sample. When the groups were combined, the males were significantly older than the female athletes ($P < 0.05$).

Table 4.2. Sports played by T&T and UK athletes.

	T&T Athletes			**UK Athletes**	
Sport	Number of Athletes	Percentage of Total	Sport	Number of Athletes	Percentage of Total
Athletics	1	2.4	Athletics	1	3.8
Basketball	3	7.3	Cricket	1	3.8
Boxing	1	2.4	Fencing	1	3.8
Cricket	6	14.6	Golf	1	3.8
Football			Handball	2	7.7
(Soccer)	7	17.1	Ice Hockey	2	7.7
Hockey	2	4.9	Lacrosse	1	3.8
Netball	4	9.8	Modern		
Rugby	2	4.9	Pentathlon	1	3.8
Swimming	3	7.3	Netball	1	3.8
Table Tennis	9	22.0	Rowing	3	11.5
Volleyball	3	7.3	Rugby	1	3.8
			Shooting	2	7.7
			Skiing	1	3.8
			Triathlon	2	7.7
			Volleyball	1	3.8
			Weightlifting	5	19.2
Total	**41**	**100.0**	**Total**	**26**	**100**

4.6.1.2. Number of sports played by country

The sports played by the athletes are presented in Table 4.2. Twenty different sports were played by the athletes. Despite the smaller sample size, more sports were represented by the UK athletes. Team sports were more popular amongst T&T athletes while there was an almost even distribution in the number of team and individual sports amongst UK athletes.

4.6.1.3. Current competitive level

More athletes from T&T were competing at the National and County levels while more UK athletes were competing at the Regional and World levels (Table 4.1.). None of the athletes that were competing at the World level for either country medalled at any of those events. Two athletes from T&T gained medals at the Regional level***4.6.2. Comparison of LM and DM athletes***

4.6.2.1. Developmental patterns

Overall, significantly more athletes developed via the diversified model pathway ($P < 0.001$), that is, they played a minimum more than 1 sport prior to specialisation (Figure 4.1.). These DM athletes played on average 2.00 ± 0.87 sports prior to specialisation in their current main sport. A similar scenario was found for the UK. There was a considerably higher number of DM compared to LM athletes ($P < 0.001$) who had played approximately 2.22 ± 0.85 sports.

For T&T, however, there were significantly more athletes that had no prior sporting history (played 0 sports; LM athletes) before specialisation in their current main sport ($P < 0.001$). The DM athletes participated in 1.72 ± 0.83 before specialising.

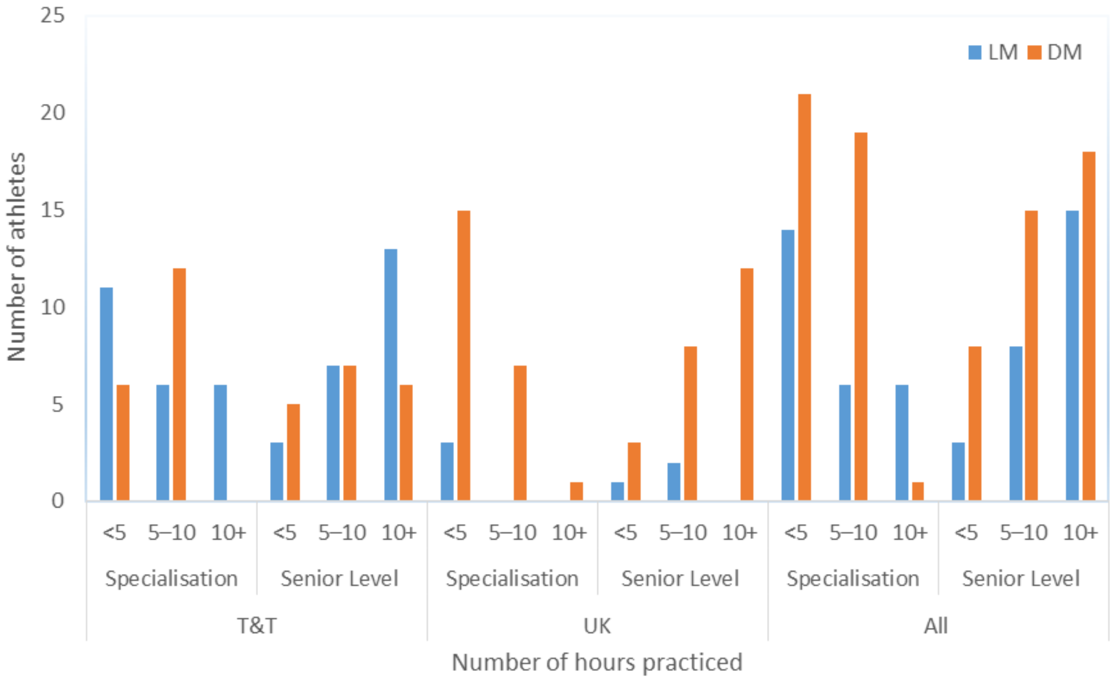


Figure 4.1. Number of sports played by the athlete cohorts prior to specialisation in their current main sport.

4.6.2.2. Practice history

At the specialisation stage, there were more LM athletes practicing their current main sport for 5 hours or less (Figure 4.2.) over 3–5 days (Figure 4.3.). For DM athletes it was a mixture of <5 hours to 5–10 hours primarily spread over 3 days or less. The number of practice hours increased at the senior level with the majority of LM athletes practicing for 10+ hours usually over 3–5 days. The level of practice for DM athletes also increased, with more practicing 5–10 and 10+ hours over 3–5 and 6–7 days.

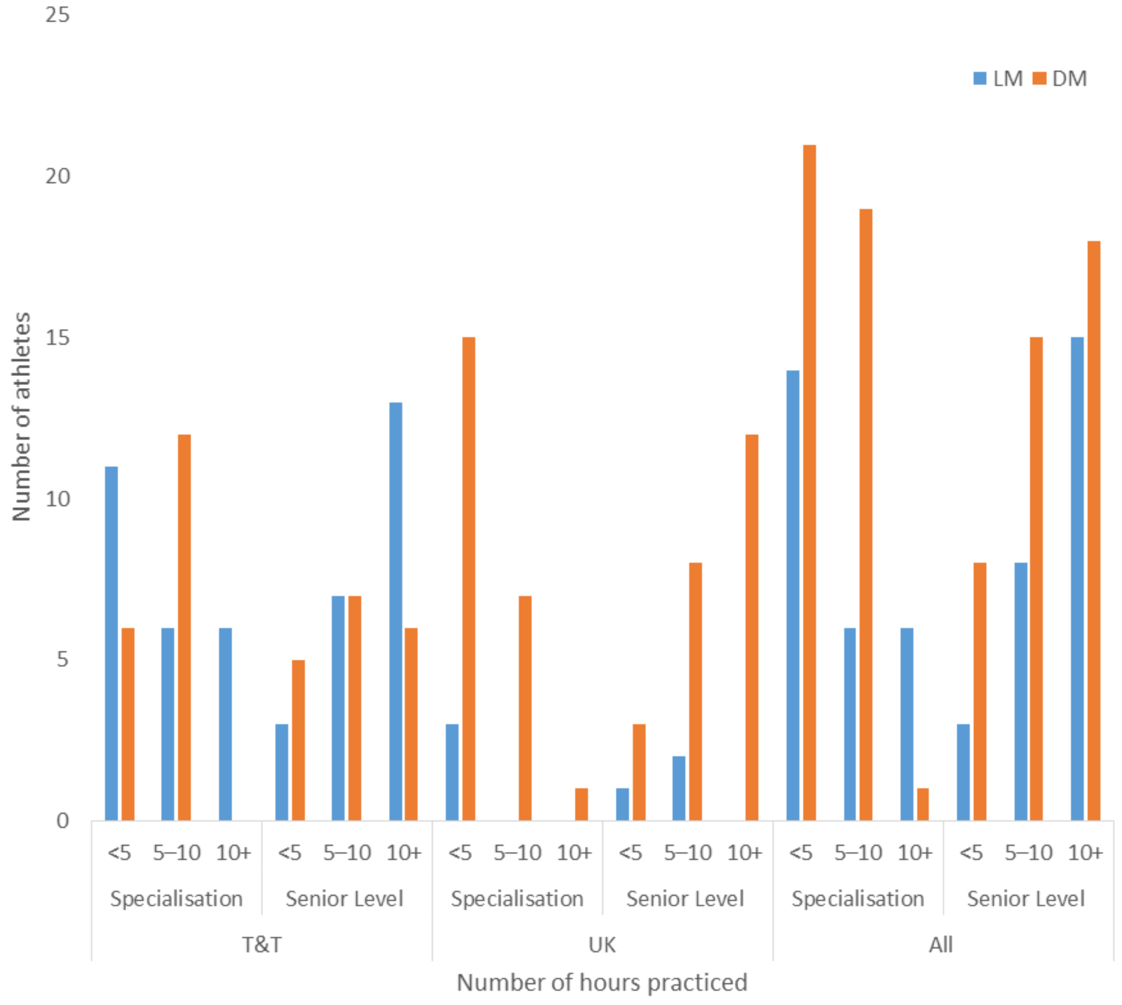


Figure 4.2. Amount of hours current main sport practiced during specialisation and at the current senior level

Analysing the practice history of the athletes separately revealed that LM athletes from T&T practiced primarily for <5 hours over 3–5 days during the specialisation stage. At the senior level, this increased to mainly 10+ hours with the number of practice days remaining constant. Diversified Model athletes, however, practiced on average for 5–10 hours during specialisation while the majority practiced for 5–10 or 10+ hours at the senior level. These DM athletes typically trained for <3 days during specialisation while there was an almost even distribution between the number of athletes practicing <3, 3–5 and 6–7 days at the senior level.

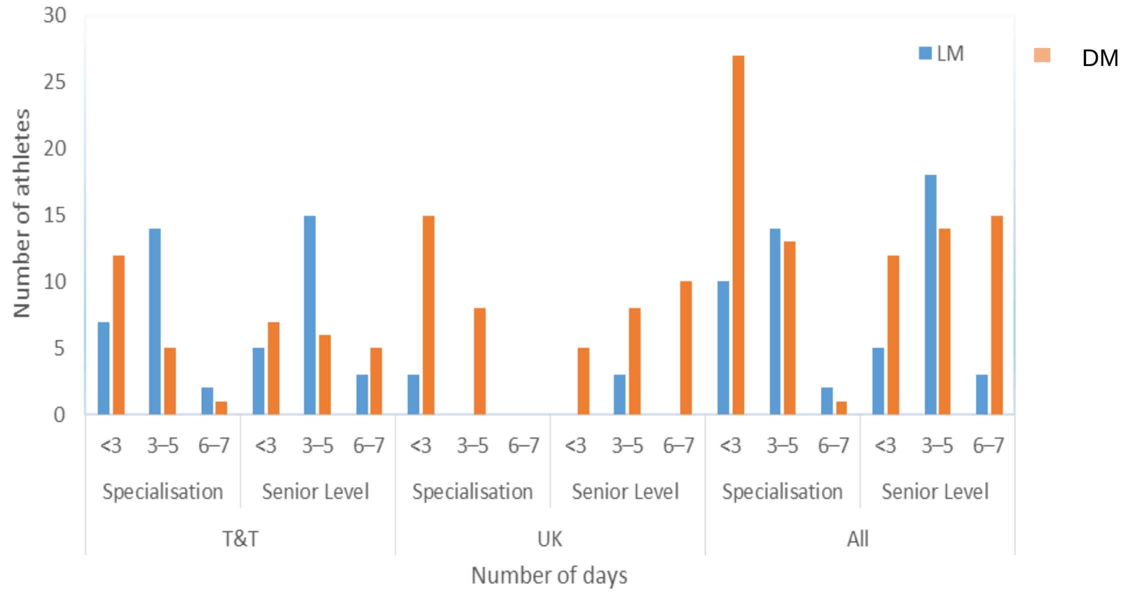


Figure 4.3. Amount of days current main sport practiced during initial specialisation and at the current senior level

A similar pattern to the above was demonstrated for the both cohorts. Linear Model athletes practiced their current main sport for 5 hours or less during specialisation for <3 days. The majority trained for around 5–10 hours over 3–5 days at the senior level. The preponderance of DM athletes trained for <5 hours during specialisation rising to 10+ hours at the senior level. Practice was usually spread over <3 days during specialisation and 3–5 and 6–7 days at the senior level.

Table 4.4. Age of specialisation in current main sport of DM and LM athletes currently competing at the National, Regional and World Championship levels (separated by country and combined)

Level of Competition	Age of specialisation					
	T&T		UK		All	
	DM	LM	DM	LM	DM	LM
National	12.60 ± 3.31*	9.22 ± 3.78	10.50 ± 4.77	17.00 ± 11.31	11.55 ± 4.14	10.00 ± 5.03
Regional	12.80 ± 0.84	14.00 ± 0.00	12.50 ± 0.71	§	12.71 ± 0.76	14.00 ± 0.0
World Championship	12.67 ± 2.08	11.75 ± 6.19	12.73 ± 2.61	13.00 ± 0.00	12.71 ± 2.43	12.00 ± 5.39
All	12.67 ± 2.54*	9.87 ± 4.25	11.74 ± 3.70	15.67 ± 8.33	12.15 ± 3.24	10.54 ± 5.00

Group differences calculated using ANOVA*.*

**There were no athletes in this group (§)*

**DM athletes specialised at an older age (P < 0.05) compared to LM athletes.*

4.6.3. Age of specialisation

The average age of specialisation in their current main sport for all athletes combined was 11.52 ± 4.05 years. Table 4.4. compares the age of average age of specialisation for LM and DM athletes from T&T, UK and all athletes combined at the National, Regional and World Championship levels. Athletes from T&T that emerged through the DM pathway specialised in their current main sport at a later age compared to LM athletes competing at the National Level ($P < 0.05$) and when all levels of competition were combined ($P < 0.05$). No differences between LM and DM athletes were found at the World Championship levels. At the Regional level, however, LM athletes were found to specialise in their current main sport at a later age, though this was not significant.

4.6.3.1. Current competitive level of LM and DM athletes

Table 4.5. Current competitive levels of LM and DM athletes separated by country and combined

		County/ Zonal	**National Team**	**Regional (Caribbean/ European)**	**World (e.g. World Cup/ Championship)**
	LM	7	11	1	4
T&T	**DM**	6	4	5	3
	All	13	15	6	7
	LM	0	2	0	1
UK	**DM**	7	3	2	11
	All	7	5	2	12
	LM	7	13	1	5
All	**DM**	13	7	7	14
	All	20	20	8	19

Combining the results of both countries (Table 4.5.) revealed that despite their higher overall numbers, the majority of LM athletes were competing at the lower levels (County and National). A higher proportion of DM athletes were competing at the higher levels (i.e., Regional and World). Similar results were demonstrated when the data was separated by country.

4.6.4. Relationship between current and base sports in DM athletes

4.6.4.1.. Team vs. individuals sports

The distribution of team and individual sports as the current main and base sport amongst DM athletes from T&T, the UK and all athletes combined is illustrated in Table 4.6. There were significantly more DM athletes from T&T ($P < 0.001$) that played a team sport as the current main sport. On the other hand, individual sports was considerably more common amongst UK athletes ($P < 0.001$) and when the groups were combined ($P < 0.001$).

There was greater tracking amongst DM athletes from the UK, with 75% of team sport players having a team sports background while 63.64% of the individual sports athletes played an individual sport before specialisation. No significant relationship between the current main and base sport of DM athletes from T&T ($p = 1.00$, $ø = –0.07$), UK ($p = 0.19$, $ø = 0.33$) and all DM athletes combined ($p = 0.54$, $ø = 0.12$) were found.

Table 4.6. Breakdown of team and individual sports participation pre– and post–specialisation amongst DM athletes (separated by country and combined)

Type of Sport	T&T		UK		All Athletes	
	Main Sport	Base Sport	Main Sport	Base Sport	Main Sport	Base Sport
Individual	6	3	11	7	17	10
Team	12	5	12	9	24	14
Total	18		23		41	

Group differences calculated using Fisher’s exact (two–sided) test.

4.6.4.2. Open–skills vs. closed–skills sports

Table 4.7. Breakdown of open– and closed–skills sports participation pre– and post–specialisation amongst DM athletes (separated by country and combined)

Type of Sport	T&T		UK		All Athletes	
	Main Sport	Base Sport	Main Sport	Base Sport	Main Sport	Base Sport
Open–skill	17	11	10	9	27	20
Closed–skill	1	0	13	8	14	8
Total	18		23		41	

Group differences calculated using Fisher's exact (two–sided) test.

Open–skill sports accounted for 65.85% of the current main sport of the study cohort (Table 4.7.). There was good tracking in both open– and closed–skills sports. The preponderance of athletes who played an open–skills sport before specialisation eventually specialised in an open–skills sport for T&T, UK and all the athletes as a whole. Similar results were found for closed–skills sports. No significant relationship between the current main and base sport of DM athletes from T&T ($p = 1.00$, $ø = –0.24$), UK ($p = 1.00$, $ø = –0.24$) and all DM athletes combined ($p = 0.71$, $ø = –0.11$).

4.7. Discussion

The appropriate development of athletic talent is a major area of concern to sport administrators, practitioners and other professionals. Numerous studies have been conducted over several decades in an effort to identify the most expedient method of nurturing the most gifted young performers. While several models of talent identification have been proposed in the literature (Abbott & Collins, 2004; Falk et al., 2004; Reilly et al., 2000; Vaeyens et al., 2008; Wolstencroft, 2002), general disagreement over which is the most suitable still persist. This study sought to add to the current debate by comparing the sporting career development patterns of 67 senior athletes from the T&T and the UK using an internet–based retrospective questionnaire protocol. The survey results demonstrated different career development patterns for the athletes and key findings are discussed below.

4.7.1. Career development patterns of T&T and UK athletes

Twenty–one sports were represented in this study and despite the smaller sample size, UK athletes were found to participate in a greater variety of sports both pre–specialisation and as a current main sport. A major mitigating factor which may explain this divergence is the difference in the level of economic development of the two countries under study. Unlike more developed countries like the UK where sporting organisations maintain a relatively high level of self–sufficiency, governments in developing countries are by far the leading benefactor of sports (Andreff & Szymanski, 2006). Sport is usually ranked as low priority in these nations when compared to a myriad of other competing concerns including education and health and budgetary allocations are often insufficient to maintain sports to a sufficiently high standard (Andreff & Szymanski, 2006). Poor financing of sport in developing countries can be linked to, inter alia, a lack of physical education and sport for all projects, limited sporting facilities and equipment (Andreff, 2001). Moreover, T&T is also smaller than the UK in terms of physical and population size. The knock–on effect of this is a reduced offering of sport with the more socially popular sports securing greater financial investment from the government and uptake by members of the population. While this may appear restrictive as it limits the available choice, on the flip side this policy restricts the further dilution of an already limited talent pool.

Differing sporting development patterns were found for the UK and T&T athletes, with both countries providing support for either of the athlete development models discussed earlier. According to Ericsson et al.'s (1993) seminal model of linear athletic talent development, to achieve senior level success the young gifted performer must endure a minimum of 10 years of planned, deliberate, monotonic practice in a particular sport. Evidence of Ericsson et al.'s (1993) model was demonstrated in the T&T cohort as a significantly higher proportion of the athletes that emerged through the LM pathway.

Conversely, significantly more respondents from the UK group were products of the DM pathway of talent development, participating in at least one sport before specialising in their current main sport. A similar result was found when the both cohorts were combined. These confirm contemporary research which suggest that linear sport development as a prerequisite for senior level success was not essential (Baker et al., 2003). The results are in accord with Oldennziel, Gagne and Gulbin (2004) who found that more than half of their sample of 681 high performance Australian athletes surveyed had previous sporting experience prior to specialisation. The 'quick developers' in their study had played on average 3.3 sports before specialising in their current main sport (Oldennziel, Gagne, Gulbin, 2004).

Ericsson et al. (1993) argued that it would be almost impossible for individuals specialising late in sport to surpass early starters as they would have benefitted from large amounts of deliberate practice hours. However, the findings of this study has disputed this claim. Overall, the majority of LM athletes were competing at the lower levels of their respective sports. This included the County and National levels. This is in direct contrast to the DM athletes or late starters, where more than half of this group were competing at the higher levels – Regional and World Championships. Similar results were found when the country data were examined separately. This divergence in competitive levels were supported in an earlier study conducted by Bridge and Toms (2012). In examining the sport participation histories of 1006 UK sportspersons, the authors found that 16–18 year olds who had played a single sport were more likely to compete at the club level while those who had previous experience of multiple sports were more likely to compete at the national levels. According to Güllich and Emrich (2014), an early start to high intensity sport specific training, competition and specialisation at the expense of participation in other sports contributed to success in the junior and adolescent ranks but was a poor contributor to senior success. This may explain why a small portion of the total number of LM athletes that completed the survey were involved at the highest levels.

4.7.2. Age of specialisation of LM and DM athletes

Based on Ericsson et al.'s (1993) linear model of sport development, talented individuals typically specialise at a very young age, often varying between 6–12 years of age (Vaeyens et al., 2009). The diversified model proposed by Côté et al. (2007), specialisation should be delayed till the ages of 13–15 years. Hence a major aim of this study was to test the preceding models by determining the age of specialisation of the LM and DM athletes in an effort to identify which group specialised later. Overall, athletes that emerged through the DM of sport development specialised later in their current main sport compared to their LM counterparts. This trend was similarly reflected in the T&T cohort where DM athletes specialised in their sport significantly later than LM athletes. These findings are in direct agreement with those of Moesch et al. (2001) and Oldennziel, Gagne and Gulbin (2004) who found that the late starters (those who played other sports prior to specialising) specialised later than the early starters (those with no prior sporting history before specialising).

The age of specialisation of the DM and LM athletes ran counter to those suggested by the linear and diversified models and found in the UK cohort. The LM athletes specialised at a later age compared to DM athletes. Caution is advised when interpreting this result, however, as the considerably smaller sample size would have compromised the robustness of the data and the efficacy of the outcome. Two of the three LM athletes specialised at a young age while one specialised at 25 which skewed the data. This late specialising LM athlete participated in weightlifting, a sport that does not typically require an athlete to specialise at a very young age.

While DM athletes from T&T specialised later than the LM athletes, the average age of specialisation was in disagreement with those of the Developmental Model of Sport Participation (Côté et al., 2007). The DMSP suggests that sampling years (when young athletes should participate in a variety of sports) should occur between the ages of 6–12 years old with specialisation occurring around 13–15 years. The age of specialisation of the DM athletes here was more reflective of age suggested for Ericsson et al.'s (1993) which is approximately 6–12 years (Vaeyens et al., 2009).

4.7.3. Practice history of LM and DM athletes

The amount of time spent in training increased for both LM and DM athletes as they progressed from the specialisation stage to the senior level. This result was the same for T&T, UK and all athletes combined. The DM athletes for both countries, however, were more likely to train more during specialisation and less at the senior level. The LM athletes, on the other hand, trained less during specialisation and this increased at the senior stage. This result was common to both T&T and the UK.

The above results were contradicted in an earlier study by Carlson (1988). In examining the career sport histories of 10 elite and sub–elite male and female Swedish tennis players, the author found that, apart from specialising later as a result of a varied sporting background, the elite players spent less time practicing during specialisation compared to the sub–elites. This increased towards the senior age groupings. The difference between this and the previous study by Carlson (1988) may be a result of the DM athletes training more in an effort to "catch up" to the LM athletes. The larger volume of time devoted to training by DM athletes during the specialisation stage is predicated on a direct need to master the fundamentals of their sport by focusing on sport–specific training (Côté et al., 2007). It may be possible that these DM athletes may view themselves as being behind LM athletes in terms of development and achievement in the sport, hence there is the need for quality practice" characterised by "intensity" and "concentration" (Côté et al., 2007).

4.7.4. The relationship between base and current sports

A conducted by Baker et al. (2003) examined the dynamic decision making skills of basketball, netball and field hockey players, the authors proposed that participation in appropriate domain specific activities during an athlete's early sporting career can positively impact the cognitive and physical skills required by an athlete's primary sport. This assumption was attributed to the transfer of learning theory which proposes that similar aspects of a sport may be transferrable to another (Baker, 2003), a definition which strongly suggests domain specificity. Hence, a secondary aim of the present study was to determine whether a relationship existed between the base and current main sports of DM athletes utilising two categories – team vs. individual and open–vs. closed–skill sports.

4.7.5. The tracking of open– and closed–skill sports

The tracking of open– and closed– skill sports for DM athletes from the UK and T&T provided strong support for the domain specificity of the transfer of learning theory. Respondents from both T&T and the UK who participated in an open–skill sport were more likely to specialise in a similar type sport. Similar results were demonstrated for UK athletes that played closed–skill sports. Bullock et al. (2009) investigated the efficacy of a 14 month talent development programme in novice female skeleton athletes. A closer look at the results of Bullock et al. (2009) revealed that 70% of the athletes were involved in closed–skill sports (track, gymnastics) before commencing training in skeleton, a similarly closed–skill sport.

4.7.6. The tracking of team and individual sports

Conversely, the tracking of team and individual sport amongst DM athletes presented a different picture. Despite team sports as the current main sport being more popular amongst athletes from T&T, less than half of the respondents had a background in team sports, whereas half of those that played an individual sport as a child eventually specialised in a team sport. There was better tracking amongst DM athletes from the UK with more than half of team and individual sports players participating in team and individual sports respectively before specialising. This weaker association suggests that the sports played by the athlete during their sampling years need not be domain specific. Teixeira (2000) contends that an array of transfer of learning typically occurs between activities, hence a perfect transfer of learning remains a rare occurrence. Participation in a variety of sports would expose the young athlete to a range of abilities, in particular fundamental movement skills (FMS), considered to be the basic building blocks (Lubans et al., 2010) for specialised sports skills. A diversified sporting background prior to specialisation exposes the athlete to a variety of movement skills which can then be transferred to the sport they eventually specialise in. Furthermore, the range of movement skills the athlete brings to their respective sport of specialisation can aid in reducing training time as less time may be needed to teach basic movement skills.

4.8. STUDY 2: PARTICIPATION MOTIVES OF ATHLETES

4.8.1. Introduction

While the required amount of practice remains a contentious issue, it is undeniably a crucial factor in the development of athletic talent (Detterman, 2014). Nevertheless practice merely represents a single element in the intricate mixture of factors that contribute to expertise development including the environment, abilities and motivation (Detterman, 2014). One area of increasing concern in the literature is motivation (Ackerman, 2014; Detterman, 2014; Fernández–Río, & Méndez–Giminénez, 2014; Hedstrom & Gould, 2004; Moesch et al., 2013; Foster et al., 2005). As testimony to the importance of this variable, Foster et al. (2005) stressed that their goal of increasing year on year sporting participation would not be realised unless they gain an understanding of the factors that motivate an individual's participation. Given the increasing state investment in talent development structures globally, comprehending the reasons that motivate athletes' initial attraction to sport can provide valuable information that would allow for a more economical investment of limited funding. Furthermore, it would contribute to the introduction of programmes aimed at encouraging and maintaining participation and ultimately augmenting the available talent pool for selection.

4.9. Motivation

4.9.1 Definition

Motivation is a complex, multidimensional construct which has often described as the state whereby the needs or desires of a person often function as a catalyst for achieving a specific external goal (Kondrič et al., 2013). Ryan and Deci (2000), authors of the Self–Determination Theory (SDT), state that motivation provides the impetus for an individual 'to do something'. Any engagement in sport and physical activity is affected by the level of motivation of the individual (Ryan & Deci, 2000) and there exists a myriad of reasons why a person would take part in sport such as mastery of a particular skill or experience a new challenge (Vallerand & Losier, 1999).

Athletes and other persons that participate in sport and physical activity are typically affected by two types of motivation which have been described in the SDT (Vallerand & Losier, 1999). On one end is intrinsic motivation which states that an individual participates in sport purely based on internally generated reasons (Ryan & Deci, 2000). Therefore an athlete may get involved in sport out of curiosity or simply to have fun. Conversely, an athlete that is extrinsically motivated participates in sport so as to gain external tangible or intangible reward (Ryan & Deci, 2000; Vallerand & Losier, 1999). For example, an athlete may get involved in sport to gain social recognition or for the financial rewards on offer.

The extensive interest demonstrated in motivation in the sporting literature, particularly in children, incontrovertibly attests to the significance of this variable. Ryan and Deci (2000) for example, assert that motivation impacts the way an individual thinks, feels and acts, and remains a primary concern to coaches, parents, teachers and other individuals responsible for encouraging others to be active. In further emphasising the importance of this variable Ackerman (2014) asserted that motivation represents one of the 'essential building blocks for future learning'. In borrowing an analogy from Ackerman (2014), an individual who is devoid of or low motivated may lack the appropriate drive to participate and succeed in sport in much the same way that a physically short person may not be able to vertically ascend the physical heights required to complete a dunk shot in basketball.

4.9.2. Motivation in sport

As the number of youth participating in sport annually, identifying leading participation motives can provide an insight into why children become involved in sport. Additionally, it can provide crucial information aimed at overcoming barriers, encouraging and maintaining participation. Numerous studies have attempted to articulate the reasons why children become involved in sport and physical activity (Brockman et al., 2011; Egli et al., 2011; Murcia et al, 2007; Spray et al, 2006; Yan and McCullagh, 2004). To date, the largest study of its kind was conducted by Seefeldt, Ewing and Walk (1993). The researchers surveyed 26 000 children between 10–18 years in an effort to examine the participation and attrition patterns in sponsored interscholastic sports. The authors found that the leading participation motives provided by the respondents included – 'to have fun'; 'to do something I am good at'; 'to stay in shape'; 'to learn new or improve my skills'; and 'to plays as part of a team'. Further exploratory studies have confirmed that the predominant reason influencing sporting participation amongst children is to have fun (Brockman et al., 2011; Crandall, 2007; McCullagh et al., 1993; Sirard et al., 2006). Participation motives vary (Kondrič et al., 2013) with gender (Sirard et al., 2006), age, culture (Yan and McCullagh, 2004) and race (Egli et al., 2011) having significant influence.

The reasons that motivated successful senior athletes to initially participate in their current sport remain unexplored. The fact that the majority of current research has been conducted in junior, non–athletic, recreational populations questions its straightforward applicability to elite sport. Considering that the goal is to identify factors that initially motivated athletes who eventually became successful, it may be inappropriate to extrapolate the results of those that included junior athletes as their sample as there is no way of prognosticating their future performance in their respective sports. Whether there exists a difference in the initial reasons for sporting participation between recreational and athletes and those who would eventually become elite performers is a question that still persists. Elite sport requires considerably higher devotion to training (Young, n.d.) compared to recreational pursuits, subsequently necessitating a different level of motivation. The psychological disposition of the elite athlete is, to a large extent, dissimilar to the non–athletic individual (Young, n.d.) and the effect of this on the participation motives is yet to be fully understood.

4.10. Aims

Young (n.d.) asserts that the elite athlete represents, inter alia, a unique admixture of talent and the appropriate psychological disposition. She/he tends to possess high levels of confidence and motivation (Young, n.d.). Providing that these are innate traits, it is hypothesised that an elite athlete's entry into sport would be motivated by reasons dissimilar to those of the non–elite individual. Based on the above, the aims of this section are as follows:

- to understand, compare and contrast the participation motives of elite athletes from two economically and culturally distinct countries: T&T and the UK.

- to contribute to the limited data which demonstrated inter–country variances in participation motives by examining differences between elite athletes from T&T and the UK.

4.11. Data Analysis

Response frequencies were calculated using SPSS (version 22; SPSS Inc., Chicago, Illinois, USA). Response frequencies and percentages for group– and gender–related differences were performed using the multiple response function. Differences in motivation by gender and country were tested using nonparametric Mann-Whitney U test. Significance level was set at $P < .05$.

4.12. Results

4.12.1. Participation motives

The most popular reason given by the athletes for participating in their current main sport was 'to have fun' (Figure 4.4.). A similar outcome was found when the results were separated by gender. Amongst female athletes, major competing secondary reasons for sporting participation were to 'stay in shape' and to find 'a new challenge'. Significantly, more female athletes began playing their current main sport 'to stay in shape' ($U = 622.0$, $P < 0.05$). Conversely, significantly more male athletes attributed their reasons for playing their current main sport due to its 'popularity' ($U = 370.0$, $P < 0.05$). Finding 'a new challenge' also appeared to be more popular among male athletes ($U = 602.0$, $P < 0.05$).

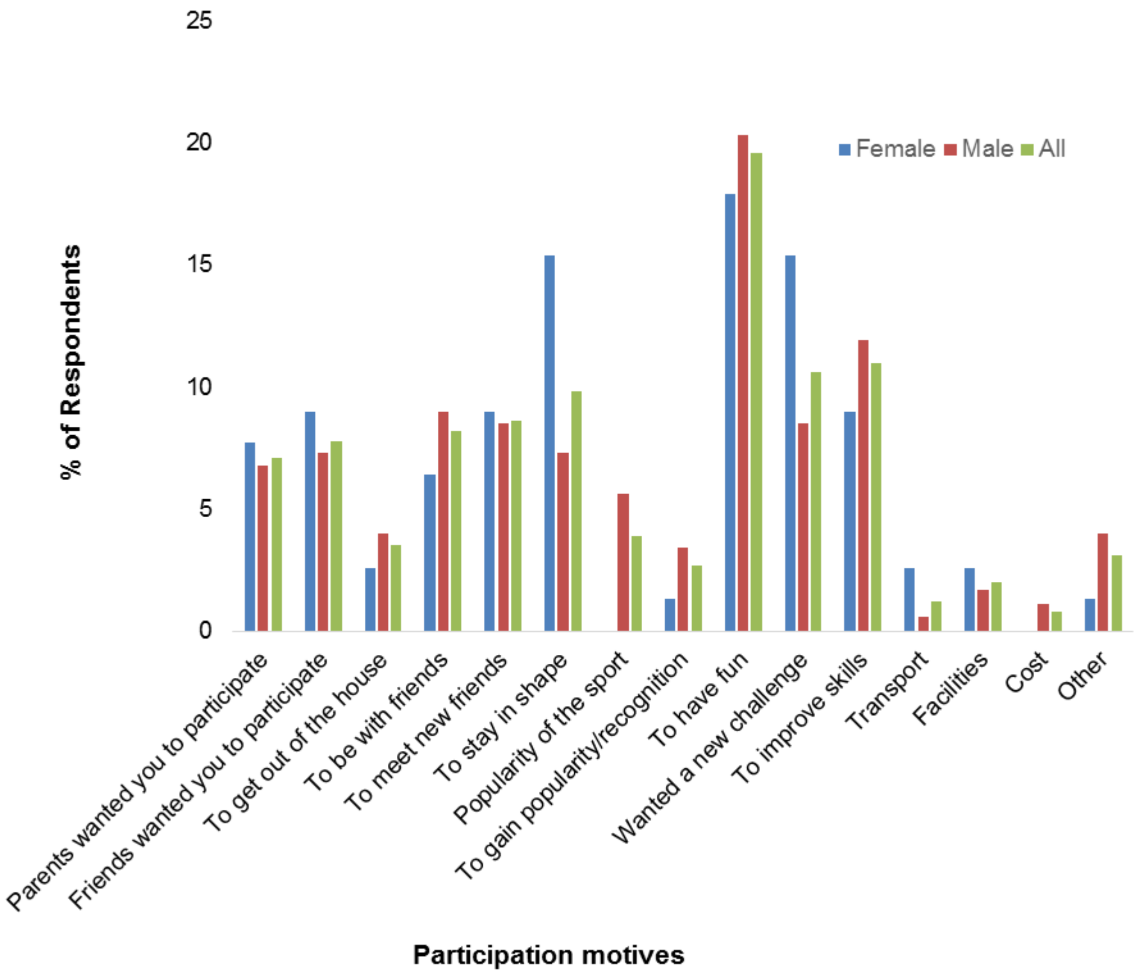


Figure 4.4. Participation motives of female, male and all athletes combined

Concomitant with the above, the overwhelming participation motive amongst athletes in T&T (Figure 4.5.) and the UK was ‘to have fun’ (Figure 4.6.). Athletes from the UK were also significantly more likely to participate in their current main sport if it provided a ‘new challenge’ (U = 314.5, P < 0.001) compared to T&T athletes.

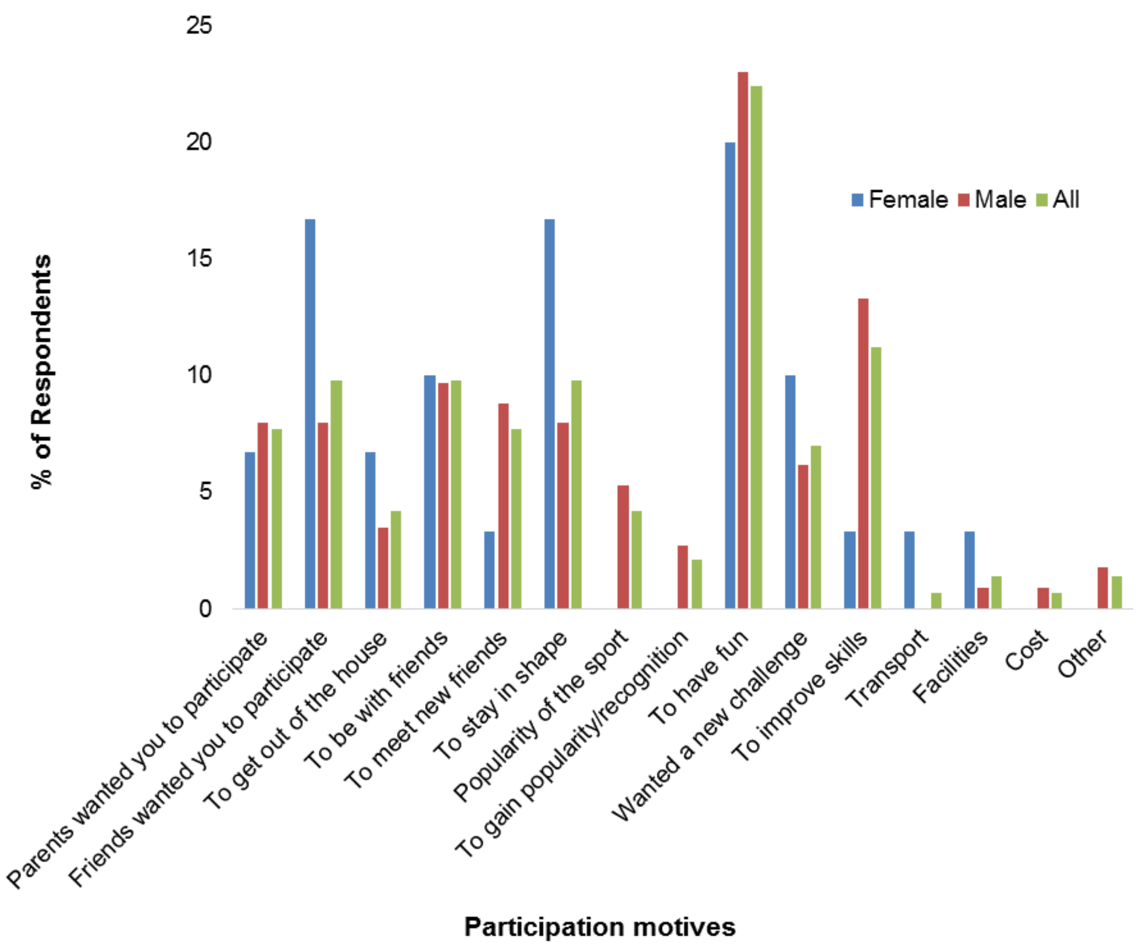


Figure 4.5. Participation motives of T&T athletes separated by gender and all combined

Further analysis revealed that gender differences in motivations varied between the two countries. Although owing to the relatively small sample size and thus loss in statistical power, none reached statistical significance at the set level. It appeared that motives of ‘staying in shape’, ‘popularity of the sport’ and ‘challenge’ characterises the UK sample more than the T&T sample. For the latter, a new motive, ‘skills improvement’, emerged for male athletes.

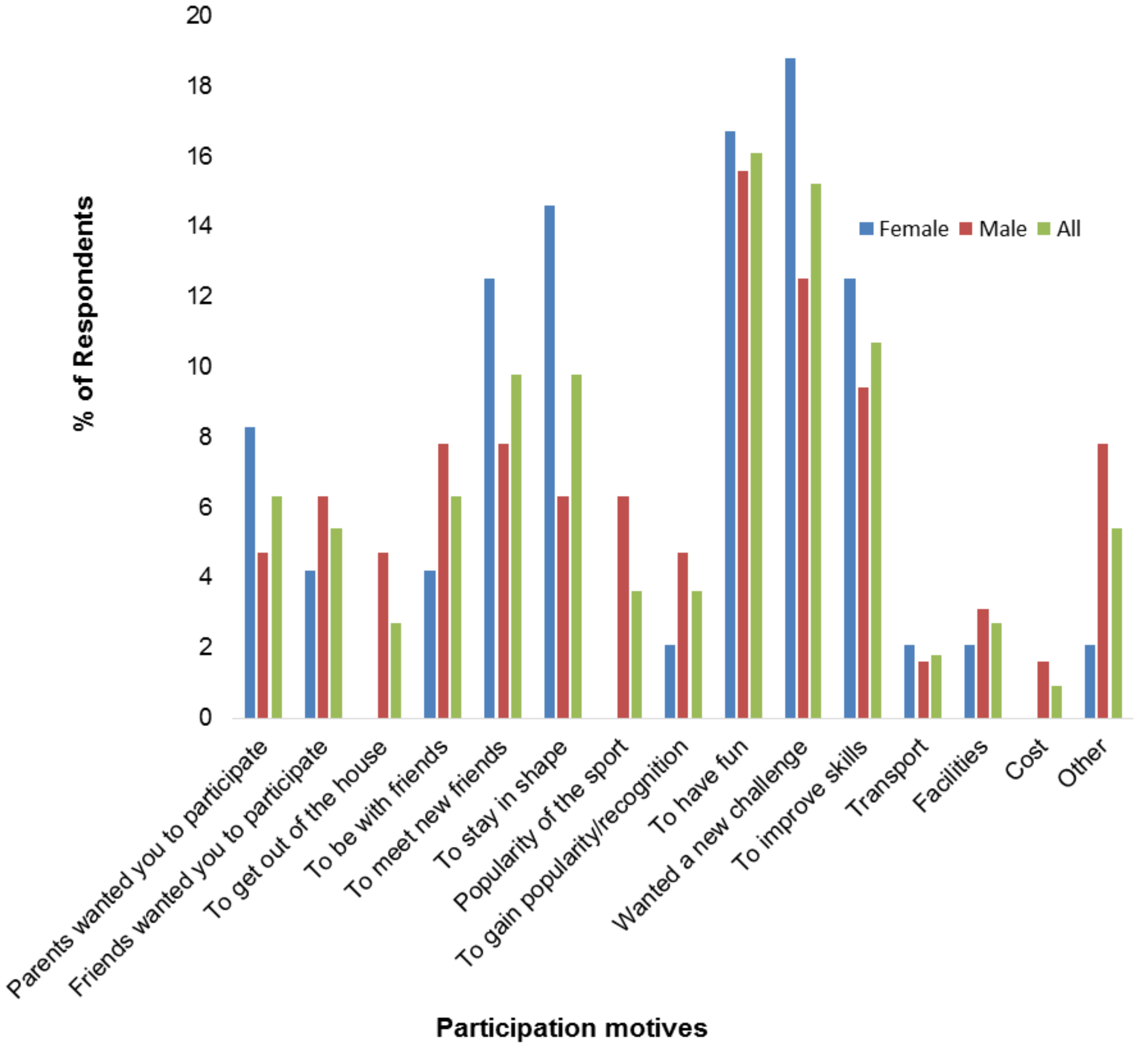


Figure 4.6. Participation motives of UK athletes separated by gender and all combined

4.13. Discussion

Research examining sport participation motives amongst elite athletes is limited. The purpose of this study was to understand why elite athletes got involved in their current sport, so as to contribute to the limited extant literature. Examining the study cohort as a whole, the results of the survey demonstrated that the primary motivating factor for sporting participation was ‘to have fun’. Even when the findings were separated by gender and country, the primary participation motive was constant. This was contrary to what was anticipated. It was hypothesised that given the psychological profile of the elite athlete, their reasons for taking up sport would have differed from their non–elite counterpart.

A lack of support for the hypothesis could be attributed to several reasons. Whilst talent, confidence and motivation are considered inherent attributes, these skills are not always readily observable or demonstrated at a young age or prior to appropriate training. Hence, until such time as these traits are discovered and proper developmental support is provided, these 'future athletes' participate in sport for reasons similar to the general child population.

Gender specific differences in participation emerged with the desire to 'stay in shape' being a significant contributory factor to female athletes taking up their current main sport. Conversely, male athletes were more likely to pick up their current sport due to its 'popularity' and to 'find a new challenge'. These differences are consistent with previous research conducted by Sirard and colleagues (2006). The authors examined gender specific motivational factors affecting participation in a sporting programme amongst 1692 middle school students. The predominant reason for participation for the entire cohort was to have fun. When the results was analysed by gender, girls reported skills benefits, completion and fitness as leading motivational factors whereas boys cited competition, social benefits and fitness more frequently.

The study also demonstrated cross country differences in participation motives. Compared to athletes from T&T, significantly more UK athletes identified the desire 'to find a new challenge' as a participation motive. Yan and McCullagh (2004) studied participation motives between American (n = 147), Chinese (n = 155) and American–born Chinese (n = 122) and found that each group reported different participation motives. Americans were found to participate in sport for competition and to improve skills while Chinese respondents cited social affiliation and wellness as the major motivating factors. American–born Chinese listed travel, equipment use and having fun as their main reasons.

4.14. Conclusion

Despite the small sample sizes, particularly amongst the UK cohort, the studies in this chapter have provided interesting results which should be considered when developing talent development systems. Firstly, distinct differences in career development patterns were found between T&T and the UK which may be owing to several reasons including economic and population differences.

The information presented here has lent support to the argument that no single pathway to success exists. While the results suggest that athletes can achieve elite success via the early specialisation and linear sport development route, stronger support was provided for the early diversification model. There was clear evidence of the need for deliberate practice, however, early specialisation may not be a prerequisite.

While there was considerable evidence of talent transfer taking place given the high number of DM athletes, no definitive support was found for the domain specificity of the transfer of learning theory. There was strong tracking of open–closed–skill sports. However, the level of transfer between team and individual sports was less robust. For example, less than half of team sport athletes had a background in team sports. This suggests that the domain specificity of talent transfer extends beyond the type of sport one played previously.

The findings of the above can be illustrated using a 3–stage model of talent development and transfer (Figure 4.7.). The skill is introduced and cognitive processing occurs as the athlete attempts to understand the skill presented to her/him (Stage 1). Building on Ericsson et al.'s (1993) model, the athlete undergoes a period of deliberate, quality practice before mastering this skill (Stage 2). During this time other skills may be introduced. For example, learning the tennis stroke would involve other skills including running and turning as the performer learns to play the stroke during dynamic game play. Stage 3 occurs when the child moves away from their previous sport to another. This skills transfer may be domain–specific (moving from a team to another team sport) non-domain–specific sports (moving from an open–skill to a closed–skill sport).

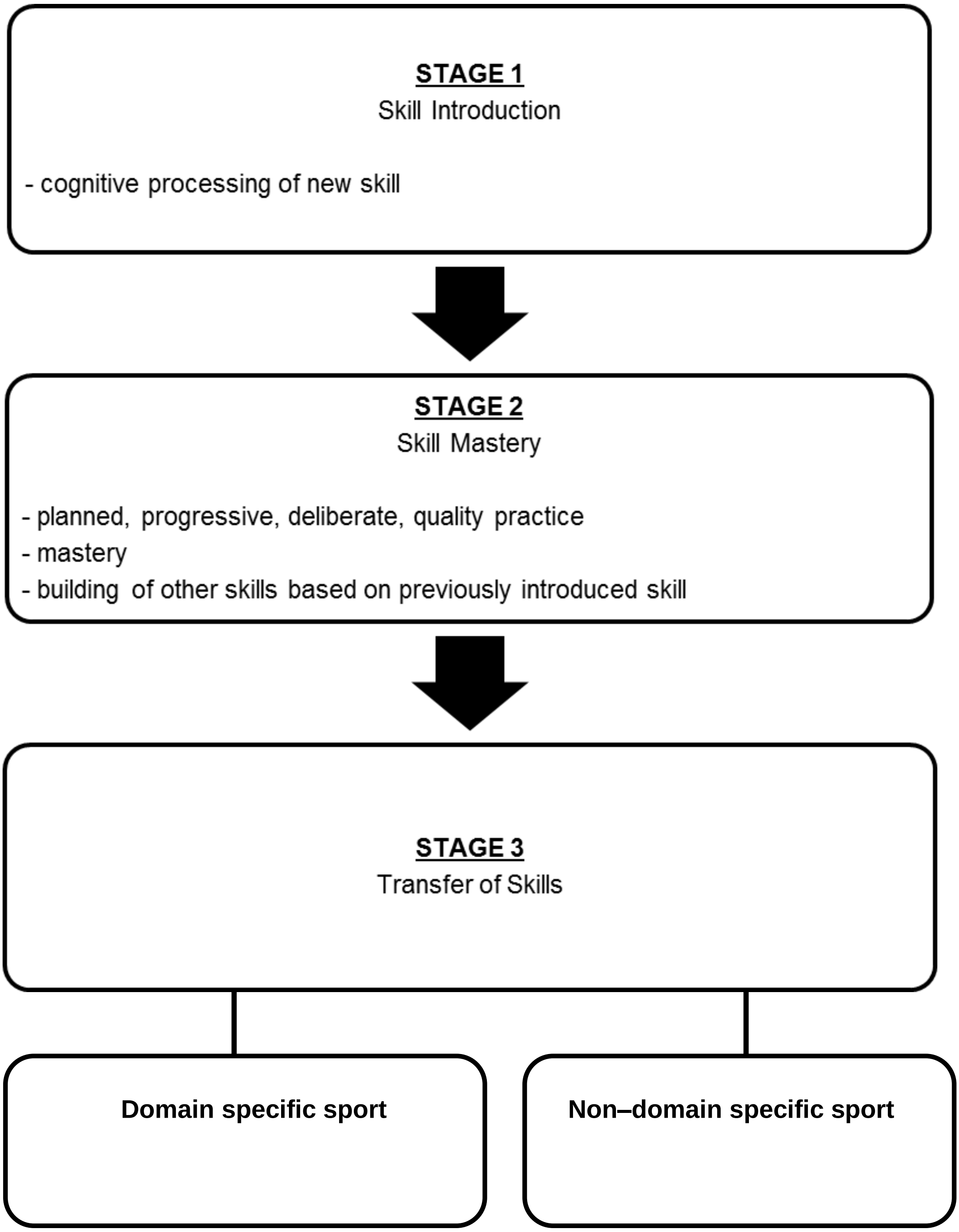


Figure 4.7. Transfer of learning and the diversified model for the development of sport expertise

The present study suggested that participation motives between non–elite individuals in the literature and the elite performers in this study did not differ. The results did, however, confirm the findings of previous studies which suggested that gender–related differences exist in participation motives. Furthermore, the study supported previous research which demonstrated intra–country variances in participation motives, though this effect seems reduced when compared to the non-elite population.

Further research is required to expand our existing knowledge of the participation motives of elite athletes. Future investigation would benefit from a larger sample size and including more countries to be conducted to confirm the results. Expanding the number of countries in the total sample with more diverse cultural profiles would also afford examining the effect of cultural differences in participation motives to initiate competitive sport participation, and later to sustain or abandon competitive sports. Such expansion could make valuable contribution to informing tailored talent development strategies.

In conclusion, the findings of the current study have several important implications. Given the thrust in investment in high performance sport occasioned by augmenting competition at the World and Olympic levels, reduced funding is being invested in activities that cater for the wider population. The delayed specialisation as demonstrated in this study lends support to flexible talent development models, which are, owing to the absence of early specialisation, less resource demanding and thus suited to countries like T&T that suffer from limited resources and smaller talent pools. Additionally, talent development systems that build on general sports participation integrate better with the sports–for–all concept which promotes sport participation at grassroots level to enhance health and social wellbeing. The results add another dimension to the sometimes limited talent recycling scheme which typically seeks to reassign unsuccessful athletes to a domain specific sport. Exposing young performers to a variety of sports exposes them to a variety of movement skills. Given their varied sporting history, it may be possible to successfully introduce these athletes to other sports thus maximising limited talent pools.

High levels of motivation is not only necessary for starting sport but, more importantly, for maintaining participation (Hedstrom & Gould, 2004). The desire to have fun is a participation motive consistent with non–elite individuals and elite athletes alike. The results therefore support the notion of investing in grassroots sports. Providing fun activities on a wider scale feeds in to the “active child” goals of many governments globally. Moreover, from an elite sport development perspective, increasing the sporting participation rate amongst children decreases the chance of an otherwise undiscovered future champion athlete going unnoticed due to lack of opportunities to be active and develop their skill. It can also improve the health of the nation due to higher physical activity levels.

The study also contradicts the idea of self–selection in sports, that is, an athlete being drawn to a particular sport because it is assumed that it befits their physical makeup. Many children, particularly early maturers are directed to sports because it is believed that they have a physical advantage. These children then undergo copious training in a sport that they may not enjoy. High levels of training at a young age have often been linked with burnout which often leads to reduced participation or even withdrawal from the sport (Malina, 2010). Hence, children should be encouraged to participate in sports they consider fun to encourage them to remain active.

CHAPTER 5

COMPARING STATE–RUN SPORT TALENT IDENTIFICATION AND DEVELOPMENT SYSTEMS IN CULTURAL CONTEXT

5. Introduction

One of the most significant trends occurring within the sporting world is the nascent institutionalisation and state intervention in high performance sport. Escalating international competition at the elite level (Olympic and Paralympic Games), primarily occasioned by an increasing number of nations participating and winning medals (De Bosscher et al., 2011) has resulted in sport being promoted to a matter of public priority in a number of countries seeking to maintain and improve their status on the elite athletic league tables, particularly on the Olympic medal count. Countries that have historically excelled in sport are often seen as aspirational, but sometimes unrealistic exemplars for other nations (Collins & Bailey, 2012).

The need to unearth, recruit and nurture the most gifted individuals has become an increasingly pertinent concern and today national talent identification and development systems (NTIDs) are commonplace. Unsurprisingly, this has attracted considerable research interest. A growing focal point has been the transferability of these structures between nations. Several studies have examined the above, particularly as it relates to sports policy, economic and political climates between the donor and adopting countries (De Bosscher et al., 2006; De Bosscher et al., 2009; De Bosscher et al., 2011; Houlihan & Green, 2009). The effect of national culture on the strategic organisation on NTIDs in sport, however, has hitherto escaped empirical scrutiny.

Authors investigating organisational structures in business settings have suggested that national cultures and organisational cultures are isomorphic (Gibson, 1994: Gulev, 2009; Krokosz–Krynke, 1988; Smircich, 1983; Taras, Steel & Kirkman, 2011). Considering that NTIDs operate in business fashion, it may be instinctive to surmise that their organisational structure is similarly culturally sensitive. As the number of NTIDs continues to broaden internationally, the reasons why these structure are alike or dissimilar has become a major subject of research interest. Understanding the extent to which the organisational structure of NTIDs reflects or repudiates national culture can prove crucial when adopting and transferring sport structures between countries, especially those with contrasting cultures.

This chapter seeks to examine the effect of indigenous cultures on the structural organisation of their NTIDs using Hofstede's 6 Dimensional (6D) Model of National Culture (1980, 2001). Hofstede's 6D taxonomy is respected as one of the more prominent models for cross–cultural research (Woodside, Hsu & Marshall, 2011) and its efficacy has been demonstrated in the literature (De Mooij & Hofstede, 2010; Chow, Shields and Wu, 1999). Secondary resources will be used to garner data for this study.

5.1. Aims

The overriding aim of this thesis is to develop a NTID model for T&T that is capable of being effectively put into practice based on the research contained within. This problem is not unique to T&T as evidenced by an expanding collection of NTID apparatuses existing globally. A common trend amongst countries like T&T who are seeking to construct new systems at the national level is to seek out successful templates existing in other nations. Learning and drawing lessons, and policy transfer from countries with successful NTIDs can aid in the development of policies, legislations and institutional reform (Dolowitz, Greenwold & Marsh, 1999).

There are a number of factors that should be afforded careful consideration when borrowing structures from other countries. Several authors have suggested that apart from, inter alia, differences in sports policies, financial investment and talent management, there is a tendency towards homogeneity of NTIDs (Green & Houlihan, 2005; Oakley & Green, 2001). Diversity does exist, however, especially as it relates to culture. Studies have demonstrated that culture plays a major defining role in business (Bock, Opsahl, George & Gann, 2012; Gibson, 1994; Lincoln, Olson & Hanada, 1978; Taras, Steel & Kirkman, 2011). This effect is not only limited to the organisational outcomes but the preferred structure of these entities (Gibson, 1994; Taras, Steel & Kirkman, 2011).

As previously stated, contemporary elite sport systems are operated in a business–like manner. These entities are structured in such a way so as to maximise the return on stakeholder investment (public and private sources). Whether culture has a similar effect on organisational structure of NTIDs and ultimately success as it does in business settings has yet to be determined. Moreover, should the effect prove true, then this would be a major consideration when formulating the NTID model for T&T.

The current study had several aims:

1) review the literature on elite sport investment
2) define key terms including policy transfer, organisational structure and culture
3) review Hofstede's 6D Model of National Culture
4) outline the structure and successes of the following NTIDs selected for this study: Australia, China, Japan, Poland and the UK
5) analyse the effect of culture on the organisational structure of the selected NTIDs using Hofstede's 6D nomenclature and in the process
6) examine the fit of Hofstede's model as a measure of the effects of national culture in sports

5.2. Review of the Literature

Considered the preeminent accolade for elite athletic achievement, an Olympic gold medal is incontrovertibly the most coveted prize within the global sporting arena. Though the International Olympic Committee declares the quadrennial Games a competition between athletes (International Olympic Committee, 2011), inter–country rivalry remains an interminable feature and medal counting has been consistently employed to juxtapose national accomplishments (De Bosscher et al., 2006). As the competition for Olympic hegemony intensifies, primarily occasioned by an augmenting number of nations participating and winning medals (De Bosscher et al., 2011), the need to unearth, recruit and nurture the most gifted individuals has become an even more pertinent concern. Consequently, an increasing number of countries have begun departing from the traditional club–based schemes in favour of systematic, government–led talent identification and development programmes.

5.2.1. Investment into elite sport success

The prevalent belief, particularly amongst researchers and policy makers, is that failure to invest in sport is akin to taking a retrograde step (De Bosscher, Shilbury, Theebom, van Hoecke & De Knop, 2011). Subsequently, many governments have been devoting considerable resources to implementing and maintaining sophisticated, systematic approaches aimed at recognising and nurturing potential athletes. The rapid proliferation of national talent identification and development systems (NTIDs) has been met with a concomitant increase in research interest. Given the mandate of these systems, success has typically been under scrutiny as the quintessential performance indicator. Numerous researchers have sought to articulate the success of NTIDs by systematically comparing results at the Olympics and other prominent international games pre– and post–introduction (De Bosscher, De Knop, van Bottenburg & Shibli, 2006; De Bosscher, De Knop, van Bottenburg, Shibli & Bingham, 2009; De Bosscher et al., 2011). Several situational factors considered requisite for the global success of these systems have been identified in the literature including population size (Bernard & Busse, 2004), economic wealth (Tcha & Pershin, 2003) and apt political systems (Hoffman, Ging & Ramasamy, 2002). A few authors have also investigated the elite sports policies of countries with NTIDs (De Bosscher et al., 2011; Green, 2005; Green & Houlihan, 2004), outlining the political arrangement necessary for the efficient functioning of these systems. One area that has remained unchallenged in the extant elite sports literature is the factors responsible for the adopted organisational structure of NTIDs across countries.

5.2.2. Adopting systems, methods and policies

Sports are social constructs with specific social dynamics and implications. Scholars examining sport in this context routinely align to mainstream sociological theories with the intent of establishing sport sociology as an independent field distinct from physical education (Malcolm, 2012) and other forms of social interactions. In consonance with this trend, public and social policy transfer principles are often applied to sport (Bloyce & Smith, 2010), utilising it as a theoretical framework for expounding developmental trends and structural characteristics of sports governance.

The reasons behind the alignment of sport governance research to social policy transfers and not business principles are a matter for a discussion independent of this project. Nevertheless, the fact is that modern elite sport in several nations is developed and managed in much the same way as a business. The significant investment (predominantly from government sources) on one end and expectations for success on the other remains a defining characteristic. Organisations and governing bodies are established with the ultimate goal of supporting elite level sport, and to ensure that the return on investment is maximised. Consequently, elite sport systems are goal oriented, formalised, highly specialised and centralised entities serving multiple stakeholders. As the long–term existence of these systems and its ancillary organisations depends on the success of its athletes at major worldwide sporting events, particularly the Olympics, considerable effort has been expended on the construction, co–ordination and application of these entities to guarantee a sufficient number of athletes at the podium level year on year.

In the quest to enter, hold position or prosper in the highly competitive environment of elite sport, national governing bodies look for established and successful systems with the view to adopt the best model available. However, transferring such systems from one country to another poses its own challenges not only because of potentially significant differences in legal and funding systems but also because of the different cultures of the 'donor' and the 'host' countries.

Each country possesses a unique national culture (Hofstede, 2001) hence one would conclude that the "strategic choice" of the structure (Child, 1972, p. 2) of NTIDs would reflect the prevailing national culture and thus vary by country. Therefore, in order to appreciate the effect of national culture on the chosen NTIDs structure, a systematic cross–country comparison of the structure of NTIDs in their particular cultural context is warranted. While national culture has received continued interest in the management and social disciplines (Kirkman, Lowe & Gibson, 2006) it has been an oversight in sport studies (De Bosscher, De Knop & Heyndels, 2003).

5.3. Definitions

This section outlines the key concepts in this chapter including policy transfer, organisational structure and culture. Hofstede's taxonomy is also introduced and discussed.

5.3.1. Policy transfer

For the purpose of this discourse, policy transfer refers to the notion by which intelligence on sport specific systems, processes and policies in one place or time is adopted in another place or time (Dolowitz & Marsh, 1996). This therefore restricts the scope of policy transfer to adoption within the same domain, in this case, elite sport. By this definition, we intentionally narrow the scope of policy transfer in order to keep the focus on NTIDs transfer from one country to another, rather than transferring knowledge from one sector (e.g. business) to another (e.g. sport).

Policy transfer often arises as a result of the adopting agent's active search for a solution to an existing problem (Rose, 2005). While policy transfer takes place at several levels including domestic and inter–institutional, there exists an inherent inclination for nations to adopt from other countries so as to draw lessons or to avoid falling behind (Newmark, 2002). Policy transfer can occur via several routes including lesson learning, emulation or convergence (Newmark, 2002). In order to facilitate successful policy transfer between the donor and borrowing countries, several preconditions must be present including similar language, level of resources, philosophy and geographic closeness (Newmark, 2002) and cultural propinquity. Nevertheless, while the preceding factors are considered elemental for successful policy transfer, it is imperative that the adopting country amend the borrowed policies to match the specific needs of their country (Newmark, 2002). If this is ignored a resultant policy failure is considered almost imminent (Newmark, 2002).

Policy transfer can occur either voluntarily or coercively (Green, 2007). Coercive policy transfer in any sphere is a rare occurrence, with the only prominent examples in sport being that which transpired in the former Eastern Bloc (Green, 2007). Voluntary policy transfer is typically reflected in contemporary NTIDs including the United Kingdom, Brazil and Australia. The primary catalysts for the construction of these NTIDs were poor performance at international events, a paucity of potential Olympic medallists (Krasilshchikov, 2011) and concern over being surpassed (Green, 2007) by other competing nations.

5.3.2. Organisational structure

Organisational structure has been operationally defined as "the internal differentiation and patterning of relationships" (Thompson, 1967, p.51). Furthermore, it can be described as the process by which member roles and resource control are defined to ensure efficient performance (Krokosz–Krynke, 1988). Intuitively, the structure assumed by an organisation is important as it not only impinges upon its functionality but ultimately its performance. Understanding how contextual variables affect the architecture of an organisation is essential to ensure optimal efficiency and that predetermined goals are realised.

Gibson (1994) suggests that the structural arrangement of an organisation sits along a continuum. On one end lies those who believe that structure is the end product of carefully calculated design (Gibson, 1994). That is, structure is independent and completely distinct of culture but rather the design of company managers and its other architects. Situated at the opposite end are those who perceive structure as an 'enacted phenomenon', the result of 'social negotiation processes' (Gibson, 1994). According to Gibson (1994) these processes are subjective and may arise from the unconscious cultural programming of individuals. This view aligns with structural contingency theory which proposes that the members or an organisation prefer or embrace structural styles that mirrors the environment in which they are located (Gibson, 1994).

Organisational theorists have suggested that a number of variables may explicate organisational structure including its size, the external milieu in which it is situated, (Child, 1972) and available technology (Krokosz–Krynke, 1988). A major mitigating variable, however, is national culture. Al–Majali (1996) contends that national culture impacts organisational strategies and practices to such an extent that organisational structures are typically reflective of the cultural context in which they have been established. He further asserts that the effect of national culture negates that of previously mentioned moderating variables. This has been termed the 'institutional specificity of culture' (Best, 1990, p. 145).

5.3.3. Culture

Culture is a complex, multidimensional construct and the literature is inundated with studies from authors seeking to deconstruct and validate its impact in a variety of settings. For the purpose of this study, culture is defined as the motives, values, beliefs, practices and identities common to the members of a collective that are socially transferred from one generation to the next (House, Javidan, Hanges & Dorfman, 2002). Cultures are organic systems that are actively created (Boyacigiller, Kleinberg, Phillips & Sackman, 2003), thus change over time as a response to significant changes in its members and environment. Although evidence for this adaptation exists (Gelfand et al., 2011), cultures are enduring and stable over decades (Hofstede, 2001), hence the process is only observable on a historical scale over centuries.

Each country possesses a unique, dominant and discernible culture (McSweeney, 2002) which ‘shapes everything’ (Hickson & Pugh, 1995). Despite its acknowledged importance, national culture remains an often neglected variable in the sporting discipline, primarily due to the arduousness of expressing this variable quantitatively (De Bosscher et al., 2003). Nevertheless, national culture significantly influences national and other institutions and a useful strategy for evaluating national culture is required to understand cross–country variances.

5.3.4. Hofstede’s 6 Dimensional Model of National Culture and cross–national research

Cross national comparative research of culture has long been utilised in a number of disciplines including management, anthropology and sociology to fulfil a variety of purposes. Despite the plethora of studies in the extant literature, Schwartz (1992) and Hofstede (1980) have emerged as the leading theorists in the field. Schwartz’s value content study (1992) sought to examine, inter alia, the significance of values to a society, the extent to which value priorities are impacted by an individual’s exposure to an array of milieus and whether cross–national/cultural differences exist. The study was developed using 40 samples from 20 countries in several regions across the globe. Schwartz’s investigation identified eleven value dimensions including self–direction, stimulation, achievement, power, conformity, tradition and universalism, which he considered to be integral facets of national culture and used to shape value priorities. Schwartz concluded that his study had identified that universal value priorities did exist. Furthermore, he advanced that these could be used to appreciate the unique, culture–specific cross–national variations.

Hofstede’s research investigated the work–related attitudes of IBM employees (van Oudenhoven, 2001). Originally conducted in 40 countries, he later expanded his study to include 53 countries generating 116 000 questionnaires (Van Oudenhoven, 2001). Hofstede's model (2001) demarcates national cultures according to five independent dimensions (later updated to 6): power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance and long– versus short–term orientation. The model ranks countries along these components using a scale of 0 to 100 (De Mooij & Hofstede, 2010). The original dimensions of Hofstede's 5-D model (2001) along with the new sixth dimension (Hofstede et al., 2011) are categorised as:

- **Power Distance (PDI):** Power distance reflects the degree to which members of a nation acknowledge that inequalities exist in their societal rank or class. PDI is defined as the "extent to which less powerful members....accept and expect that power is distributed unequally".

- **Individualism/collectivism (IDV):** This dimension measures the level of mutual reliance amongst members of the collective. High individualistic countries are those whose members often seek out the personal interest of themselves and family. Conversely, members of collectivist countries feel a sense of belonging to a larger group which 'takes care of them in exchange for loyalty'.

- **Masculinity/femininity (MAS):** Masculine societies are achievement oriented compared to feminine societies where the focus is on looking after others and the quality of life.

- **Uncertainty avoidance (UAI):** This index explores the extent to which members of a culture tolerate ambiguous situations.

- **Long– versus short–term orientation (LTO):** This dimension was included in Hofstede's updated model (2001). Cultures that are high in LTO are future focused while those that receive a low score on the LTO scale tend to maintain a short term view.

- **Indulgent versus Restraint (IVR)** is the sixth, new, dimension, where nations with high indulgence scores are characterised by enjoying life and having fun as opposed to suppressing these basic and natural desires by strict norms.

The choice of using Hofstede's cultural model as a theoretical framework is justified on several accounts. Hofstede's typology of culture is considered the preeminent framework for cross–cultural comparative research and has been applied in a variety of settings including global branding and advertising (De Mooij & Hofstede, 2010), international tourism behaviour (Woodside, Hsu & Marshall, 2011), the design of firms and their employee preferences for management controls (Chow, Shields & Wu, 1999). Furthermore, evidence supports the strong link between culture and typical organisational structures (and other organisationally relevant outcomes) that characterise a country (Gibson, 1994; Taras, Steel & Kirkman, 2011; Tayeb, 1994). Hofstede's model has been extensively used in business studies as being the most comprehensive, containing the largest number of countries of any cross–cultural study (Van Oudenhoven, 2001; Kirkman et al., 2006). Today's elite sport is highly institutionalised and characterised by its degree of formalisation, centralisation, specialisation and co–ordination. Therefore elite sport systems in developed countries exhibit similar organisational features deeming elite sport systems directly comparable to business organisations. Lastly, Hofstede's dimensions are considered relatively simple and hence attractive to researchers (De Mooij & Hofstede, 2010).

5.3.5. Hofstede's 6D Model of National Culture: A Critique

"Undoubtedly, the most significant cross–cultural study of work–related values is the one recently carried out by Hofstede (1980)."

Bhagat & McQuaid, 1982.

Though dated, the above quote aptly describes the significance of Hofstede's works within the cultural realm. Since its pioneering publication in 1982, Hofstede's model of national culture has established itself as the most extensively quoted framework employed to explicate the synergistic relationship existing between national culture and management (Jones, 2007; Williamson, 2002). In substantiating this claim, Tung and Verbeke (2010) stated that up until June 2010, Hofstede's model had been cited in the literature in excess of 54 000 times.

While Hofstede's model was by no means unique [his work was predated by Bartel's *"A Model for Ethics in Marketing"* (1967, cited by Jones, 2007)], its widespread appeal was predicated upon the fact that it was considered a significant milestone at the time (Bhagat & McQuaid, 1982), offering an innovative, significant method for examining cross–cultural relations (Jones, 2007; Tung & Verbeke, 2010). Hofstede's model has had a major impact on the operation of numerous business systems including work group dynamics and performance, training and design, leadership styles, management control systems, innovation and a variety of other cross–cultural matters (Jones, 2007).

Despite the rife popularity of Hofstede's model of national culture, critics have been divided in their acceptance of it. While the vast majority of authors are willing to support the model and its inherent tenets (Jones, 2007), there are those who are not so ready to offer such unbridled acceptance (Baskerville, 2003; Jones, 2007; McSweeney, 2002; Nathan, 2015; Williamson, 2002). This section seeks to offer as balanced as possible review of the debate surrounding Hofstede's work.

The use of Nations as Units of Analysis and the Homogenisation of National Culture

McSweeney (2002) and Baskerville (2003) contended that Hofstede's decision to employ nations as his variables for comparing cross–cultural differences was untenable as culture is not merely a product of the geographical borders that encapsulates it. In essence, Hofstede had committed a major blunder by assuming that the indigenous inhabitants of the countries included in his survey were a "homogenous whole" (Jones, 2007, p. 5). In reality, culture is often separated along several lines (DiMaggio, 1997) and the populations of countries are composed of an admixture of people drawn from an array of ethnic and other origins (Jones, 2007). Furthermore, at any moment in time there is typically a variety of cultures present in any country (Wildavsky, 1989 cited by Baskerville, 2003). For example, 98 varying cultures were detailed in 48 African countries, 81 in 32 countries in Western Europe and 147 Native American cultures along with 9 Native American folk cultures were identified in North America (Baskerville, 2003).

Homogenisation and ossification of national culture at the expense of acknowledging individuality introduces an element of arbitrariness to the results (Jones, 2007; Scheuch, 1996 cited by Baskerville, 2003) as responses and analyses of the questionnaire are ultimately constricted by the cultural idiosyncrasies of the individual being interviewed (Jones, 2007). These would include, but are not limited to the effects of race, ethnicity (Nathan, 2015) and the community and the diverse influences they exert on the individual (Jones, 2007). Thusly, by ignoring the heterogeneity known to exist and instead coalescing cultures with nation states was negligent on Hofstede's part and suggested that he had not fully understood culture's nomenclature (Baskerville, 2003). This, according Baskerville (2003) was the fundamental reason why the preponderance of sociologists and anthropologists have rejected Hofstede's work.

In response, Hofstede (1998) would only offer that the nation represented the only method for classifying and assessing inter–country cultural variances. However, McSweeney's (2002), Baskerville's (2003), Williamson's (2002) and others suggestion of Hofstede's perceived ignorance of culture is emblematic of why culture remains an oft maligned subject in sport and other disciplines that lie external to anthropology and sociology. Apt measurement of culture remains a deeply contentious issue and an even more onerous undertaking particularly due to its intangibility. Much of the dissonance, though, can be attributed to the multitudinous array of definitions in existence, which tend to differ by discipline. Baskerville's, McSweeney's and Williamson's understanding of culture is straitened by anthropological and sociological underpinnings which effectively prevented them and others in their field from fully comprehending and accepting Hofstede's cultural schema.

In defence of Hofstede, noted Oxford anthropologist Malcolm Chapman (1997) pointed out stated that anthropology and business studies exist as independent fields and as such possess contrasting paradigms and therefore should not be assessed using the same yardstick. For example, anthropology and sociology are located in the non–essentialist framework which advances the dynamism, heterogeneity and changeability of culture (Nathan, 2015). The emphasis here is on interpretation and acknowledging the individuality of the observer (Nathan, 2015). Conversely, in business, organisational and management spheres, models of culture are representative of the essentialist paradigm (Nathan, 2015). This archetype generally assumes that conformity, homogeneity and constancy of the cultural identity of individuals is delimited by the geographical confines of their respective national boundaries (Nathan, 2015). Significance is placed on comparison and objectivity (Chapman, 1997). Furthermore, the reification of culture involves pigeonholing individuals virtually neglecting their power to choose (Nathan, 2015). Hence all members of a cultural group, in this case those that represent a country, are expected to act according to established stereotypes thereby constricting their behaviour (Nathan, 2015). Inter–country differences are essentially the fundamental concern of business research (Hofstede, 2003) and this would explain why Hofstede's model, which was produced for business settings, would so readily utilise nations as his variable of analysis.

Though Nathan (2015) cautioned against offering blind recognition of Hofstede's and other essentialist models, he would further state that a substantial commensurate model of culture from the non–essentialist paradigm is yet to be presented in the literature. Therefore, while anthropologists and sociologists are keen to reject Hofstede's work due to its inability to sufficiently satisfy their established definitions, Chapman (1997) asserts that it was and remains pivotal in its handling of culture in business and management studies. As Hofstede (2003) rightly concluded, in the absence of suitable evidence stating the contrary, one cannot assuredly conclude that equating country names with national culture and its subsequent conclusions were completely invalid.

Flawed Method

Critics have questioned the use of a survey as a suitable method for assessing divergences in culture (Jones, 2007; McSweeney, 2002; Schwartz, 1999). This becomes even more important when the variable being measured (in this case culture) is particularly sensitive and subjective (Jones, 2007; Schwartz, 1999). Furthermore, it was observed that Hofstede utilised the same questions repeatedly on more than one scale (Jones, 2007). Additionally, they have found considerable cross–loading taking place (Jones, 2007). Jones (2007) draws attention to the fact that Hofstede's analysis was composed of 32 questions with a mere 40 subjects (i.e., 40 data points corresponding to 40 countries). Employing such a small sample considerably exploits the element of chance and augments the probability of sample error (Jones, 2007).

In contesting Hofstede's (1982) method, McSweeney (2002) suggested that any amount of stratifications of the questionnaires Hofstede utilised could have resulted in probable divergences in culture. He surmised that Hofstede's dimensions were therefore were not a consequence of national culture. The fatal flaw in McSweeney's (2002) argument, however, was his failure to identify that could produce the differences in culture. In examining the effect of possible confounders, Williamson (2002) reported that divergences in survey responses between countries were considerably more significant than those which existed between sex and age. Additionally, Hofstede's (1982) factor examinations of organisational culture resulted in contrasting groupings of dimensions when compared to national culture.

Datedness and Stability of Culture

Several researchers have argued that Hofstede's work is out–dated having been published since 1980 (Baskerville, 2003; Jones, 2007). As Baskerville (2003) were to point out Hofstede's failure to update the model is evidence of a precarious assumption that culture was static, subsequently intimating that his work would endure for a considerable period. In reality this may not be so. For example, Scheuch (1996 cited by Baskerville, 2003) analysed the results of an attitude to work question in Germany over a 30 year time span and found a divergence of approximately 30 percentage points in the responses. The diffusion of culture coupled with dynamic national and ethnic migration, globalisation, internationalisation, mass migration and convergence can result in issues in describing and reifying cultural identities over time (Baskerville, 2003; Jones, 2007). Ultimately, the aforementioned factors would ultimately considerably diminish the contemporary value of Hofstede's model (Jones, 2007).

Hofstede did agree that culture would undergo change over time (Søndergaard, 1994, cited by Jones, 2007) but this would not occur overnight. This notion was corroborated by Baemer & Varner, 2003 (cited by Ming–Xiang, 2012) who stated that culture and its associated values, beliefs and attitudes often persist at the base level even in the presence of external antagonistic forces. Hofstede (1998) would add that his research was established on hundreds of years of indoctrination. Recent replications have upheld the fact that culture is slow to change (Jones, 2007). In a bibliographical analysis conducted by Søndergaard (1994, cited by Jones, 2007), for example, the authors evaluated reproductions of work that were comparable to Hofstede's study. The preponderance of these reproductions confirmed Hofstede's predictions – 4 of these agreed completely while a further 15 demonstrated imperfect acceptance (Søndergaard, 1994, cited by Jones, 2007). Individualism was the only dimension for which no conclusive validation was demonstrated (Søndergaard, 1994, cited by Jones, 2007).

Only One Company Assessed

Basing the entire research exclusively on one company lacks the ability to provide a credible picture of the cultural structures existing in the countries surveyed (Jones, 2007).

In reply, Hofstede (1998) argued that rather than seeking to supply an absolute measure, his intention was to evaluate variances in culture. Hence, he surmised that his cross–sectional approach was fitting. Moreover, Hofstede (1998) asserted that his use of a lone multinational entity eliminated the impact of inter–company corporate policies and management systems which typically effect employee behaviour. Subsequently, the only remaining explanant of cultural differences is national culture (Hofstede, 1998).

Insufficient Number of Dimensions

Several authors have stated that 5 dimensions were not sufficient to explain cultural differences (Jones, 2007; McSweeney, 2002). McSweeney (2002), for example, argued that national culture is profoundly intricate variable and it would be impossible to comprehensively measure or represent it utilising a mere 4 or 5 quantified dimensions. Hofstede (1998) was in agreement saying that his was a work in progress and that further dimensions should be added over time. As a point of evidence, Hofstede's (1982) initial model contained just 4 dimensions which was later upgraded to 6 by 2010 (Hofstede, 2010).

Conclusion

McSweeney (2002) and numerous other critics have demonstrated Hofstede's model is not without its faults – some more telling than others. On the other hand many more researchers have applauded, and rightly so, Hofstede's attempt at providing a workable tool for measuring culture. As Williamson (2002) contended when deciding to employ cultural models in research on national culture investigators are faced with a choice – between selecting a model that is exhaustive or specific and one that approximately assesses the components under consideration. The fact that researchers continue to use Hofstede's 6D model and with such consistently high frequency stands as testimony to the acceptance of and the notion that his model has advanced knowledge of culture and the related issues that these researchers sought to address (Hofstede, 2003). The cultural narrative varies by field and to criticise Hofstede's work based on an inability to adequately understand it first or offering a viable alternative does not offer any benefits to the field and those who would follow it. Until a universally accepted definition of culture is developed, there probably would never exist a model in any sphere that can precisely, or even to a lesser extent adequately capture and quantify culture.

5.4. Fitting systems to cultures

Management theories, systems and practices are culture dependent (Hofstede et al., 2010). Following Hofstede's pioneering work (1980), research in cultural differences has burgeoned in the search for a recipe for excellence and effective performance in business settings (De Mooij & Hofstede et al., 2011; Taras et al., 2011). The fit between systems and culture has been extensively explored in relation to operating complex systems, such as international marine and aviation transportation systems and military operations (Hodgson, Siemieniuch, Hubbard & Sinclair, 2010; Strauch, 2010). In addition, consequences of a misfit between standard operating procedures, training and culture have been discussed in military and civil aviation contexts (Hodgson et al., 2010). Although the cultural difference effect is more pronounced in high stress situations, these findings highlight the need for fitting systems to people and cultures. The cultural effect appears on a continuum and exhibits greater effects in countries with tighter (as oppose to looser) cultures (Taras, Kirkman & Steel, 2010; Gelfand et al., 2011), where tight culture is defined as having strong norms coupled with low tolerance for deviance (Gelfand, Nishii & Raver, 2006).

A continued increase in multinational entities, international competition (Gibson, 1994), globalisation and policy transfer between countries has heightened the need for awareness of the effect of culture on organisational structure. Nelson and Winter (1982), for example, asserted that it may be necessary to rehabilitate organisational structure in line with existing cultural rules. This was later reiterated by Swidler (1986) who identified as a set of tools from which individuals extract institutional terms. While studies examining a mismatch of culture and organisational structure as it pertains to policy transfer were not available, there is evidence of the effect of culture – structure clash in the literature.

A case in point is the failure of Wal–Mart in Germany at the turn of the century (Taras, Steel & Kirkman, 2011). After successfully opening stores in Canada and the UK, Wal–Mart ventured into the German market in 1997. By 2005 the chain was forced to sell its stores to a local rival at a loss of approximately US$1 billion. Taras, Steel and Kirkman (2011) contends the collapse of Wal–Mart was the result of the company's attempt to impose American styled management practices in Germany. Lincoln, Hanada and McBride (1986, cited by Gibson, 1994) investigated the impact of operations technology on the structural arrangement of companies in Japan and the United States. The authors reported that the effects were considerably weaker in Japan, a result they attributed to the compactness of the institutional environment in that country. Hence, the cultural effect was found to outweigh the technological impact. The authors concluded that the existing Japanese cultural framework plays a major role on the country's organisational structure. These studies demonstrate that understanding the effects of culture on organisational design is a requisite concern when borrowing policies from international sources. A failure to acknowledge may have deleterious effects.

5.5. Methods

This section outlines the research methodology used in this chapter. Culture is a popular topic in the sociology and management disciplines given the large volume of information found online.

Secondary data were the sole sources utilised to explore the research aims of this chapter. Library catalogues based at Kingston University, London and London South Bank University were the first to be searched. Other major sources of information were Google Scholar, PubMed and EBSCO host online research databases. Search terms related to the aims of this chapter included but were not limited to *"national talent identification systems", "culture", "Hofstede", "organisational structure", "culture and sport", "the effect of culture on* *organisational structure", "culture and the management of sports system", "structure of Japan's sport system", "structure of Australia's sports system"* were used retrieve information. After analysing the information, only that which was considered relevant to the current study were cited in this chapter. To maintain the credibility of the cited information, data from published peer reviewed journals and books were used.

Based on the data gathered during extensive research, the chapter was structured as follows:

1) analyses the structure of NTIDs
2) description of the structure and reported successes of the NTIDs of Australia, China, Japan, Poland and the UK to demonstrate the effect of the respective NTIDs on Olympic performance pre– and post–introduction
3) comparisons of the organisational structure of the NTIDs using Hofstede's 6D Model of Culture.
4) outlining T&T's rank on Hofstede 6D scale
5) conclusion.

5.6. National Talent Identification and Development Systems (NTIDs)

Despite its apparent ubiquity, NTIDs are not recent phenomena. While the exact origin of these systems remains unknown, the most popular and widely documented structure was that which existed in the Eastern Bloc in the 1960s. Considered the progenitor of existing NTIDs, it was rooted in political ideology and its mandate was

"*…not only to contribute to the well–being of GDR citizens and the reproduction of labour but also to the development of key characteristics of the socialist personality such as discipline, honesty, a collective spirit and a willingness to defend the homeland. Furthermore, the success in international competition and a high level of popular participation in sport were intended to demonstrate the superiority of the socialist system over capitalism (Dennis, p. 576, cited by Green & Oakley, 2001).*"

The fundamental goal of this then rudimentary, labour intensive programme was to discover, develop and prepare large groups of young athletes exhibiting the greatest potential to be successful at the elite level (Green & Houlihan, 2005; Mylinski, 2002). This system was dependent on natural selection and the only prerequisite for participation was to be fit and healthy (Krasilshchikov, 2011). Children were assessed as young as 6 years using a variety of basic physical and performance tests and those selected were then siphoned off to linear sports training programmes which lasted for several years (Abbott & Collins, 2002; Jones, 2008; Krasilshchikov, 2011; Vaeyens et al., 2009).

Notwithstanding the numerous criticisms levelled against the former Eastern Bloc countries, the success of their NTID is undeniable. In the years intervening 1972–1988 the Eastern Bloc countries, in particular the Union of Soviet Socialist Republics dominated the Olympic proceedings. Such was the athletic might of these countries that their decision to boycott the Games in 1984 allowed the Americans to claim 174 medals. Prior to this, America was only able to secure a high of 94 medals, and with the exception of 1972 they finished no higher than third. A return of the socialist countries to the Games in 1988 would once again relegate America to third in the overall standings and a haul of 94 medals.

More recently Australia (Hogan & Norton, 2000; Sotiradou & Shilbury, 2008; 2009) and some western European countries including the UK (Houlihan & Green, 2009), Germany, France and Italy (Digel, 2002) have joined the nations with systematic, scientific talent identification and development models. Implementing such approaches to managing elite sport with the view of consistently producing podium level success is in line with the view that infrastructure, services and set practices of talent identification and development are the key contributors to success (UK Sport, 2003).

Figure 5.1. The pyramid model of talent identification and development

These methodically planned talent identification and development requires a talent pool, a definite intervention point and provisions as well as mechanisms for investment into talent development. The overarching sport model in almost every country resembles a pyramid (Figure 5.1.) with a wide base for sport clubs serving both recreational sport and grassroots activities for initial talent identification and a narrow top for the internationally excellent, elite sport performance.

The pyramid shape indicates an inverse relationship between the level of sport and the number of participating athletes and organisations responsible for organising sport activities. The difference is captured in the involvement of the public authorities in managing the process of athletes moving upward in drastically reduced quantities to the summit to being a podium contender at the Olympic Games. This Darwinist approach suits some countries better than others, particularly those with an abundant supply of athletes. At the national level, early selection and specialisation is costly and suits those with a large talent pool to select from an early age. Prediction about potential, followed by investment, is made at least 10 years into the future resulting in significant loss between start to finish. China is a prime example of this, having strong control over the process from early age resulting in a 115:1 ratio between the number of talented athletes at the base and at the top (Hong, Wu & Xiong, 2005). Countries with smaller talent pools but available resources possess less control over club level sport but intervene at a later stage to ensure that talented athletes are found and helped to develop to their full potential and thus enter the pyramid at the investment stage. Specialisation is mostly done independently from the NTID system. This approach is typical for the entrepreneurial models of the UK and Australia

5.7. Structure of NTIDs of Australia, China, the UK, Poland and Japan

5.7.1. Australia

The first institutionalised NTID programme to emerge in the Eastern hemisphere was in Australia (Du Randt, 2008). The programme was a direct attempt by the government of the day to stem Australia's declining fortunes in international competition (Green, 2005). The Federal Government established the Australian Sports Commission (ASC) in 1989 by parliamentary act (Australian Sports Commission, 2010). Directly accountable to the Minister of Sport (Figure 5.2.), this statutory body was entrusted with the administration of sports in Australia, maintaining responsibility for the disbursement of resources and policy generation (Australian Sports Commission, 2011c). The extent of the roles and responsibilities are laid out in the Australian Sports Commission Act of 1989 (Australian Sports Commission, 2010).

The unit entrusted with the responsibility of identifying, selecting and training the country's elite athletes for major national and international sporting events is the Australian Institute of Sport (AIS; Australian Sports Commission, 2011b). Today, the AIS provides scholarships to approximately 700 athletes across 35 different programmes encompassing 26 sports (Australian Law Reform Commission, 2001). National Sporting Organisations (NSOs) maintain a considerable degree of autonomy and are essentially responsible for the development of their elite programmes (Australian Government Independent Sports Panel, 2009). The ASC provides financial support to NSOs to assist with all steps of their respective developmental programmes (Australian Sports Commission, 2011a). Sports Clubs is where skills are initially developed and honed while State Institutes of Sports (SIS) supplies gifted athletes to the NSOs and eventually the AIS (Cycling Australia, 2012).

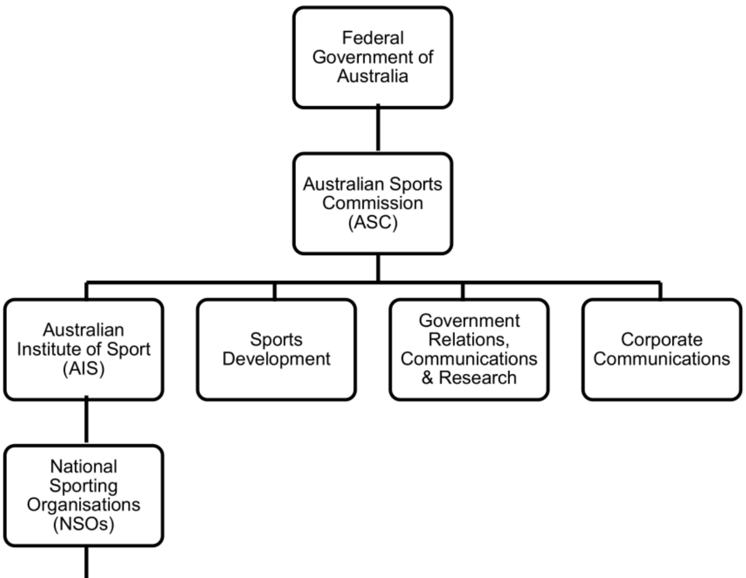


Figure 5.2. Structure of the Australian NTIDs

5.7.2. China

The intricate details of the Chinese NTID programme are not publically available so the information offered in this review is limited. Of the three countries included in this review, China has the youngest TID system (Figure 5.3.). Unlike Australia and the UK, China already possessed a carefully constructed sports system despite the country's lengthy absence from the Olympics. At the helm is the General Administration of Sport (GAS), which fundamentally functions in similar fashion to UK Sport and the Australian Sports Commission. The GAS is made up of several departments including Public Sports, Policy Research, Science and Education, and Management Centres for Sports (China Culture, 2003). The Chinese NTID programme has a tall linear structure with strict state control over every aspect of the development pathway.

It is understood that identification of talent in China often occurs between the ages of 6–9 years (Hong et al., 2005) and those possessing talent are directed to local sports schools. After several years of training those athletes that perform exceptionally then progress up the ranks (Hong et al., 2005). In terms of numbers, of the 372,290 young athletes that qualify for training at the sport schools, only

46,758 make it to the professional levels and considerably fewer go on to become Olympic athletes (Hong et al., 2005). Clearly, the system requires over 100 to 1 investment, which may not be a feasible option for countries with small talent pool and/or cultures with high level of individualism.

5.7.3. The UK

The government's response to the UK's abysmal showing at the 1996 Atlanta Games (National Audit Office, 2008) would signal its desire to play a much greater role in elite sports. In 1997, UK Sport was established (National Audit Office, 2008). Answering directly to the Department for Culture, Media and Sports (Figure 5.4.) this government organisation plays a primarily pecuniary role, investing millions received from the National Lottery and Exchequer (National Audit Office, 2008) in developing Great Britain's brightest medal hopefuls. UK Sports' purview encompasses elite athletes only, and does not extend to the community or school level (UK Sport, 2011a).

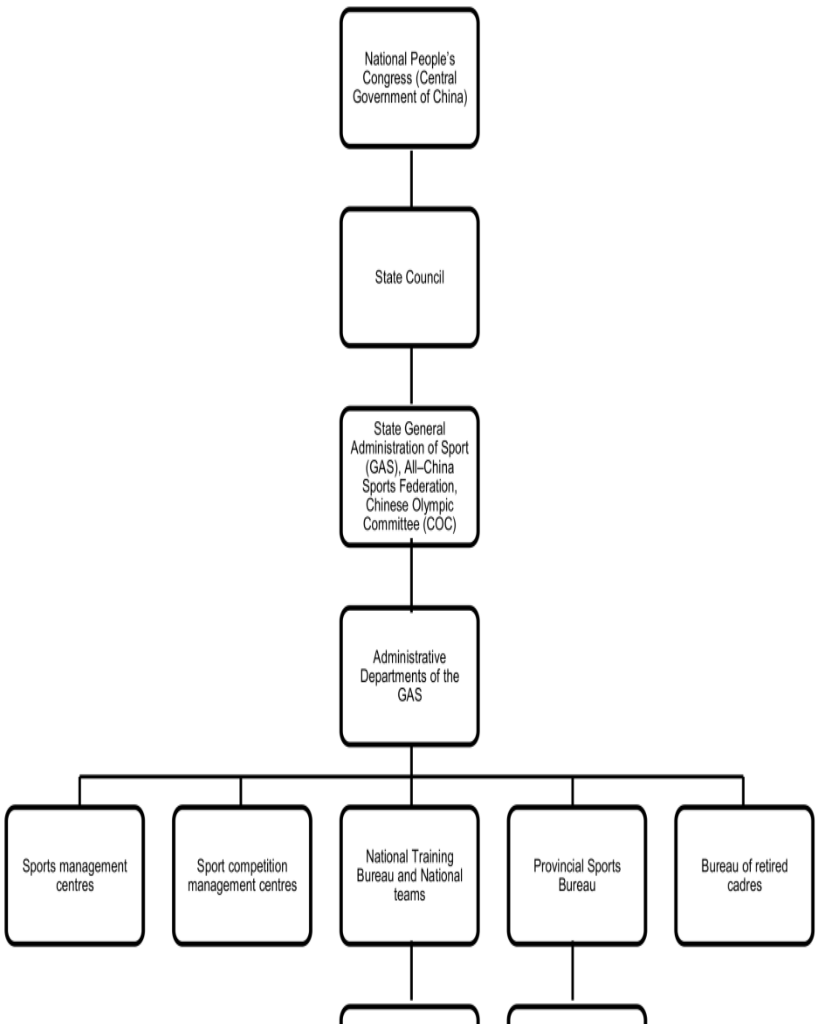


Figure 5.3. Structure of the Chinese NTIDs

UK Sports maintains a close partnership with the national governing bodies for sports (NGBs), assisting them in devising talent identification and development programmes (UK Sport, 2011a). Additional funding is provided by the Home Country for Sports Councils (HCSC) geared at maintaining facilities utilised by the elite athletes (National Audit Office, 2008). The HCSCs also provides a connection between elite and grass root sports by providing financial assistance to NGBs' grass roots programmes (National Audit Office, 2008). Athletes receive scientific and medical support from each Home Country's respective Institute of Sport (National Audit Office, 2008). In 2006, UK Sport founded its own in–house UK Talent Search Team (UK Sport, 2011b). The Talent Search Team has overseen several programmes including Sporting Giants, Pitch2Podium, Girls4Gold, Talent 2012: Fighting Chance, and Talent 2012: Paralympic Potential (UK Sport, 2011c).

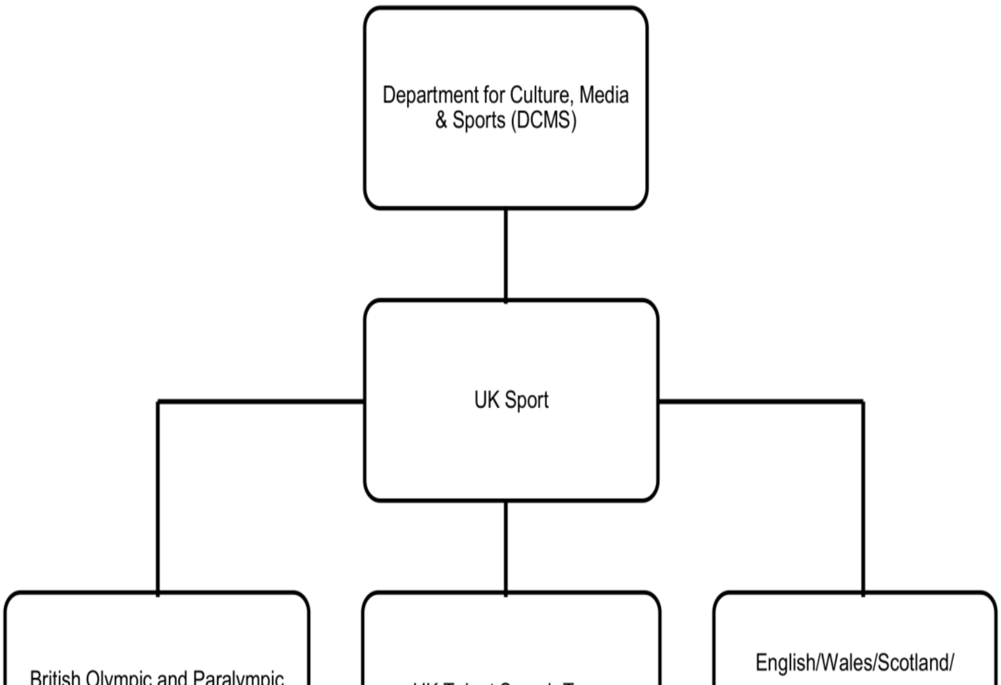


Figure 5.4. Structure of the UK NTIDs

The NGBs has primary control over elite athlete development and this process is assisted by UK Sport. UK Sport employs a strong arm approach to funding, investing only in those sports demonstrating the greatest medal potential at the Olympic level (National Audit Office, 2008). While overall investment in NGBs has increased at each successive Olympics, funding is performance related and those sports that fail to achieve medal targets at an Olympic Game receive a reduced budget to prepare for the next Games (National Audit Office, 2008).

5.7.4. Poland

State intervention in Polish sport was evident in the post–World War II era (Żyśko, 2008). Emerging out of the Eastern Bloc system, an overhaul of the sport system began in 1989 (Żyśko, 2008) as the political character of the country shifts from a socialist to democratic style. Polish sport operates under a mixed design where the state, civil (voluntary bodies) and private (commercial enterprises) sectors are involved in its management (Figure 5.5). Despite this perceived system of sharing, the function and scope of these bodies is laid out in several laws, including the Championship Act (Żyśko, 2008). Chakar (2004) states that the Polish system is ‘interventionist and bureaucratic’. At the helm is the Ministy of Sport which was established to oversee the national administration of sport and acts as the principal decision making body (Żyśko, 2008). Consisting of 9 departments, its responsibilities include supervising the various sport associations, managing the NSC, recruiting and training talented athletes (Żyśko, 2008). Operating at the regional level are ‘voivodeships’ which are responsible for sport and physical culture (Żyśko, 2008). Within each district are the ‘Gminas’ which are administrative offices which are tasked with the administration of sport in their respective locale.

The voluntary sector is composed of the POC and PPC. They act as the national body for overseeing the PSV and National Multi–sport Federations (Żyśko, 2008). According to law, only 1 association is permitted per sport and there existence can only be authorised by the Minister of Sport (Żyśko, 2008). Their responsibilities include preparing athletes for international competition, the training and education of coaches, and the granting of licences to coaches, clubs, athletes and referees (Żyśko, 2008).

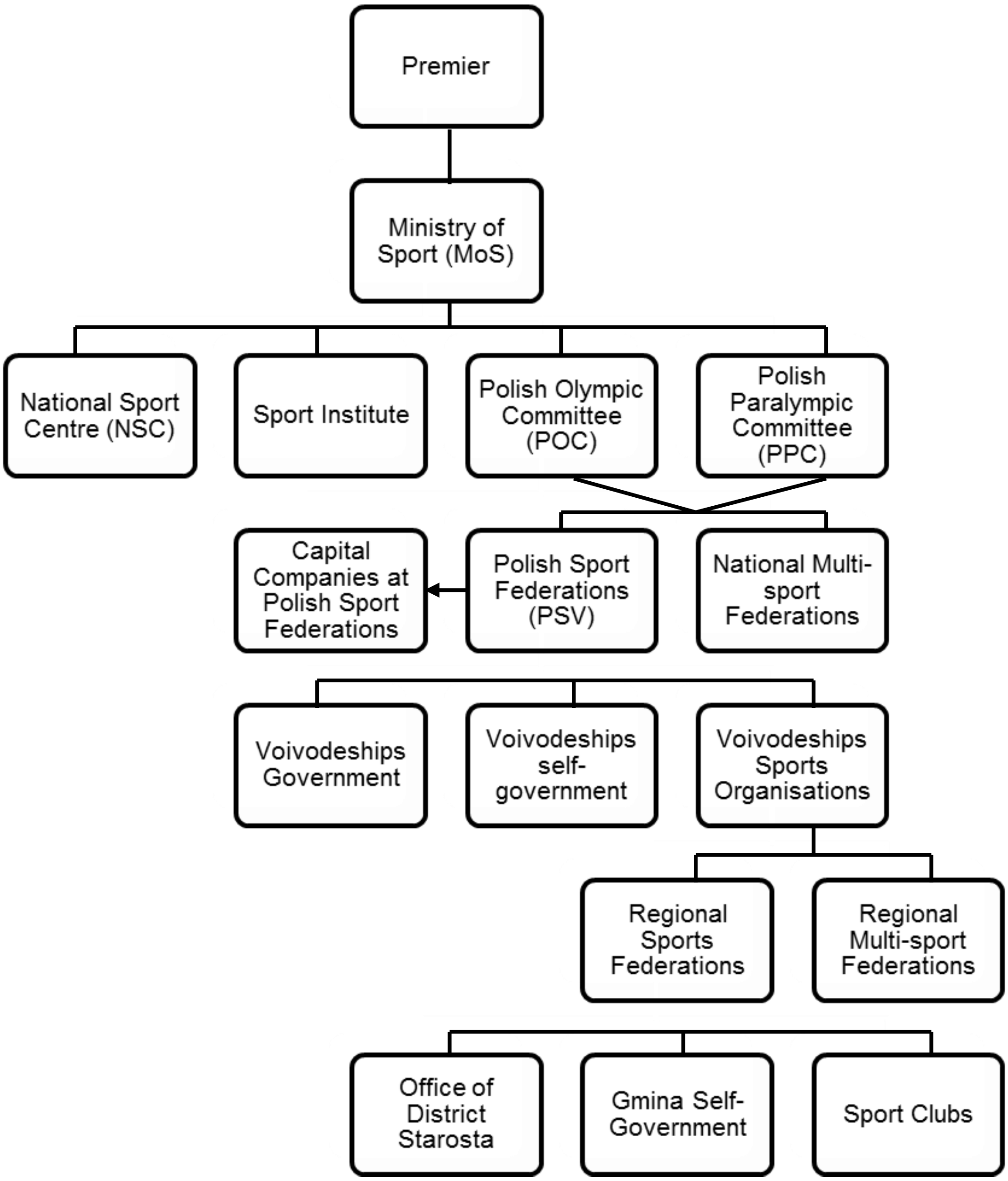


Figure 5.5. Structure of the Polish NTIDs

5.7.5. Japan

Very much like China, Japan already possessed a structured sporting system (Figure 5.6.). Governmental involvement in sport dates back as far as 1928 with the introduction of the Physical Education Division (Yamamoto, 2008). Sports policies were politically motivated and the aim was to emphasise social physical education amongst the population (Nakamura, 1996). Nevertheless, it was not until the passage of the Promotion of Sports Law in 1961 prior to hosting the 1964 Olympics that ushered in an era of greater government involvement and a shift in political focus to achieving Olympic greatness (Nakamura, 1996). Principal responsibility for the administration of the system rests with Ministry of Education, Culture, Sports, Science and Technology (Yamamoto, 2008). Conception and implementation of elite sport policy is the responsibility of the Competitive Sports Division. The Japan Institute of Sports Science is the leading supplier of sports medicine, science and technical advice with the objective of supporting athletes demonstrating the ability to be successful (Yamamoto, 2008). Despite being regarded as independent, the operation of this body is bound by government mandates (Yamamoto, 2008).

The National Training Centre operates as the premier domestic, central facility for training elite athletes (Yamamoto, 2008). The Prefectural PE/Sports Associations effect major control sports promotion, establishing performance targets for the yearly inter–prefectural National Athletic Meeting and recruiting the top performers (Yamamoto, 2008).

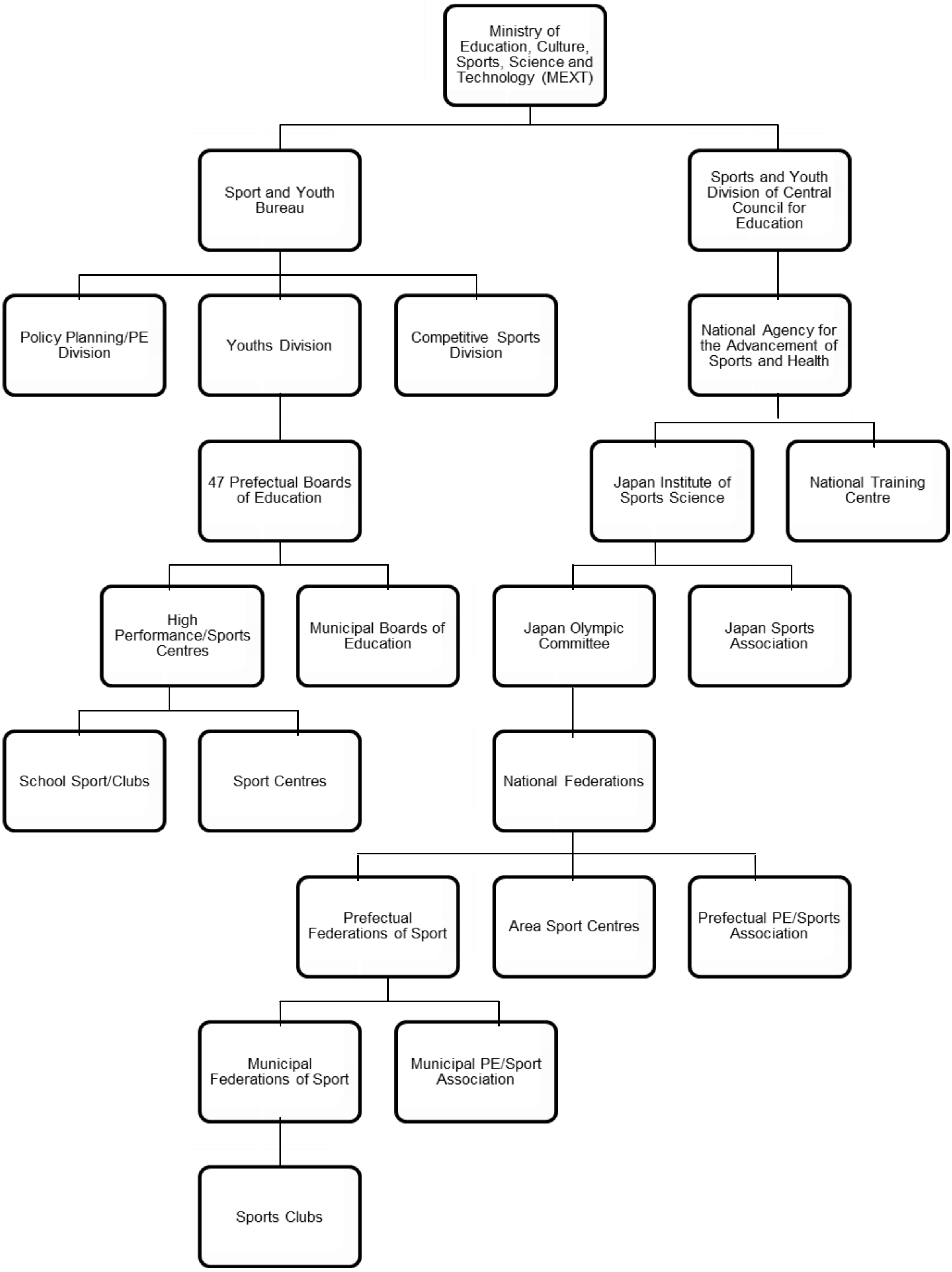


Figure 5.6. Structure of the Japanese NTIDs

Very much like China, Japan already possessed a structured sporting system (Figure 5.6.). Governmental involvement in sport dates back as far as 1928 with the introduction of the Physical Education Division (Yamamoto, 2008). Sports policies were politically motivated and the aim was to emphasise social physical education amongst the population (Nakamura, 1996). Nevertheless, it was not until the passage of the Promotion of Sports Law in 1961 prior to hosting the 1964 Olympics that ushered in an era of greater government involvement and a shift in political focus to achieving Olympic greatness (Nakamura, 1996). Principal responsibility for the administration of the system rests with Ministry of Education, Culture, Sports, Science and Technology (Yamamoto, 2008). Conception and implementation of elite sport policy is the responsibility of the Competitive Sports Division. The Japan Institute of Sports Science is the leading supplier of sports medicine, science and technical advice with the objective of supporting athletes demonstrating the ability to be successful (Yamamoto, 2008). Despite being regarded as independent, the operation of this body is bound by government mandates (Yamamoto, 2008).

The National Training Centre operates as the premier domestic, central facility for training elite athletes (Yamamoto, 2008). The Prefectural PE/Sports Associations effect major control sports promotion, establishing performance targets for the yearly inter–prefectural National Athletic Meeting and recruiting the top performers (Yamamoto, 2008).

5.8. Olympic performance of Australia, China and the UK Between 1984 and 2012

Nations are often compared on their sport prowess by creating league tables of records or medals won. One of the most popular league tables is the Olympic medal table, which is tabulated for each event and combined into an aggregated, all time medal table. Figures 5.7.–5.11. illustrate the medal haul and points tally for Australia, China and the UK 1980–2012, and Japan and Poland 1956–2012. An earlier Olympic year of 1956 was selected for Japan and Poland. This was based on the fact Japan's state investment in sport started earlier than the other Australia, China and the UK. For Poland, this date was chosen on two counts. Firstly, like Japan, the Polish government was already investing in sport, though under differing circumstances (i.e., the Eastern Bloc system). Secondly, as previously outlined, the Polish system is undergoing a period of transition from socialism to democracy. This would allow for comparisons of performance under both political systems.

The withdrawal of Japan and Poland from the 1980 and 1984 Olympics respectively would account for the missing data for these countries during these years. Olympic years preceding the introduction on the NTIDs were included so as to highlight its impact on the country's performance.

5.8.1. The effect of NTIDs on country performance at the Olympic Games (1984–2012)

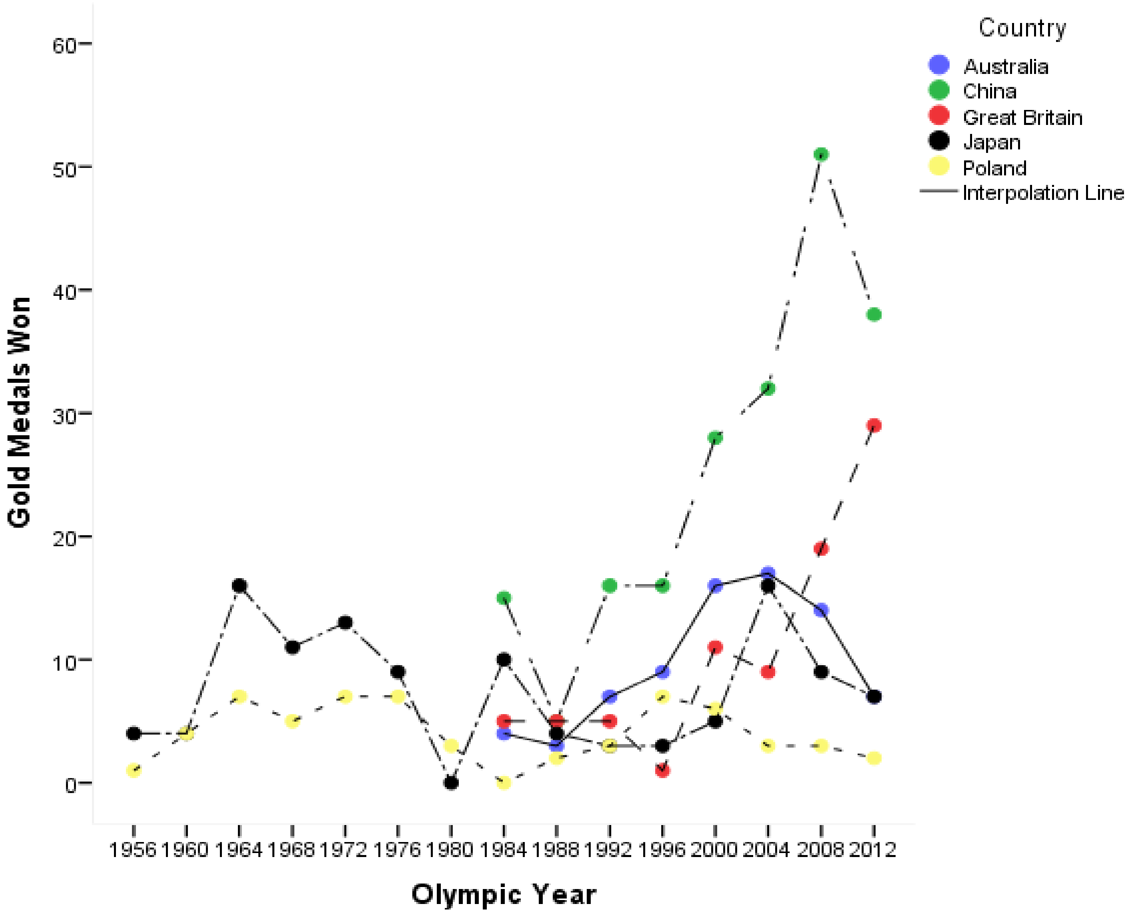


Figure 5.7. Gold medal hauls for Australia, China and the UK between 1980–2012 and Japan and Poland 1956–2012

Sources: Wikipedia (2013) and BBC Sport (2012)

Unsurprisingly, overall medal count (Figure 5.10.), gold (Figure 5.7.), silver (Figure 5.8.) and bronze (Figure 5.9.) medal tallies for the 5 countries under consideration exhibited an almost continuous upward trend. To ascertain whether there was a true increase in medal quality, a points system was utilised based on that employed by (Ball, 1972). Three, two and one point was awarded for gold, silver and bronze medals respectively. Calculations showed an increase in points for all three countries following the introduction of the TID programmes (Figure 5.11.).

This not only suggests an increase in medal haulage, but in the quality of medals gained, i.e., the countries were not only receiving more gold but more silver medals as well.

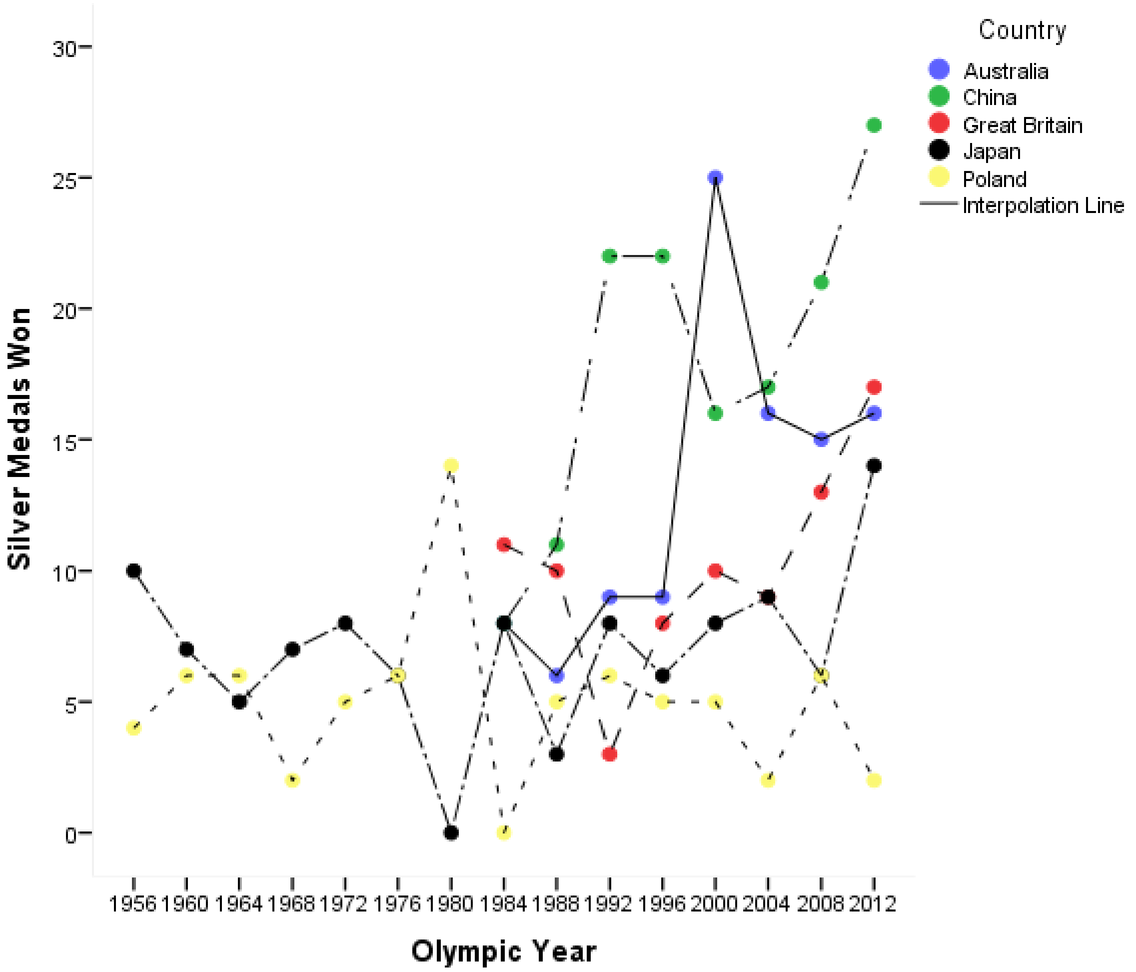


Figure 5.8. Silver medal hauls for Australia, China and the UK between 1980–2012 and Japan and Poland 1956–2012

Sources: Wikipedia (2013) and BBC Sport (2012)

Australia, the first of the three countries to introduce a national TID programme experienced an increase in medal quality (points awarded), gold and overall medal attained for the first three Olympics post–introduction. The number of gold medals received more than doubled between 1992–2000. While gold medals received remained relatively stable between 2000–2004, the total number and medal quality exhibited a downward trend. One possible explanation for this decline is based on the fact that an increasing number of countries are participating in the Olympic

Games every cycle. More competition from other countries, particularly in events Australia were previously successful in can result in the country winning less or lower quality medals. Secondly, Australia may have been the victim of the “hosting effects” described by Nevill, Balmer and Winter (2009). According to this phenomenon, countries that host the Olympic Games typically perform better in the Games they host and those that directly precede it (Nevill et al., 2009). Wilson and Ramchandani (n.d.) contend that Games related funding often comes with certain stipulations, most notably a requirement to produce measurable results. Hence, improved performance, especially in the home Games is considered a consequence of contesting in a familiar environment (Wilson & Ramchandani, n.d.).

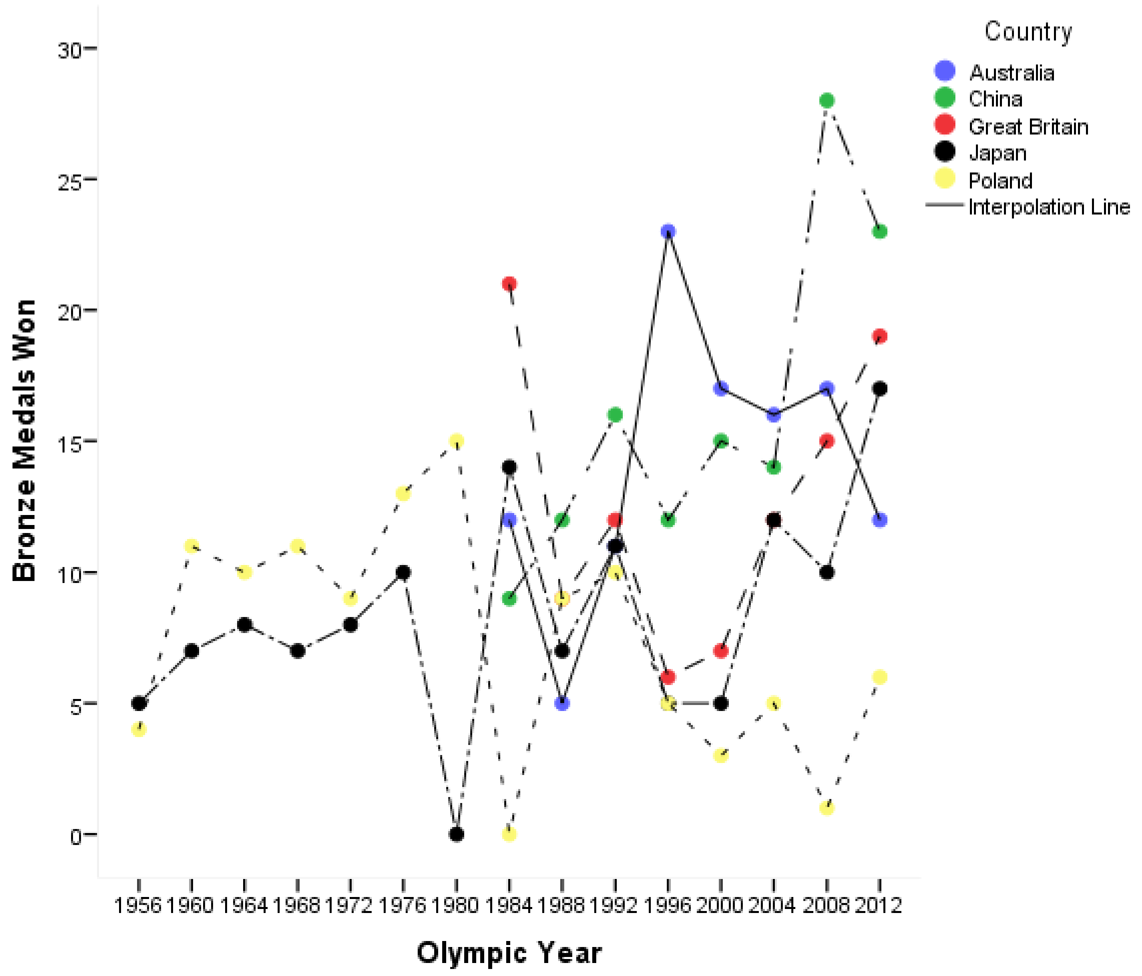


Figure 5.9. Bronze medal hauls for Australia, China and the UK between 1980–2012 and Japan and Poland 1956–2012

Sources: Wikipedia (2013) and BBC Sport (2012)

With the exception of 1988, China's performance at the Olympic Games following the country's re–entry has been steadily on the ascent. While the countries experienced a small increase in gold medal haul (with the exception of the UK) between the first and second Games following the introduction of the TID system, China exhibited the greatest increase. China realised a 37% increase in gold medals between the first and second Games, the greatest increase of any of the three countries. Australia had a 22% increase while the UK declined by 22%. The UK, however, experienced a 58% increase between the 2nd and 3rd Games. Similarly, China had a 37% increase in medal quality, while Australia rose by 26%. The UK had a 3% decline. Following the recently concluded 2012 Olympic Games, China also seemed to be suffering from the hosting effect. This, however, may be a temporary dip in performance and the post–hosting decline can only be truly confirmed after observing the country's performance in future Olympic Games.

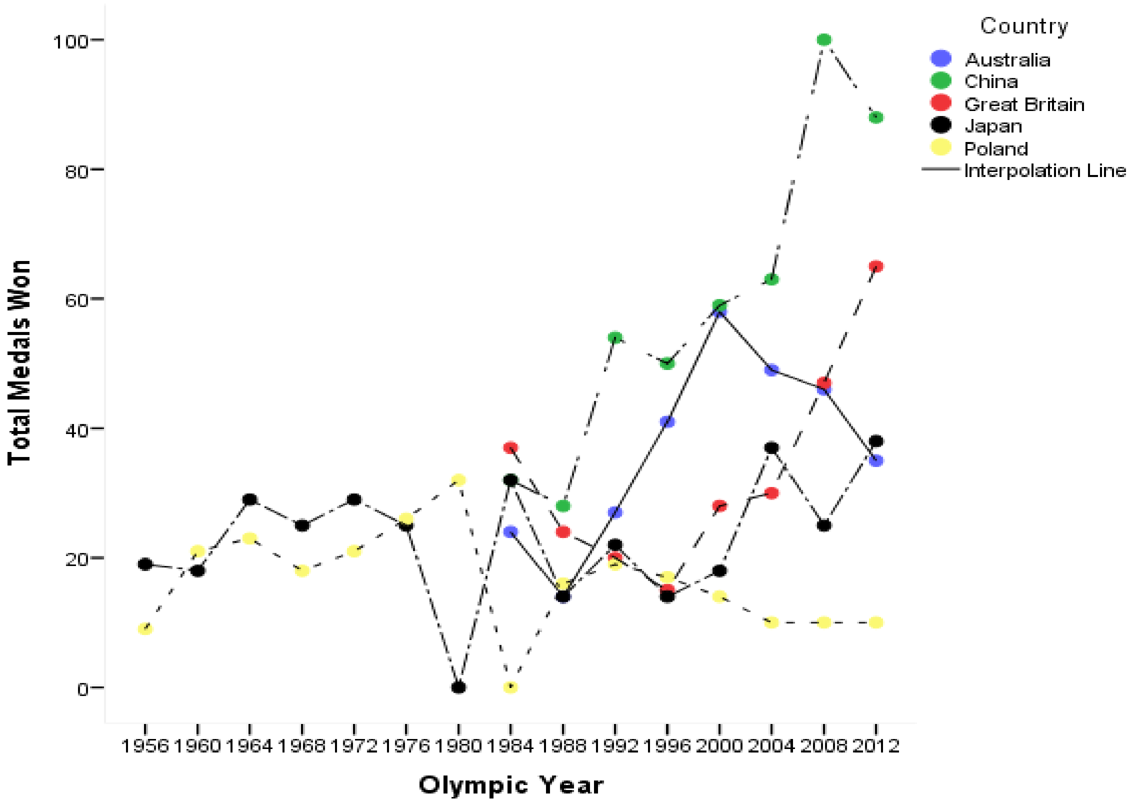


Figure 5.10. Total medal hauls for Australia, China and the UK between 1980–2012 and Japan and Poland 1956–2012

Sources: Wikipedia (2013) and BBC Sport (2012)

Japan's performance at its Games in 1964 declined compared to the previous. Apart from 1968 where overall medal haul improved, Japan's performance at the Games has been relatively unstable. The country experienced achieved its best medal tally in 2004, a result which coincided with the introduction of the Japan Institute of Sports Science in 2004. This was MEXT's attempt to introduce a more scientific approach to athlete identification and development.

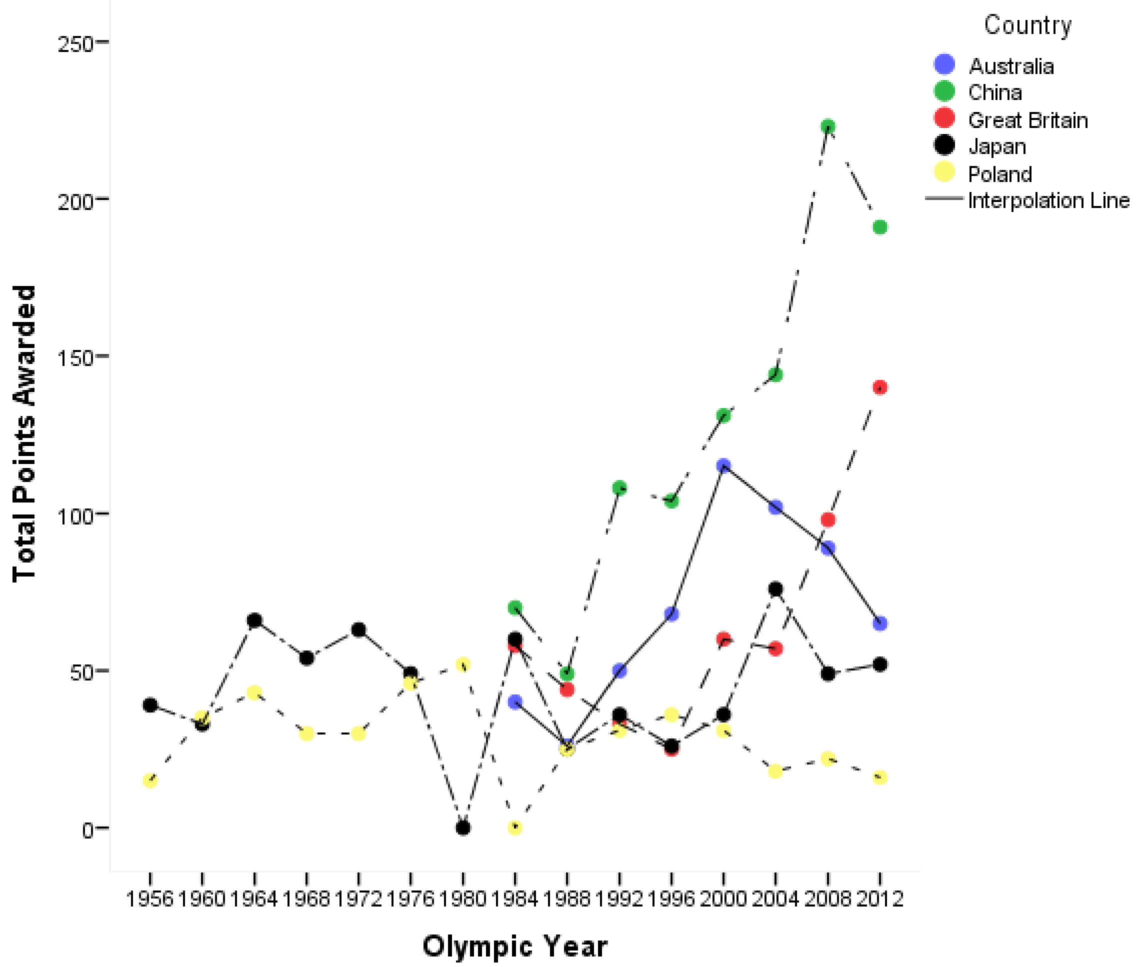


Figure 5.11. Total points awarded to Australia, China and the UK between 1980–2012 and Japan and Poland 1956–2012 calculated using medal tallies
Sources: Wikipedia (2013) and BBC Sport (2012)

A somewhat different situation was exhibited for the Polish system. There was an increase in gold, silver, bronze and total medal hauls and total points tally in the Olympic year following the introduction of the democratic style of governance (1992) when compared to the previous Olympic Games. The subsequent Games displayed a downward trend in performance. It is important to note that the political system in Poland is still undergoing change and this would impact all sectors in society including sport. Overall, the country has performed better in the Games during the socialist era.

5.9. Contrasting the National Cultures of Australia, China, the UK, Japan and Poland along the Six Dimensions of Hofstede's Model of National Culture

Considering the ever increasing competition for Olympic medals, construction of NTIDs has become a national concern for many countries. While numerous studies have examined the success of these systems, no researcher has attempted to analyse the implications of culture on organisational structure. Inter–country variances in national cultures exist and this implies that 'one structure' does not fit all. Hence, the aim of this chapter was to examine whether differences in national culture impacts organisational structure between Australia, China, Japan, Poland and the UK using Hofstede's 6D Model of National Culture (2001). Cultural profiles of the aforementioned nations along Hofstede's 6 cultural dimensions are depicted in Figure 5.12.

5.9.1. Power distance (PDI)

A leading concern in any organisation is the distribution of power. This dimension assesses the unevenness of power distribution in society and the extent to which members are willing to accept this (Hofstede, 2001). Societies that are ranked high in PDI typically possess a more centralised, authoritarian, pyramid like structure (Terzi, 2011). Low PDI cultures are usually democratic and there is less bureaucracy (Terzi, 2011).

China has the most rigidly structured and centralised NTID system of the countries under scrutiny and this is reflected in its high PDI rating (Figure 5.12.). China's

NTID has a tall organisational structure, possessing many levels along its hierarchy. The state maintains strict control over the entire NTID process. This is typical of other socialist countries such as Russia (rated 93). Bureaucracy in high PDI countries is strong (Terzi, 2011) and obedience to authority is culturally ingrained.

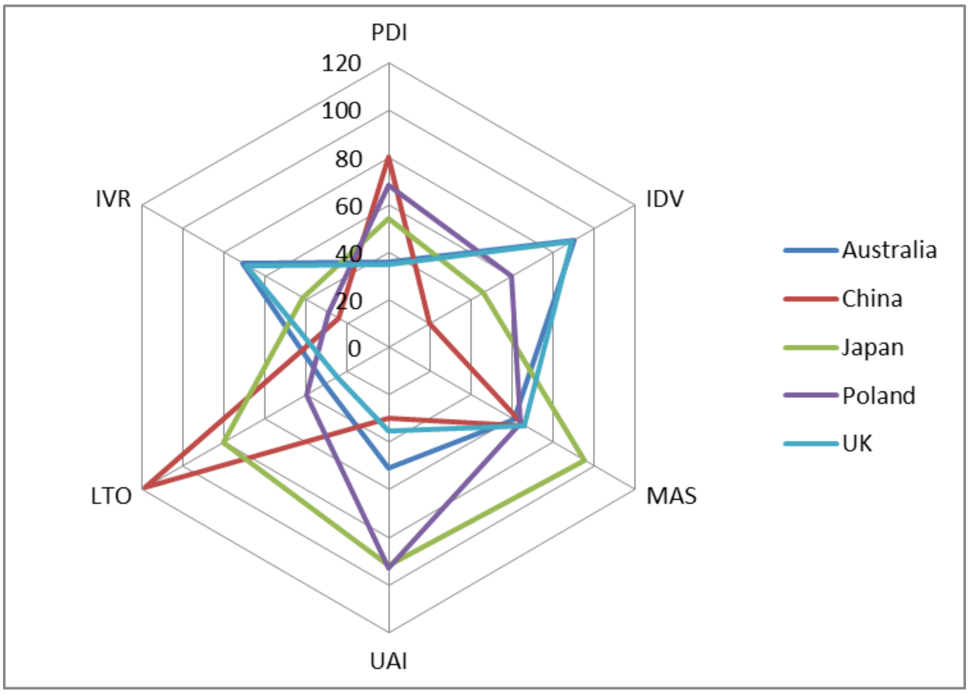


Figure 5.12. Cultural profiles of Australia, China, Japan, Poland and the UK using Hofstede's 6D Model of Culture

Poland was also found to rank high in PDI. While Poland, like many of the countries of the former Eastern Bloc is transferring to a more democratic, commercialised state, there remains a strong element of socialism (Henry, 2009; Petry, Steinbach & Tokarski, 2004). Despite the mixed model Polish set up, the state plays an interventionist role with legislation governing each level of the organisational chain (Żyśko, 2008). Japan is a marginally high PDI country but considerably lower than China and Poland. Unlike most of its Asian counterparts Japan is considerably less bureaucratic (Hofstede, 2001). This is based on a pervasive sense of meritocracy (Hofstede, 2001). Citizens, however, are cognizant of their hierarchical standing in society (Hofstede, 2001).Despite the rigidity in the system, there is still some measure of flexibility and there is less government control compared to China and Poland.

Similar to most other democratic, westernised countries, Australia and the UK have a Low PDI rating. Their NTID structure is flatter, allowing for more flexibility (Pfeffer & Leblebici, 1973). If we examine Australia's (Figure 5.2.) and the UK's (Figure 5.4.) NTID programmes, there is considerable divestment of power where the NSOs, SIS (Australia) and NGBs are given considerable autonomy over the development of the elite athlete development process. The AIS and UK Sport adopts a more supervisory role, providing financial support, and setting development and performance targets. Furthermore, their NTIDs structures are representative of the entrepreneurial structure whereby external market forces play a considerable role (Henry, 2009). Under this system, the impetus is placed almost exclusively on outputs (Henry, 2009) and management of the system is determined based on the social or economic demand for the sport in question (VOCASPORT, 2004). The NGBs are set performance targets and their continued funding or lack thereof is based on this. The government of these countries interfere less in the management of their NTIDs, with their responsibility often limited to designing frameworks to allow for market forces to articulate itself (VOCASPORT, 2004).

5.9.2. Individualism/collectivism (IDV)

Both Australia and the UK received similarly high IDV scores which characterises their cultures as being more individualistic. High individualism is associated with higher levels of independence and responsibilities (Krokosz–Krynke, 1988). In addition, there is considerable emphasis on rewarding individuals (Fernandez, Carlson, Stepina & Nicholson, 1997). Similar to the argument outlined earlier, while the state maintains the primary authority, other departments including NSOs and NGBs have considerable authority over the elite process. Funding of elite programmes in the UK is performance based and there is considerable competition amongst NGBs to attract funding.

Considering the bureaucratic structure, Poland received a relatively high IDV rating. Strict state legislation which guides the entire process limits self-expression, stifling independence. However, Hofstede (2001) contends that though Poland remains highly individualistic, there remains an inherent need for hierarchy. The opposite is true for low IDV or collectivist countries like China and Japan. The rigid structure stifles individualism and promotes collectivism for the greater good of the system. There is a strong sense of mutual obligation (Tavakoli *et al*. 2003) and cooperation in collectivist cultures (Sorokowski, 2009). The focus is on 'we' (Hofstede, 1985) and all members have to operate as a group in order to be effective. China, despite possessing a tall structure, the various departments work together. Devolution of power is virtually non–existent and all departments operate under the purview of the state to ensure the efficient functioning of the entire system.

5.9.3. Masculinity/femininity (MAS)

Societies that rank high on the MAS scale are typically regarded as being highly competitive, progressive and success oriented (Hofstede, 2001). There is an emphasis on being on top and this mantra permeates every level of society (Hofstede, 2001). Clear performance goals are an essential feature of these societies (Hofstede, 2001) hence their NTIDs are structured as such. All of the countries being studied received similarly high score MAS ratings. The effect of masculinity on organisational structure remains an under researched area in the extant literature hence its effect remains more or less ambiguous (Paszokowska, 1998). This is largely due to its accentuation on discerning historical gender roles, that is, males tend to be the assertive breadwinners versus the tender, nurturing females (Paszokowska, 1998). Paszokowska (1998) asserts that organisations in highly masculine countries would presumably be characterised by centralised structures. Autocracy dominates as managers are expected to take expeditious, definitive action (Paszokowska, 1998) to ensure that performance goals are met. The more rigid, centralised structure of Japan, Poland and China's NTIDs compared to the other two countries can be attributed to their high PDI ratings.

While the Australian and UK systems are more malleable, their entrepreneurial styles promote competitiveness. Funding is performance based and failure to meet pre–set targets is met with a reduced inflow of funds to the offending sport.

One may question China's high MAS scores given the country's socialist leanings. There is an emphasis on collective responsibility in socialist states, with cooperation and generosity considered essential for its success. Relationships tend to predominate and there is little emphasis on physical rewards and personal success (Paszokowska, 1998). These socialist values, according to Paszokowska (1998), would predispose these countries to being feminine societies. Nevertheless, shifting social phenomena, political and economic factors directly impacts MAS scores (Paszokowska, 1998). Despite its socialist label Hofstede (2001) states that China is a highly masculine society. Success is expected and the Chinese are willing to forego leisure and even family life to ensure that this is achieved (Hofstede, 2001).

5.9.4. Uncertainty avoidance (UAI)

Uncertainty avoidance is associated with risk taking and acceptance of ambiguity (Hofstede, 1980; Paszokowska, 1998). It demonstrates the degree to which members of society desire structured (high UAI) over unstructured (low UAI) situations (Paszokowska, 1998). Societies high in UAI tended to be more rigid compared to the flexibility of low UAI societies (Paszokowska, 1998). Japan and Poland received almost identical ratings in this domain. According to Henry (2009) in highly bureaucratic structures, there is a strong emphasis on commitment, capacity building and long term investment for long term outcomes. A rigidly structured ensures that these goals are met. Hierarchy and order is regarded as important in these societies (Hofstede, 2001).

China's low UAI rating was inconsistent with the country's political profile. Research by Fernandez, Carlson, Stepina and Nicolson (1997) found that Russia had the largest UAI rating of the countries included in their study. This they attributed to Russia's communism, where structure, routine and certainty are regarded important. China's tall NTID structure is reflective of this. Hofstede (2001) suggests that this divergence may be due to the Chinese ability to be flexible in response to situations they are presented with. To reinforce his assertion, Hofstede (2001) referred to the large number of words with ambiguous meanings in the Chinese language.

Australia was ranked midway along the UAI scale, a similarly unexpected rating. It was anticipated that given the similarities in the politics of Australia and the UK, both countries would receive similar scores on this scale. This score may be based on the practicality of the Australians. While the Australians spend time planning, short term changes can be made (Hofstede, 2001). There is considerable room left for innovation (Hofstede, 2001). This may explicate the flat NTID structure adopted by the Australians and the considerable freedom allowed to the NSOs and SISs. This allows these groups considerable flexibility should it be required.

5.9.5. Long– versus short–term orientation (LTO)

Long– versus short–term orientation is the most recent of the dimensions as it was not part of the original model of national culture (Newman & Nollen, 1996). Members of cultures characterised as being higher in LTO are patient, diligent, obedient and dutiful (Newman & Nollen, 1996). There is a tendency for greater planning and organisations are more formalised. Furthermore, compromising autonomy may be required to ensure that long term goals are realised. There is a focus on the process in an effort to guarantee immediate success (Henry, 2009). Unsurprisingly, China and japan were awarded a significantly higher LTO score compared to Australia and the UK. China and Japan's NTIDs are tightly structured and the state maintains total control. Though Poland possesses a similar structure, it received a low LTO. This result is in discord with the considerable control the Polish government exerts over its NTIDs.

The UK and Australia were ranked low LTO countries and their entrepreneurial models of sport development are consistent. The spotlight is on short term goals and maximising immediate outputs (Henry, 2009). Funding is allocated per Olympic cycle and this is reduced or all together terminated if the sport in question fails to meet specified targets.

5.9.6. Indulgence/restraint (IVR)

This dimension examines the degree to which members of a society are able to take pleasure in basic, natural human desires (Hofstede, 2001). Inhabitants of indulgent countries are permitted to freely enjoy these desires (Hofstede, 2001) such as leisure. Conversely, in restraint countries the ability to enjoy these desires are restricted and controlled by strict social norms (Hofstede, 2001). Given the relative newness of this dimension, there is limited research in this area hence its conclusion would be less significant compared to the other dimensions. Australia and the UK are considered high Indulgence countries whereas China, Japan and Poland are ranked low on this variable (i.e., more Restraint). Intuitively, one can assume that given the restrictions on low IVR countries there would be a tendency towards stricter, more centralised structures as is the case with the latter three countries. There is a prevailing sense of hopelessness and preserving order is considered important (Hofstede, 2011) thus authoritarian control may be a necessary feature. On the other hand, the freedom allowed in high IVR countries allows for more flexible, looser systems. Members of society perceive greater control over their personal life and freedom of speech regarded as essential (Hofstede, 2011). More flexible structures allows for greater employee input into the system.

5.10. Cultural Profiling of T&T Using Hofstede's 6D Model of National Culture

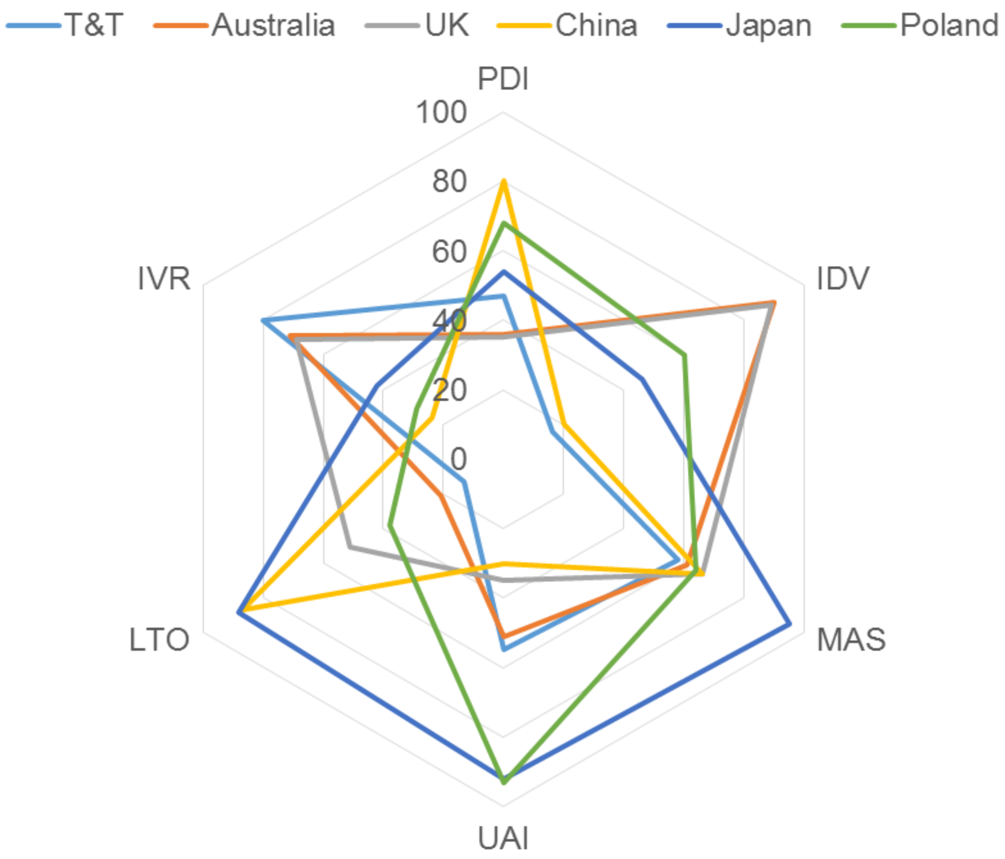


Figure 5.13. Cultural profile of T&T compared to those of Australia, UK, China, Japan and Poland using Hofstede's 6D Model of Culture

The results in the preceding section provided evidence of an effect of national culture on organisational structure based on Hofstede's 6D framework. It thus emphasised the need to pay particular attention to the impact of culture when borrowing systems from other countries. Trinidad and Tobago's cultural profile Hofstede's 6D Model of culture is depicted in Figure 5.13. The ratings are discussed below.

PDI: T&T was ranked low on this dimension suggesting the need for independence of its members, superiors are accessible and informal attitudes towards managers (Hofstede, 2001).

IDV: T&T's low rank on this scale points towards a collectivist tendency where there is a strong commitment to the group rather than the self (Hofstede, 2001). In a low IDV country like T&T, ‘management is the management of groups’ (Hofstede, 2001).

MAS: T&T’s high score on this scale makes it a masculine society. Individuals live with main intention of working and managers are supposed to be decisive and take charge (Hofstede, 2001). The country is considered to be competitive and success oriented (Hofstede, 2001).

UAI: T&T received an intermediate score on UAI which provides no clear distinction as to how the country handles unknown situations.

LTO: A low LTO score like T&T’s indicate that the focus is on short term goals and seeking immediate success (Hofstede, 2001).

IVR: T&T’s high score on this dimension characterises it as indulgent. Individuals are typically optimistic, like having fun and leisure time is considered important.

An analysis of T&T’s scores on Hofstede’s 6D scale indicates that the country is similar culturally to Australia and the UK. This is not surprising given the country’s colonial past and that its political system is alike those of Australia and the UK. Hence, Australia and the UK may be obvious choices to draw lessons from. This would translate into a more democratic, less rigidly structured NTIDs where NGBs are afforded a fair degree of autonomy. However, one needs to be mindful of the fact that though Hofstede’s scale was able to establish a link between culture and the structural design of NTIDs, several discrepancies did present itself. For example, Poland’s high IDV score despite being a highly bureaucratic society.

5.11. Conclusion

Overall the results demonstrated that national culture does impact the structure of the NTIDs in the countries studied. Furthermore, it highlights the importance of considering cultural characteristics in cross-cultural policy transfers and the applicability of Hofstede’s 6D Model of National Culture for developing a broad appreciation of cultural differences. This holistic approach could assist in understanding the complexity of sport development systems which the contrasting needs of sport participation for all and elite sport management. When compared to the countries included in the analysis, T&T was found to be more closely aligned culturally to the UK and Australia. This would suggest that any NTIDs that is introduced would require a relatively lean structure where the focus is primarily on short term outcomes.

Several inconsistencies in the structure of the NTID and dimensions of Hofstede's 6D Model were found. For example, the socialist, highly bureaucratic Poland was surprisingly ranked high in IDV as well especially when other countries with similar political outlooks such as Japan, and China were ranked low on this scale. These anomalies demonstrated the difficulty in assessing organisations within a cultural context. Though culture plays a major defining role, organisational structures are affected by several extrinsic factors.

Contingency theory of management had established decades ago that there is no one best way to manage. Rather, it depends on the environment in which the organization must operate. Hence, when designing an NTID model for T&T, utmost care is warranted when adopting an existing (and successful) system. One that may be successful in its own cultural context can easily be a hindrance in a context alien to its fundamental governing principles.

Hofstede and McCrea (2004) posits that over-time the stability of the relationship between personality traits and national cultures might be due to selective migration, where individuals with personality profiles divergent to the prevailing culture (thus consequently at odds with the rules, systems, operating principles and regulated work processes) eventually move to find an environment that fits with their personality profiles. At the European level, the free movement within the EU removes the administrative barriers to migration within the EU, making athletes' transfer easier. In addition, the heavy reliance on sport scholarships in the US elite sport system could be attractive to athletes reaching university, particularly in countries where higher education requires significant financial investment from the students or their families.

It was difficult retrieving information describing the structure of NTIDs primarily because they remain closely guarded secrets. However, to validate the effects of culture and to further confirm the applicability of Hofstede’s model to sport further research which includes a much larger sample is required. Secondly, it was noted that each country enjoyed a measure of success after implementing their NTIDs. It was, however, difficult to explain whether the improved performance of the country at the Olympic was a direct result of appropriately structured, culturally sensitive NTIDs or was it a caused by external factors (e.g., increased investment). Child (1972) asserts that organisational structure does impact organisational outcomes or success but it was difficult to form a link between the two here.

CHAPTER 6

CONCLUSION: TOWARDS ESTABLISHING A NATIONAL STRATEGY FOR TALENT IDENTIFICATION AND DEVELOPMENT IN TRINIDAD AND TOBAGO.

6. Introduction

Trinidad and Tobago, much like most other countries takes pride in the sporting achievements of its nationals. Athletes successful at the highest levels have been awarded the country's highest honours (SPORTT, n.d.), feted in public, received national holidays (Singh, 2012), and rewarded with money and houses (Julien, 2012). In light of the achievements of athletes, sport in T&T is currently undergoing a positive state of transition primarily predicated on increased state interest and intervention. In its quest to increase the medal potential and by extension cement the twin island Republic's status as a regional and international sporting powerhouse, the government of T&T has established several state agencies that are mandated to recruit, cultivate and support gifted young nationals (SPORTT, n.d.). Talent identification and development, elite and high performance sport and terms now solidly etched in several sporting policies and the objectives of established ancillary bodies such as SPORTT (GHRS, n.d.; GOTT, 2002; MYSA, 2008; SPORTT, n.d.).

Despite its achievements, T&T does not possess a coordinated strategy aimed at maintaining and increasing its available pool of talented individuals capable of successfully competing at the highest levels. According to Gagné (2008), in order for talent to be effectively developed, there is a pertinent need for long term–investment in systems that support appropriate learning, training and practice. Given the continuous efforts by the current and previous administrations to improve and enhance sport and the performance of elite athletes, establishing a national framework for identifying and developing talented youngsters is a timely issue.

The central aim of this research thesis was to develop a national framework that possesses the capacity to effectively identify and develop gifted young nationals of Trinidad and Tobago who exhibit the ability to successfully perform at the highest competitive levels of sport. It is important to note that the foundation of any meticulously constructed NTID model, theoretical or otherwise, is designed using "evidence, intuition by analogy….or theory" (Bailey & Morley, 2006). Hence, in creating the NTIDs for T&T, relevant information contained in the literature (Chapter 2) and gathered from empirical research (Chapters 3–5) were collected, collated and analysed resulting in the model that will be discussed later in this chapter.

6.1. Chapter outline

Athletic talent is the product of a multiplicity of causal inputs including, inter alia, the presence of relevant abilities, motivation and a supportive environment (parents, teachers, regional and national agencies; Gagné, 2008). Considering the previous, a multidisciplinary approach to establishing the model was used. Hence, the initial approach to this chapter was to summarise the sources of information contained in Chapters 2–5 that provided the basis for the design of the NTID model of T&T. These chapters are briefly highlighted below:

- Chapter 2 offered a comprehensive literature review which sought to provide a sound theoretical basis upon which the thesis and the empirical studies included were constructed
- Chapter 3 provided an insight into the initial stages of talent identification in action by examining the efficacy of sport–specific anthropometric and physiological testing protocol in cricket, still considered the most popular sport in T&T

- A reflective career history questionnaire was employed in Chapter 4 to investigate the development of elite athletes in T&T and the UK
- Finally, Chapter 5 provided a cross country comparison of the effects of national culture on the preferred NTIDs structures of selected successful countries.

The data derived above, and the conclusions and recommendations offered at the end of each chapter were considered along with existing research to develop this chapter and satisfy the research objective:

The data derived in this project will be utilised for the development of a NTID system that is capable of being successfully introduced in T&T.

Considering that athletic talent is a multifactorial construct affected by a complex interaction of biological and environmental factors (Baker, 2003), it is imperative that any meticulously constructed, progressive TID programme take these factors into consideration. Hence, a multidisciplinary approach was employed in this study.

The fundamental aim of this study along with several sub–aims were clearly described at the start of this discourse, and provided guidance for the empirical studies and reviews contained herein.

6.2. Conclusions and Recommendations (Chapters 2–5)

6.2.1. Talent identification and development: Clarification of terms and concepts (Chapter 2)

Prior to constructing any model of TID, it is imperative that a basic theoretical framework is developed (Foster et al., 2005) and this was the primary concern of Chapter 2. By providing an understanding of what talent is and its manifestations, it would provide useful information for designing a system capable of appropriately identifying and cultivating this variable.

Côté et al. (2007) stated that the continued research interest in talent emerged from the desire to identify factors that contribute to its manifestations. Therefore, prior to proceeding with any descriptions of talent identification and development, it was important that the term “talent” was firstly delineated. From the literature, it was surmised that a universal definition of talent was not available, primarily as a result of rife inconsistencies in definitions offered. Much of the debate encompassing talent was found to emanate from Galton’s nature versus nurture theory (Baker et al., 2003; Côté et al., 2007; Krebs, 2009; Tranckle & Cushion, 2006). Extensive empirical support for the two competing sides has been presented in the literature (Baker & Horton, 2004; Helsen et al., 1998; Hodge & Deakin, 1998; Starkes et al., 1996; Tucker & Collins, 2012) but this has only served to broaden the divide between the opposing views. Genetic testing in sport was seen as an area of great potential as it has the ability to test for several sport specific traits at once, is not time, location and training–status sensitive as traditional TI methods. However, it is still some way from becoming a reality as more research is required to properly identify genes associated performance characteristics.

Unsurprisingly, the same problems that plagued the delineation extended to talent identification and development. It was concluded that the myriad of factors that contribute to TID must be taken into account (Burgess & Naughton, 2010; Reilly et al., 2000) in order to ensure effective recognition and development of promising individuals in T&T.

Several models of talent development were described including classic 10 000–hour Theory (Ericsson et al., 1993) and the more contemporary Differentiated Model of Giftedness and Talent (DMGT; Gagné, 2005) and the Developmental Model of Sports Participation (DMSP; Côté et al., 2007). The strength and weaknesses of each model were discussed. The DMGT and DMSP were considered the most relevant to this study as they proposed the most expansive models of TD, taking into consideration both the inter– and extra–individual factors that contribute to talent development.

In an effort to highlight the impact of this study beyond the sporting sphere, sport and its significance to society were also examined. Sport was seen as a powerful tool which has been exploited by numerous governments worldwide to achieve a variety or social, political, health and economic objectives (Frey & Eitzen, 1991). It was opined that a nation like T&T can only truly benefit from sport if there are talented individuals with the potential to be successful available.

It was hence concluded that talent, particularly as it relates to sport, requires further elucidation. While a universal interpretation may not be forthcoming in the near future, it was hoped that this study would foster further explorations into talent in sport, acknowledging external impacting factors (including environment, society, political climate) in an effort to provide a clearer understanding of this variable. Ultimately, this would establish a more robust foundation for constructing a more comprehensive model of talent identification and development.

6.2.2. Physiological Testing in talent identification (Chapter 3)

Physiological, psychological, anthropometric and other methods of athlete profiling offers a means of assessing the strengths and weaknesses of players (Veale et al., 2010). Moreover, it provides coaches and clubs with important data that can be used to identify players that have the ability to progress to the elite ranks in sport (Veale, Pearce, Buttifant & Carlosn, 2010). While many sports currently have tests available for identifying athletes, a similar situation does not exist for cricket. The first stage in developing a TI model is the design of a testing protocol that can be used to establish reference data for successful (Keogh, 1999). More importantly, it must be capable of discriminating players of differing abilities (Keogh, 1999). This chapter examined the effectiveness of an anthropometric and physiological test battery in distinguishing between elite and non–elite junior male cricketers. Cricket was selected due to the fact that it remains the most popular sport in T&T. There has also been very little empirical research in the area.

The elite cricketers performed better on all the physiological tests included in the protocol. Although the results were promising, it raised several issues. Firstly, it drew into question the confounding effect of training. It was expected that elite performers would perform better on the tests given that they were tailored to be sport specific and they would have more playing experience. Considerable support for the efficacy of the test would have been provided if one or more of the non–elite players achieved a result that was on par with or exceeded those of the elite cricketers. This then highlights the inadequacy of one off talent testing (Sotiriadou, Shilbury & Quick, 2008). The non–elite cricketers may not have achieved the same performance level of the elites on this occasion but subsequent testing over several years, after they have received more sport specific experience may yield markedly different results.

It was summarised that though the physiological tests did achieve their stated objective of discriminating between players of differ playing abilities, their effectiveness as a talent identification tool requires further clarification. Additionally, given the fact that numerous factors are responsible for the expression of talent, further research is warranted. In light of time and finance restraints it was not possible to conduct follow up testing but the author of this discourse intends to pursue this in the future.
The applicability of the results to T&T was also questioned. Firstly, it demonstrated the effectiveness of a physiological testing battery using T&T athletes, performed under local conditions. Hence it offers a protocol that may be readily applied to cricket. Secondly, the study used a field–based protocol which offers a cheaper, easily administered alternative to laboratory–based testing (Payne, Hoy & Carlson, 1986). Given the limited resources available both financially and in terms of qualified personnel this would of great benefit to T&T.

In order to improve this test in the future, it was advised that further research, in the form of a longitudinal study and involving repeated, periodical testing be conducted. Additionally, it may be useful to use a random cohort with no cricketing experience and a group consisting of more advanced players (e.g., junior players competing at the international level such as the International Cricket Council Junior World Cup). The applicability of the physiological testing protocol to other sports was also questioned. For example, the 505 agility may not be fully applicable in football or hockey which involves bouts of turning, starts and stops over a shorter distance. Finally, it was acknowledged that physiological testing represents only one method in the cadre of tests for talent. Psychology, coach observation and reaction testing present other valuable tests that should be included when seeking out new athletes.

6.2.3. Talent development: Comparing the sport career histories of talented athletes in T&T and the UK using a sport history questionnaire (Chapter 4)

This study examined the development histories of T&T and UK athletes emerging through the linear development (LM) and diversified models (DM) of talent development using a reflective questionnaire. This study had several aims. Firstly, it sought to determine the age of specialisation of the cohort to identify whether DM athletes specialised in their main sport later than LM athletes as demonstrated in the literature. Results were mixed. More athletes from the UK emerged through the DM pathway while the opposite was true for T&T. There was, however, overall support for the later specialisation of DM athletes though this did not attain statistical significance which was in agreement with previous research (Moesch et al., 2001; Oldennziel, Gagne & Gulbin, 2004). Analysing by country revealed that DM athletes in T&T specialised at an older age compared to LM athletes while the opposite was true for the UK. This aberration in the UK result was attributed to the smaller cohort and the fact that some of the LM athletes were boxers, a sport with a typically later specialisation age.

The second objective of this study was to compare the early (or base) sports played by the DM athletes and the sport in which they eventually specialised. Comparisons were conducted using two categories:

1) Team versus individual sports: Overall, more than half of all DM athletes that currently compete in team and individual sports played a team or individual sport respectively prior to specialisation. Similar results were demonstrated for UK DM athletes. In T&T, while half of the DM athletes that currently play a team sport had prior experience in team sports, less than half of individual sport players had experience in individual sports. No significant relationships were found were found for any of the relationships.

2) Open– versus closed–skill sports: the majority of athletes that played an open– or closed–skill sport prior to specialisation, specialised in an open– or closed–skill sport respectively. The results were the same for T&T and UK athletes and when both groups were combined. However significant associations were demonstrated.

Apart from the above, the data also suggested that there was a clear advantage of emerging through the DM rather than the LM pathway. The DM athletes were more likely to be competing at the highest levels (Regionals and World) while the LM athletes were more likely to be competing at the lower levels (County and National). These results question the strong domain specificity of talent transfer advocated by many programmes (Vaeyens et al., 2008), whereby athletes are directed to sports that were related to their earlier sporting experience (UK Sport and EIS, n.d.). On the surface, the results suggested that provided the athlete has previous sporting experience before specialising, a degree of transference takes place. This may not necessarily be sports skills (e.g., less than half of team sports athletes had previous experience in a team setting). Hence, transfer of skills may not be restricted to domain specificity. Further, playing several sports before specialising may impact the level of competition one may ascend to in the future.

This augurs well for T&T. Linear sport development tends to be more resource demanding (Côté et al., 2007) and can eventually deplete the available talent pool owing to burnout and early retirement, common features of this system (Malina, 2010). Additionally, talent transfer makes better use of limited resources. Talent transfer and recycling helps to keep athletes in the system by guiding them to sports that they may be suited to if first chance identification is unsuccessful. Given that athletes who play a variety of sports were found to achieve a higher level of competition, this may translate into better quality athletes for T&T. Further research employing a bigger sample and including more countries is warranted as this would provide a better idea of how talent is developed in other countries.

6.2.4. The effect of culture on national talent identification and development systems (Chapter 5)

National TIDs are a common feature internationally and Green and Houlihan (2005) suggest that a considerable level of homogeneity exist between systems. National TIDs function in a business–like manner. Considering that the organisational structure of businesses and culture are isomorphic (Gibson, 1994; Gulev, 2009; Krokosz–Krynke, 1988; Smircich, 1983; Taras, Steel & Kirkman, 2011), it was hypothesised that the same would apply to NTIDs. Understanding the significance of culture is even significant in a globalised world where inter–country policy and systems transfer is a common occurrence (Houlihan, 2009. The overarching purpose of Chapter 5 therefore was to examine the extent to which the indigenous cultures of Australia, China, Japan, Poland and the UK affected the organisational structure of their NTIDs using Hofstede's 6D Model of National Culture. The selection of these countries hinged on the fact that they possessed established and historically successful NTIDs.

Firstly, the study sought to determine the effect of NTIDs on success of the included countries at the highest levels. The results demonstrated that countries introducing NTIDs improved their performances at the proceeding Olympics when compared to those before. The fact that the success of these countries was sustained following hosting of the Games points to the benefits of implementing state–led, structured NTIDs.

Secondly, the efficacy of Hofstede's six dimensional nomenclature of culture as a method for cross–country comparisons was examined. A review including a critique of Hofstede's model was first done. While many criticisms have been levelled against his 6D model, the preponderance of authors have supported Hofstede's attempt to provide a tool for measuring national culture. Much of the disagreement over Hofstede's model is a direct result of differing views of culture varying by discipline. Hofstede's work is not on 'culture' as it is used in anthropology or sociology but it is closely aligned to its definition in management and business studies. As Williams (2002) would indicate that researchers are faced with a choice when selecting a model – they can choose one that is exhaustive and specific or one that closely examines the components under consideration. Analysing the structure of the NTIDs using six dimensions generally demonstrated that national culture impacted on the organisational architecture. For example, NTIDs with taller structures (such China and Japan) were found to be lower in IDV compared to the less bureaucratic structured of the UK and Australia that were ranked higher on the IDV scale. The structural divergences highlighted a lack of complete uniformity of NTIDs as earlier hypothesised.

Considering that the crux of this thesis is the formulation of a NTIDs for T&T, the classification of the country along Hofstede's 6D Model was included. In light of the fact that national culture has a demonstrable effect on organisational arrangement, T&T's ranking of the 6D Model would prove useful when designing its NTID. Trinidad and Tobago received low scores on PDI and LTO and was ranked high in MAS, UAI and IVR. These scores were closely aligned to those of Australia. It was surmised that any NTIDs introduced in T&T should be low in bureaucracy and allow for a considerable degree of flexibility. The low IDV score, however, demands that the state maintains a considerable level of control over the system to ensure its success.

In conclusion, the findings presented in this chapter attested to the importance of considering national culture when designing NTIDs. Considering that T&T does not already possess and NTID nor is there one available in its geographic locale, the framers of this model may look elsewhere for an example. This becomes even more important when borrowing or importing systems from other cultures, as success in one environment may not equate to the same in another. The efficacy of the Hofstede's 6D Model of National Culture was demonstrated. However, the effects of a mismatch in NTIDs and the culture of the adopting country could not be determined. It may be premature to assume that the success of the systems may be a result of the isomorphism of culture and NTIDs as no evidence of a failed system could be located in the literature. Provided the recommendations included at the end of this chapter are ratified and implemented in T&T, it would be interesting to follow the progress of the system to assess whether a successful culture–structure fit would take place. Further research which includes a greater number of countries is warranted to authenticate the findings in this study.

6.3. Proposed National Talent Identification and Development Model for Trinidad and Tobago

Trinidad and Tobago has produced several renowned athletes at the international level with Dwight Yorke, Ato Boldon and Brian Lara being the most notable. While the state of sport has improved, particularly fuelled by increased government investment, there is still considerable room for growth. Recently, the president of the Trinidad and Tobago Olympic Committee set an ambitious target of 10 Olympic gold medals by 2024 (Trinidad Newsday, 2013). While possibly achievable, the current state of sport does not allow for this. Young, gifted individuals often get lost in the system due to a general lack of opportunities, access to facilities and the absence of a structured method for recognising and nurturing them. Those who actually ascend the performance ladder do so primarily out of luck or the fact that they emerge from a privileged environment. Compounding this is the fact that the development of the fortunate few elite T&T athletes is typically undertaken in North America largely as a result of the superior facilities and support on offer. There is a critical need for an NTID in T&T as it will not only improve the identification of promising young persons but enhance their development through the provision of improved facilities and trained personnel.

The rationale behind this research thesis was the development of a NTIDs for T&T and like any other existing model it is anticipated that it will produce a sustained high level of world class performers. The proposed model that will be subsequently outlined is grounded in theory, an admixture of research emanating from the extant literature and empirical studies conducted throughout the duration of this PhD. The results generated from the studies I conducted were mixed yet equally promising. The novelty of some of the studies, for example the investigation into the effect of national culture on NTID structure rendered it difficult to make comparisons with existing studies. It has, however, highlighted the fact that research into TID and NTIDs are far from complete. All of the studies have contributed to the proposed NTID model contained below.

6.3.1 Preconditions to establishing a working model of talent identification and development

Henriksen, Stambulova and Roessler (2010) suggest that there are three essential ingredients that must be made available when designing a successful talent development model. These factors include:

Funding: national TID programmes require considerable investment to be successful (Henriksen, Stambulova & Roessler, 2010). For example, Hogan and Norton (2000) estimated that an Olympic Gold medal costs the state Australian $37 million. Funds are required to train not only athletes but coaches and other personnel involved in the TID system. Other costs include sending athletes to regional and other competitions, staff wages, research, facilities maintenance and construction. As outlined earlier, the LM of talent development requires huge costs as it involves early specialisation and extended training in one sport (Côté et al., 2007). Choosing the DM provides a cheaper alternative and as demonstrated in Chapter 5, it may lead to greater success as more DM athletes were competing at the highest levels compared to LM. Additionally, the use of field tests rather can offer a major cost saving as they are generally cheaper.

At present, funding for sport in T&T is provided almost exclusively by the government, and extends from the provision and upkeep of facilities to the upkeep of NGBs and clubs (MOSTT, n.d.b). While this is necessary as sporting organisations typically do not have large amounts of cash at their disposal, this heavy reliance can also prove detrimental in the long run. Relying exclusively on government funding can translate into problems should the government run into financial difficulties (Andreff, 2006). While clubs may not become truly self–sufficient, efforts should be made to raise a greater proportion of the budgetary funding through their own efforts.

Facilities: it is important that a sufficient number of high class training, accommodation and other facilities are made available for the development of elite athletes (Henriksen, Stambulova & Roessler, 2010). Recreational facilities should also be made available to improve and maintain the level of physical activity amongst the citizenry. Trinidad and Tobago has several world class sporting facilities at its disposal including the Queens Park Cricket Oval, Dwight Yorke and Hasely Crawford Stadia and the Cycling Velodrome (SPORTT, n.d.). These facilities have all hosted major world sporting events including the FIFA Boys Under–17 World Cup in 2001 (FIFA, 2014), World Netball Championships 1979 (SPORTT, n.d.) and the International Cricket Council 50–Overs Cricket World Cup in 2007 (ESPN Cricinfo, n.d.) to name a few. Currently under construction is the Aquatic Centre which will include Olympic sized swimming pools (Mamchan, 2014). An audit of existing facilities needs to be conducted to provide an idea of the state of these facilities and requirements for new ones.

Personnel: this includes the full spectrum of staff inclusive of coaches, administrative and management officials, umpires, researchers, scientists (Henriksen, Stambulova & Roessler, 2010; Sotiriadou, Shilbury & Quick, 2008), the roles of which is critical to the maintenance of the system. For example, the Australian Cricket Board was quoted as saying that coaches play an important role in the enlisting, retaining and nurturing in what they refer to as the “starts of the future” (Sotiriadou, Shilbury & Quick, 2008). The more trained professionals available translate into the improved quality of testing, training and development. Considerable progress has been made in T&T with regards to the training of sporting personnel with the establishment of the Institute of Sport at the University of Trinidad and Tobago (ISUTT) and the persons sent abroad to study. The ISUTT offers undergraduate and postgraduate degrees in sports science, physical education and sports management (UTT, n.d.).

6.3.2. Talent identification and development pathway

The recommended NTID model for T&T is depicted in Figure 6. The model is an amalgamation of several existing TID models combined with research contained in previous chapters. When developing this model, the multidimensionality of talent was taken into account. It also departs from traditional, uncompromising models which singularly focussed on advancing those identified as talented, often at the expense of the vast majority (Bailey & Collins, 2013). These models were fixated on mass participation with a gradual yet dramatic deselection of participants based on an inability to meet established standards (e.g., ideal physical dimensions) as they advance up the performance pathway to the elite level (Bailey & Collins, 2013; Sotiriadou, Shilbury & Quick, 2008). It then becomes almost impossible for those severed from the programme to return to the system (Bailey & Collins, 2013).

Figure 6. is in line with contemporary frameworks that promote the development of athletes via the DM pathway. This is largely based on previous research (Moesch et al., 2001; Oldennziel, Gagne & Gulbin, 2004) and the results of this study which suggests that developing via the DM pathway may confer several benefits. Firstly, it helps to maintain the talent pool by keeping more athletes in the system via talent transfer and recycling. As outlined earlier, it also provides a cheaper alternative. It can also speed up the development as they present to the new sport with skills that act as the building blocks for future sports skills.

This model presents a more flexible option that allows individuals to progress in divergent paths up the system. The focus is not only on maximum participation at every level (which is important given T&T’s small population) but maintaining that level of participation even if the individual is not selected for specialised training. Increased participation at every level of the framework increases the number of potential elite performers that may progress to the world class level (Sotiriadou, Shilbury & Quick, 2008). Unlike other models that focus exclusively on producing medal winners, this framework is participant–centred, affording them a great deal of movement within the system. It permits the participants to withdraw from and return to the sport or even to adjust their participation level over time (Sotiriadou, Shilbury & Quick, 2008). It also provides a lifeline to participants who may have been forced to leave the system based on a failure to meet performance or testing thresholds.

Foundation

The initial stage in the proposed NTID model is the Foundation. This stage targets the younger, primary–aged individuals (approximately 5–12 years), introducing them to fundamental or basic movement skills (FMS). While the precise causal link between learning through play and exceptional performance is not well understood, it has been proposed that deliberate play educates the child on the FMS (Bailey & Collins, 2013). These are considered the requisite building blocks upon which more advanced, specialised sport and physical activity (PA) specific skills are established (Bailey & Collins, 2013). While research supporting this is at the embryonic stages, a strong association between insufficient FMS and low levels of PA has been demonstrated (Bailey & Collins, 2013). Higher levels of FMS are correlated with higher levels of PA and these tracks favourably from childhood to adulthood (Bailey & Collins, 2013). The result of this is a more active, healthier T&T population and a greater participant base from which talent be selected.

Introduction and re–introduction to sport

The second stage of the model is the Introduction (or in some cases re–introduction) Athletes are introduced (or re–introduced to those with prior experience) to sport–specific activities. This should act as a sampling period (Baker, 2003), allowing individuals to participate in a variety of sports. Talent identification and development also begins at this stage.

Towards the end of this stage talent identification occurs (at approximately 14 years of age, however this is sport dependent as some sports require earlier specialisation). Talent identification would involve the profiling of athletes, identifying which sports they may be more suited to based on the results of sports specific tests. It is important that selected tests are specific to the fitness and movement requirements are selected and their validity and reliability investigated before widespread usage. In Chapter 3 the efficacy of a cricket specific field–based anthropometric and physiological testing battery was demonstrated. Field tests were used as it offers a more economical alternative to laboratory testing. It also allows for a larger number of individuals to be tested simultaneously. The test proved to be an efficacious discriminator of players of differing playing abilities. It also provided a set of reference data that can be used as minimum entry standards for those wishing to specialise in the sport.

The above, however, is only the first step in the development of a TI model. To establish the effectiveness of the testing battery in identifying future cricket talent, it is essential that follow up studies be conducted. These would take place at several points during the Performance stage. It is important to note here that talent is a multidimensional construct hence additional tests that includes psychological assessments should also be used.

Though the testing protocol used here was cricket specific, many of the movement patterns in cricket also applies to other sports. Hence the tests can be used to identify athletes in other sports. For example, the agility test can be used to identify athletes where agility is important such as hockey and football. Further studies using athletes from a variety of other sports is warranted to determine the ability of the tests to distinguish between players of differing abilities. This would allow researchers to test a variety of athletes at the same time and use the information to identify the sport of best fit. The development of the selected individuals should also be tracked to determine the number(s) of those identified that actually progress to the elite level.

Performance and participation

Participants identified by the testing programmes are then guided to the Performance stage, where they receive appropriate training and support in the sport they have been identified as being best suited to. These identified athletes are exposed to competition and talent selection in order to assess their level of development and potential to succeed at the elite level. As previously stated, it is necessary to conduct further testing so as to overcome the effects of growth and maturation.

Excellence

Confirmed athletes then progress on to the Excellence level where it is hoped that they will succeed internationally. Athletes who may not have achieved success in the previously identified sport may be transferred to another sport in which they may display potential.

As shown in Chapter 4, it is not important to transfer athletes to a domain specific sport. It is possible for an athlete to transfer to a sport that may not be related to their previous sporting experiences, for example, moving from a team to individual sport (Chapter 4). Participation in a variety of sports and play activities during the Foundation and Introduction/Re–Introduction stages equips the child with a variety of perceptual, movements, conceptual and physical conditioning skills (Baker, 2003) which can then form the basis for the new sport to which the individual is transferred to. As this and previous studies have shown (Oldennziel et al., 2004; Bullock et al., 2009), previous sporting experience can decrease the rate of development from novice to expert performer in the new sport.

Athletes unselected at the end of the Introduction and Performance stages are encouraged to remain active by continued participation in sport. These individuals may also be reassessed at a later stage to identify whether there was a delayed display of talent. This offers a second chance identification and can prove beneficial to T&T as it will help expand the talent pool. Those showing potential are transferred to the Performance stage and later to Excellence provided they demonstrate the ability to attain world class performances.

It should be pointed out here that understanding the barriers to participation must be understood in order to ensure that the proposed system can benefit its target population, is effectively utilised and caters for as many young citizens of Trinidad and Tobago. Failure to do this can lead to widespread wastage as a result of poor utilisation of the system. While evidence has demonstrated a continued decline in physical activity levels amongst children, particularly those from low income groups in developed countries (Holt et al., 2011), similar information is not available for T&T. Apart from a lack of finance, a considerable barrier to sport and physical activity participation is motivation (Foster et al., 2005).

Foster et al. (2005) suggested that it is vitally important to overcome any psychological barriers to participation in sport and physical activity in order to increase uptake. A major first step should be the identification of participation motives. Previous research in non–athletic populations (Brockman et al., 2011; Crandall, 2007) has shown that the primary reason for sporting participation is “to have fun”. A similar result was found amongst the elite cohort used in this thesis (Chapter 4). Hence, it is important that there is an emphasis on the fun element in the activities offered particularly at the Foundation and Introduction stages. Coaches and other individuals involved in the delivery of sport and physical activity should be trained in methods to increase the fun element so as to maintain a high level of interest amongst participants and to encourage those who may lack the necessary motivation to participate.

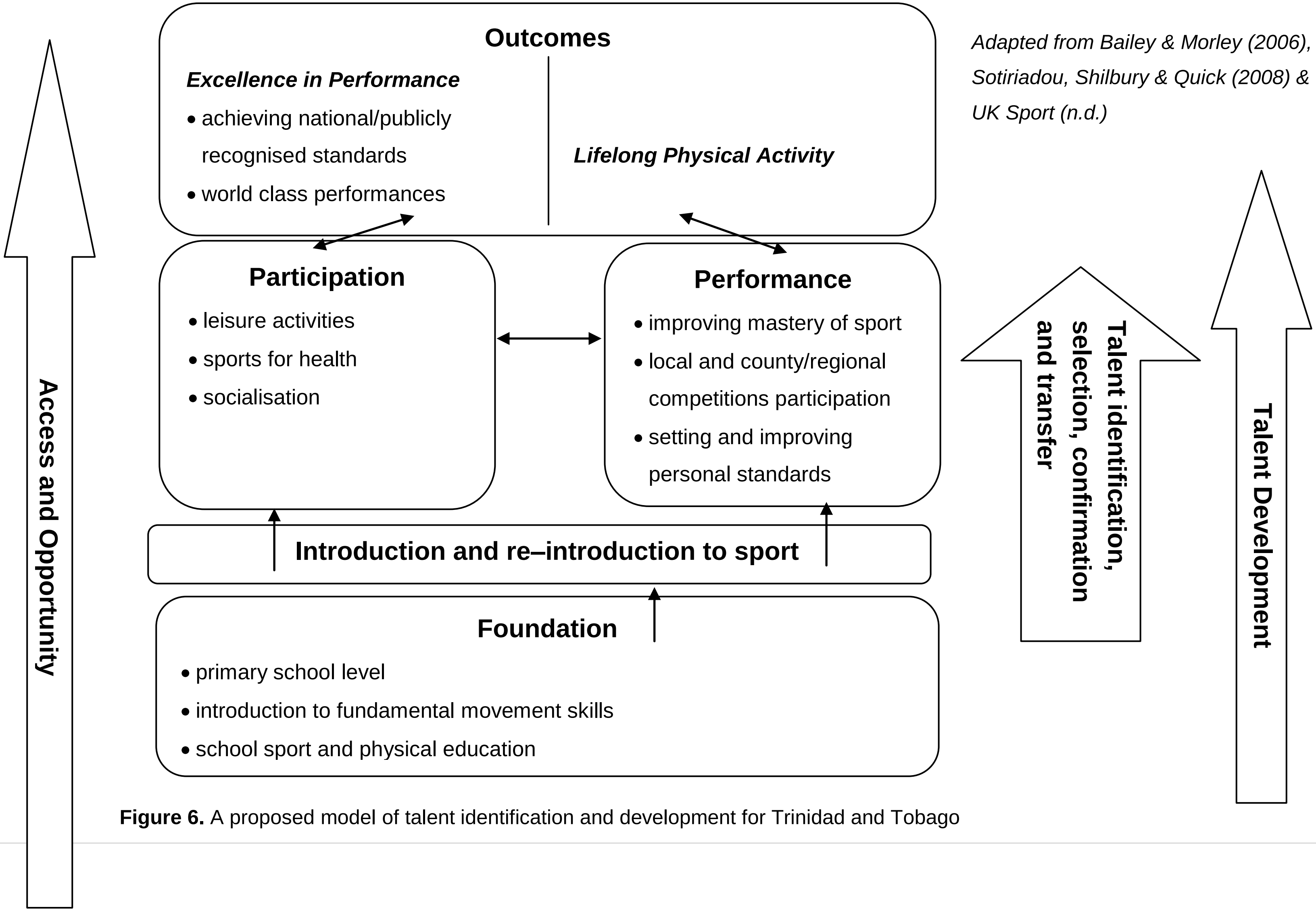


Figure 6. A proposed model of talent identification and development for Trinidad and Tobago

It is essential that in order for an athlete to progress from the Foundation stage and up to the apex of the pathway, suitable and appropriate access and opportunities are provided. This would take the form of suitable coaching, providing the right environment for training and honing skills and suitable facilities. Though not included in the model, provisions should be made for athlete retirement, whether it occurs at the end of a successful career or prematurely due to injury or a lack of success. These athletes should be encouraged to maintain a physically active life and share their knowledge and expertise with upcoming athletes. Educational opportunities should also be made available to those wishing to seek employment outside of sport.

6.4. National talent identification and development system management structure

In order to ensure that the proposed Model of for National Talent Identification and Development in Trinidad and Tobago achieves its stated objectives, it is necessary that an efficient organisational structure is erected. The organisational structure provides a clear definition of the operational outcomes of the entity and lucidly demarcates the inter–relationships and boundaries of each member contained within it to ensure optimum performance (Krokosz–Krynke, 1988; Thompson, 1967). Chapter 5 demonstrated the success of well–orchestrated NTID organisations in several countries including the UK and China and highlighted the important effect of culture on the adopted organisational configuration using Hofstede's 6D Model of National Culture. The rankings of T&T on the 6 scales were also described and it pointed towards a lean organisation, similar to that in the UK and Australia. This was taken into account when designing Figure 6.1 which offers a proposed NTIDs organisational structure for T&T.

Ministry of Sport Trinidad and Tobago: stationed at the top of the system is the MoS which acts on behalf of the government of T&T. Apart from its fiduciary responsibility, the system will be guided by the MOSTT.

SPORTT: as outlined earlier, SPORTT functions in similar fashion to UK Sport. It is the financial arm of the organisation and should be entrusted with the responsibility of being the sole provider of funds to NGBs to aid their athlete development programmes. This helps to improve accountability and reduce duplication.

National Sports Development Company: this entity will be responsible for the promotion of grassroots, leisure sports and the sports–for–all policy aimed at increased activity amongst the population.

Talent Search Group: this group would maintain responsibility for the identification of talent. They would lead national talent identification campaigns in concert with NGBs.

Research and Development Committee: the R&DC committee will be responsible for increasing the local scientific knowledge base via research into talent identification and research methods and the development of novel methods relative to the existing environment in T&T. This will involve partnering with the University of Trinidad and Tobago, University of the West Indies (Trinidad), Talent Search Team and the various NGBs.

Media and Communications Group: their obligation will include communicating information to the press, publication of research, development of print and electronic material for talent search campaigns and relating information from UK Sport and other members to the NGBs and other groups.

Training and Development: this team will be responsible for developing locally based, world class training programmes for coaches, teachers and other sporting officers.

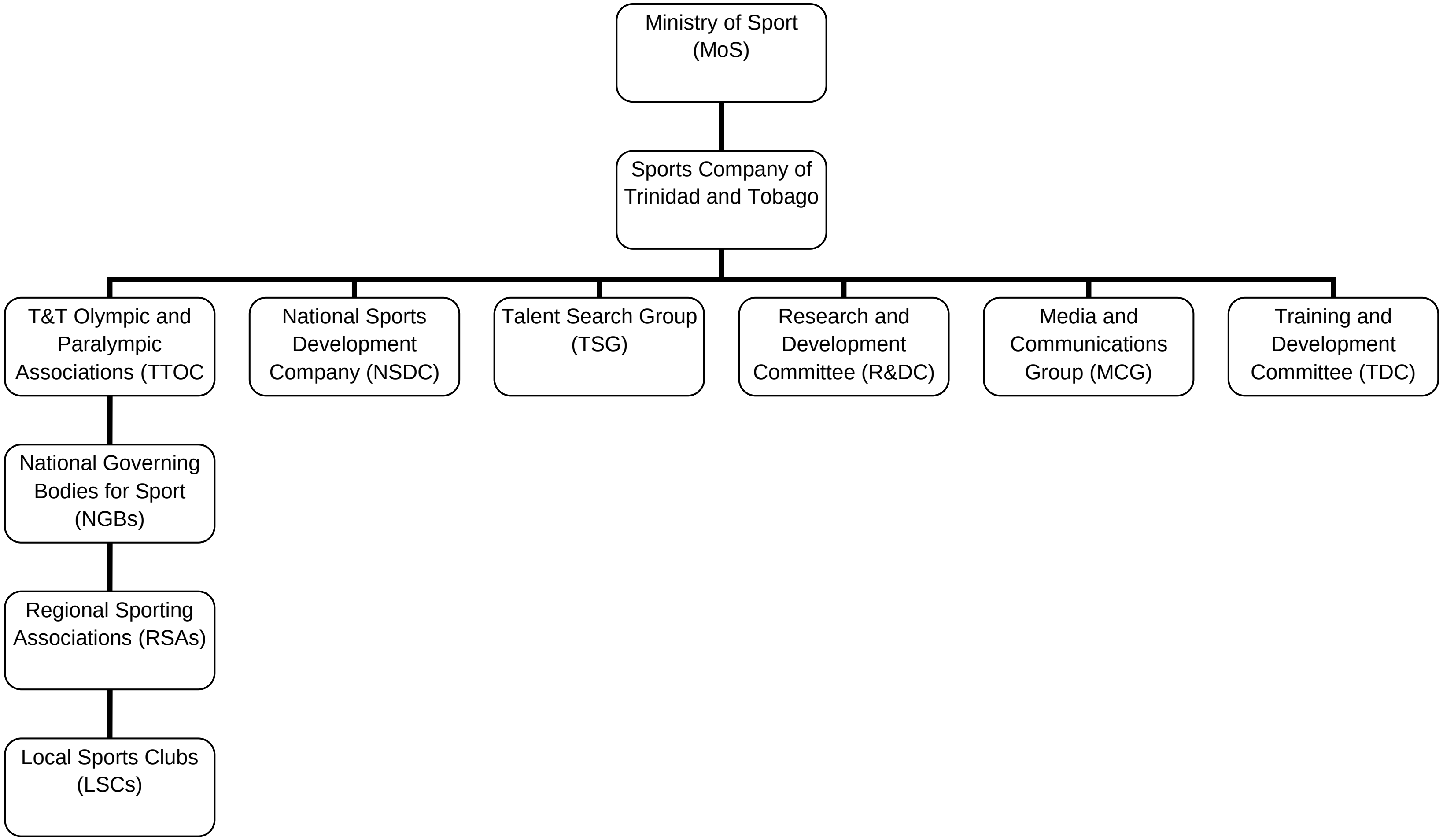


Figure 6.1. Proposed structural framework of the National Talent Identification and Development Programme of Trinidad and Tobago

TTOC & TTPC: these are the umbrella bodies for elite abled and disabled sports. They are responsible for the governance of their respective sports (Athletics Federation overseeing all athletics clubs). They are also responsible for developing their own sport–specific TID programme using the NTID presented in Figure 6.

National Governing Bodies for Sport: the NGBs are responsible for the functioning of their respective sports. Their duty includes the development of sport–specific talent selection, confirmation and development models based on the proposed blueprint provided in Figure 5. They are also responsible for devising schemes aimed at increasing participation in their respective sports.

Regional Sporting Associations: to improve the ease of administration and to ensure that each division is adequately represented, T&T will be divided into regions based on an existing system (east, west, north and south Trinidad. Tobago is considered one separate region). Each RSA will be run by a sport committee that oversees the distribution of funds to sports clubs and will also offer scientific support to elite athletes.

Local Sports Clubs: these clubs will maintain responsibility for providing participation opportunities for interested individuals, with emphasis on grassroots sport.

6.5. Conclusion

Elite sport in T&T is currently on the ascendency. Increasing government interest in the forms of policies and funding has translated into gradually improving performances at the Olympics and other international competitions. The proposed models introduced above offer frameworks for the systematisation of sport in T&T – providing the country with a NTIDs in the fashion of Australia and several other developed countries. The potential benefits of this NTID to T&T are numerous. It can increase the number of identified athletes, and provides a clear pathway for the development of the raw talent into world class performers. Furthermore, it proposes mass participation in physical activity which can improve the health of the nation.

Provided the system is implemented, follow up research is required to track its progress and compare these with its stated objectives. This would involve monitoring the success (via medal counting) and level of representation at all levels of competition include county, national, regional and international. Further, it is important to assess whether the selected model is in line with the national culture of T&T. As Chapter 5 demonstrated, culture does have a major impact on the selected structure of the NTID apparatus. While the structure of the proposed model (Figure 6.1.) is deemed reflective of the prevailing national culture of T&T, there exists a possibility of a mismatch occurring. Should any deficiencies arise after future investigations it is imperative that the necessary alterations are made to the model to ensure its success.

6.6. Future Research

This research thesis should be considered a work in progress rather than the final product. To examine the effectiveness of this proposed model, it is important that it is implemented and its success (or lack thereof) is tracked. One possible suggestion from the author of this discourse is that the NTID model be put into action at the NGB level to test its efficacy. This would help to identify the strengths of the model and any areas that would need improving before it is presented to the government of T&T. As not much is known about the structure and functioning of sports in T&T, it is essential that further information is gathered before implementing the model. Some of the proposed research (that were not completed during the course of this Ph.D) is highlighted below.

Proposed research

As indicated by Gagné (2008), numerous factors affect the emergence of talent. While the studies included in this discourse provided considerable information on

TID particularly as it relates to T&T, more work is required. Future research studies have already been designed in an effort to gain as wide an understanding of TID as possible which can then inform and improve the proposed NTID for T&T. These future studies are included below. Their rationales and aims are provided to highlight their importance.

6.6.1. Study 1: Sports Provision in Secondary Schools

Literature examining expertise in sport has indicated that though parents are the first to introduce and expose children to sport (Jones & Petlichkoff, 2008), schools have been found to play an influential role in the identification and nurturing of talent (Bailey & Morley, 2006; Hohmann & Seidel, 2003). In his seminal work, Bloom (1985) examined the achievement of expertise in the sciences, arts and athletics. The author found that teachers were instrumental in developing the talent of the participants. This was later confirmed in reports by leading athletes who credited the efforts of their physical education (P.E.) teachers (Gunnell & Priest, 1995; Redgrave, 2000; Johnson, 2003, all cited by Bailey & Morley, 2006).

Bailey and Morley (2006) have asserted that though supportive P.E. teachers are a major contributing factor in talent development, other variables are important. Teachers must have specialist skills in their particular sport, there must be sufficient protected time allocated to the provision of P.E., apposite equipment and facilities (Bailey & Morley, 2006) and finance (Andreff, 2001) must be made available. Failure to provide these at an even basic level may result in insufficient development, or in extreme cases, the talent of these young athletes may go unnoticed (Bailey & Morley, 2006). Country reports, however, have revealed that these important resources are often not available (Hardman & Marshall, 2000, 2005; Pushe & Gerber, 2005, all cited by Bailey & Morley, 2006), particularly amongst developing and least developed countries (Andreff, 2001; UNESCO, 2003).

Trinidad and Tobago is a Small Island Developing State (United Nations, n.d.) located in the southernmost part of the Caribbean. Despite its relatively small size, T&T boasts of sporting greats including Brian Lara (cricket), Dwight Yorke (football), Hasely Crawford (athletics), Ato Boldon (athletics) and several other medallists at the Olympics and other major games, and even a first time appearance at the 2006 Football World Cup. Little is known about the TID in T&T largely due to a lack of recorded data and the absence of any national programmes. Though recent National Sports Policies have called for major investment in elite sport (Ministry of Planning and Development, 2006; Ministry of Sport and Youth Affairs, 2002), there is a glaring lack of strategies, systematic or otherwise, aimed at identifying or even developing young sporting talent.

While there are no existing studies that have examined the effect of sports offered by schools and P.E teachers on the sport their gifted students may have specialised in, it is believed that they may play a major role in recognising and nurturing talent. One possible explanation for this is the presocialisation effect (Tranckle & Cushion, 2006). This phenomenon proposes that extraneous factors including parents, media and peers impact the child's preconceived idea about a sport sub culture (Tranckle & Cushion, 2006). If the child considers their presumptions alluring, it can subsequently affect natural selection in sport (Tranckle & Cushion, 2006).

The aim of the present study is to examine the sports offered by secondary schools during P.E. in T&T and whether any relationship exists between this and the success of the country in particular sports. It is expected that this will be the first in a series of studies aimed at identifying and understanding factors that limit sport provision in schools and eventually offering possible solutions to enhance this.

6.6.2. Study 2: Governance of Sports in Trinidad and Tobago

The elite sporting landscape in any country is typically composed of an intricate matrix of governing bodies, spanning the spectrum from ministries of sports at the upper levels to community based clubs at the bottom. These governing bodies are essential for the development of elite athletes and the overall survival of sports as they provide essential services including funding, facilities, competitions and coaching.

On a global perspective, there is an increasing transmogrification of sports from amateur to professional levels largely owing to an augmented interest in and the economic (Burger, n.d.) and social impacts of sport. Given the increasing array of pressures from multiple internal and external stakeholders (e.g., revenue generation, increasing membership, producing world class athletes), good governance practices are considered imperative for the effective management of governing bodies (Yeh & Taylor, 2008). Good governance allows for the activities of governing bodies to be monitored and allows for maximum benefits to be delivered to stakeholders (Yeh & Taylor, 2008). Poor governance structures have a range of deleterious effects including withdrawal of sponsorship, reduced participation and membership numbers and the probable intervention of external agencies in extreme cases (Yeh & Taylor, 2008).

Good governance practices provide a framework to assist the board members of sporting organisations implement and maintain effective governance systems suited to their respective sport (Australian Sports Commission, 2009). Furthermore, it provides stakeholders with a yardstick for measuring the performance of the organisation (Australian Sports Commission, 2009). Several authors have examined governance practices of sporting organisations (Burger, n.d.; Reade & Edwards, n.d.; Yeh & Taylor, 2008).The Australian Sports Commission (2009) identified 3 major concerns of good governance including:

- the methods by which the sporting organisation develops goals and directions
- how the executive structure of the sporting organisation monitors its performance with respect to its stated objectives and compliance with legal and regulatory obligations
- ensuring that the executive acts in the best interest of its members and stakeholders.

The Australian Sports Commission has attributed poor governance to a number of factors including inexperience of directors, conflict of interests (internally and externally), breakdown in financial controls, weak internal systems and reporting. The Australian Sports Commission asserts that the pernicious effect of poor governance is not limited to the sport involved but impacts the sporting industry as a whole.

Trinidad and Tobago elite sporting structure is closely aligned to that which exists in the United Kingdom and Australia (Figure 1). The Sports Company of Trinidad and Tobago which was established in 2004 has a similar function to UK Sport and the Australian Institute of Sport including administering sports, managing and maintaining facilities, disbursement of funds to organisations and overseeing the overall elite sports system (MOSTT, n.d.a). Very little, however, is known about the governance practices of the various branches within the sporting model and the relationships that exist between the organisations.

This study serves to address the aforementioned gap on the structure of the sporting system in T&T and the governance practices of the systems involved. To achieve this, representatives of each organisation (MOSTT, SPORRT, Olympic and Paralympic Committees, the 14 NGBs) and selected community based sports clubs will be invited to participate in a live questionnaire session streamed via Skype. The questionnaire will seek to elicit information pertaining to their organisational composition, funding, athlete identification and development programmes and the relationship between the various organisations.

Both studies included above are survey based and copies of the questionnaires are included in the Appendix C (p. 272). Though they were unable to be completed for this thesis, they will be completed in the future as they are important issues to consider when designing NTIDs.

REFERENCE LIST

Abbott, A., Button, C., Pepping, G., & Collins, D. (2005). Unnatural selection: Talent identification and development in sport. *Nonlinear Dynamics, Psychology and Life Sciences, 9*(1), 61–88.

Abbott, A., & Collins, D. (2002). A theoretical and empirical analysis of a ‘state of the art’ talent identification model. *High Ability Studies*, *13,* 157–178.

Abbot, A., & Collins, D., (2004). Eliminating the dichotomy between theory and practice in talent identification and development: Considering the role of psychology. *Journal of Sports Sciences*, *22,* 395–408.

Ackerman, P. L. (2014). Nonsense, common sense, and science of expert performance: Talent and individual differences. *Intelligence, 45*, 6–17.

Adams, J. A. (1987). Historical review and appraisal of research on the learning, retention, and transfer of human motor skills. *Psychological Bulletin, 101*(1), 41–74.

Ahamad, G., Naqvi, S. K., & Beg, M. M. S. (2013). A model for identification in cricket based on OWA Operator. *International Journal of Information Technology & Management Information Systems, 4*(2), 40–55.

Aleksanda, N., Mirkov, D. M., Kukolj, M., Ugarkovic, D., & Jaric, S. (2007). Effect of maturation on the relationship between physical performance and body size. *Journal of Strength and Conditioning Research, 21*(1), 245–250.

Al–Majali, F. (1996). A cross–cultural comparison of the impact of organisational size on organizational structure: a meta–analysis study. *Journal of Economics and Administrative Sciences, 12*, 126–151.

An, P., Rice, T., Gagnon, J., Borecki, I. B., Pérusse, L., Leon, A. S., et al. (1999). Familial aggregation of resting blood pressure and heart rate in a sedentary population: The HERITAGE Family Study. *American Journal of Hypertension*, *12*(3)*,* 264–270.

Andreff, W. (2001). The correlation between economic underdevelopment and sport. *European Sport Management Quarterly*, 1, 251 – 279.

Andreff, W., & Szymanski, S. (2006). Sport in developing countries. In W. Andreff & S. Szymanski (Eds.), *Handbook on the economics of sport* (pp. 308–315). Cheltenham: Edward Elgar Publishing Limited.

Andreff, W. (2001). The correlation between economic underdevelopment and sport. *European Sport Management Quarterly, 1*(4), 251–279.

Araújo, D., Fonseca, C., Davids, K., Garganta, J., Volossovitch, A., Branadão, R., et al. (2010). The role of ecological constraints on expertise development. *Talent Development & Excellence, 2*(2), 165–179.

Australian Government Independent Sports Panel. (2009). *The future of sport in Australia.* Retrieved 20th November, 2011 from http://www.health.gov.au/internet/main/publishing.nsf/Content/1DDA76A44E5F4DD4CA257671000E4C45/$File/Crawford_Report.pdf (Retrieved 20.11.11).

Australian Law Reform Commission. (2001). *Sport: Talent identification and performance genes.* Retrieved 20th November, 2011 from http://www.alrc.gov.au/publications/38-sport/talent-identification-and-performance-genes

Australian Sports Commission. (2009). Governance principles: A good practice guide. Retrieved July 2nd, 2013 from: http://www.goodgovsport.eu/files/GGGS_WEB/Files/3_Governance_principles_-_a_good_practice_guide.pdf

Australian Sports Commission. (2010). *Australian Sports Commission Act 1989: Act No. 12 of 1989 as amended*. Canberra: Office of Legislative Drafting and Publishing.

Australian Sports Commission. (2011a). *National talent search.* Retrieved 20th November 2011 from https://secure.ausport.gov.au/news/fact_sheets/national_talent_search

Australian Sports Commission. (2011b). *Talent identification and development a priority.* Retrieved 20th November, 2011 from http://www.ausport.gov.au/sportscoachmag/development_and_maturation2/talent_identification_and_development_a_priority

Australian Sports Commission. (2011c). *What is the ASC?* Retrieved 20th November, 2011 from http://www.ausport.gov.au/about/what_is_the_asc

Baade, R. A., Baumann, R. W., & Matheson, V. A. (2011). Big men on campus: Estimating the economic impact of college sports on local communities. *Regional Studies, 45*(3), 371–380.

Bailey, R., & Collins, D. (2013). The standard model of talent development and its discontents. *Kinesiology Review, 2*, 248–259.

Bailey, R., & Moley, D. (2006). Towards a model of talent development in physical education. *Sport, Education and Society, 11*(3), 211–230.

Baker, J. (2003). Early specialization in youth sport: A requirement for adult experience? *High Ability Studies*, *14*(1), 85–94.

Baker, J., Côté, J., & Abernethy, B. (2003). Sport specific training, deliberate practice and the development of expertise in team ball sports. *Journal of Applied Sport Psychology, 15,* 12–25.

Baker, J., Côté, J., & Deakin, J. (2005). Expertise in ultra–endurance triathletes early sport involvement, training structure and the theory of deliberate practice. *Journal of Applied Sport Psychology, 17*, 64–78.

Baker, J., & Horton, S. (2004). A review of primary and secondary influences on sport expertise. *High Ability Studies, 15*(2), 211–228.

Baker, J., Horton, S., Robertson–Wilson, J., & Wall, M. (2003). Nurturing sport expertise: Factors influencing the development of elite athlete. *Journal of Sports Science and Medicine, 2,* 1–9.

Ball, D. W. (1972). Olympic Games competition: structural correlates of national success. *International Journal of Comparative Sociology, 13*, 186–2000.

Baptiste, A. (2013). Dancing brave: Olympic success saves bad year for sport. *Trinidad and Tobago Guardian*. Retrieved 12th November 2014 from http://www.guardian.co.tt/sport/2013-01-02/olympic-success-saves-bad-year-sport

Baskerville, R. F. (2003). Hofstede never studied culture. *Accounting, Organizations and Society, 28*, 1–14.

Bergsgard, N. A., & Rommetvedt, H. (2006). Sport and politics. *International Review for the Sociology of Sport, 41*(1), 7–27.

Bernard, A. B., & Busse, M. R. (2004). Who wins the Olympic Games: Economic resources and medal totals. *The Review of Economics and Statistics, 86*(1), 413–417.

Besson, G. A. (2011). Cricket. *The Caribbean History Archives*. Retrieved 14th October 2014 from http://caribbeanhistoryarchives.blogspot.co.uk/2011/11/cricket.html

Best, M. H. (1990). *The new competition: Institutions of industrial restructuring*. Cambridge, UK: Polity Press.

Beunen, G., & Thomis, M. (2004). Gene powered? Where to go from heritability (h^2) in muscle strength and power? *Exercise and Sports Science Reviews, 32*(4), 148–154.

Bhagat, R. S., & McQuaid, S. J. (1982). Role of subjective culture in organizations: A review and directions for future research. *Journal of Applied Psychology Monograph, 67*(5), 653–685.

Bloyce, D., & Smith, A. (2010). *Sport policy and development.* London: Routledge.

Bock, A. J., Opsahl, T., George, G., & Gann, D. M. (2012). The effects of culture and structure on strategic flexibility during business model innovation. *Journal of Management Studies, 49*(2), 279–305.

Böhkle, N., & Robinson, L. (2009). Benchmarking of élite sport systems. *Management Decisions, 47*(1), 67–84.

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *American Educational Research, 34*(6), 3–15.

Bouchard, C., Daw, E. W., Rice, T., Pérusse, L., Gagnon, J., Province, M. A., et al. (1998). Familial resemblance for VO2max in the sedentary state: The HERITAGE Family Study. *Medicine and Science in Sports and Exercise, 30*(2), 252–258.

Boyacigiller, N. A., Kleinberg, M. J., Phillips, M. E., & Sackman, S. A. (2004). Conceptualizing culture: Elucidating the streams of research in international cross-cultural management. In B. J. Punnett and O. Shenkar (Eds.). *Handbook for international management research* (2nd ed., pp 99–167). Ann Arbor: University of Michigan Press.

Bray, M. S., Hagberg, J. M., Pérusse, L., Rankinen, T., Roth, S. M., Wolfarth, B., & Bouchard, C. (2009). The human gene map for performance and health–related fitness phenotypes: The 2006–2007 update. *Medicine and Science in Sports and Exercise, 41*(1), 34–72.

Breitbach, S., Tug, S., & Simon, P. (2014). Conventional and genetic talent identification in sports: Will recent developments trace talent? *Sports Medicine, 44*, 1489–1503.

Bridge, M. W., & Toms, M. R. (2012). The specialisation or sampling debate: A retrospective analysis of adolescent sports participation in the UK. *Journal of Sports Sciences, iFirst Article*, 1–10.

British Broadcasting Company Sport (BBC Sport). (2013). *Olympics: Medal Table*. Retrieved 24th May 2013 from http://www.bbc.co.uk/sport/olympics/2012/medals/countries

Brockman, R., Jago, R., & Fox, K. R. (2011). Children's active play: Self–reported motivators, barriers and facilitators. *BMC Public Health, 11, 461*. Retrieved 18th May 2013 from http://www.biomedcentral.com/1471-2458/11/461.

Buchheit, M., & Mendez–Villanueva, A. (2013). Reliability and stability of anthropometric and performance measures in highly–trained young soccer players: Effect of age and maturation. *Journal of Sports Sciences, 31*(12), 1332–1343.

Bullock, N., Gulbin, J. P., Martin, D. T., Ross, A., Holland, T., & Marino, F. (2009). Talent identification and deliberate programming in skeleton: Ice novice to Winter Olympian in 14 months. *Journal of Sports Sciences*, *27*(4), 397–404.

Burger, S. (n.d.). Compliance with best practice governance principles of South African sport federations. Retrieved July 2nd, 2013 from: http://www.easm.net/index.php?option=com_rubberdoc&view=doc&id=932&format=raw&Itemid=187

Burgess, D. J., & Naughton, G. A. (2010). Talent development in adolescent team sports: a review. *International Journal of Sports Physiology and Performance*, *5,* 103–116.

Burgess, D., Naughton, G., & Hopkins, W. (2012). Draft–camp predictors of subsequent career success in the Australian Football League. *Journal of Science in Medicine and Sport, 15*(6), 561–567.

Burr, J. F., Jamnik, R. K., baker, J., Macpherson, A., Gledhill, N., & McGuire, E. J. (2008). Relationship of physical fitness test results and hockey playing potential in elite–level ice hockey players. *Journal of Strength and Conditioning Research, 22*(5), 1535–1543.

Calvo, M., Rodas, G., Vallejo, M., Estruch, A., Arcas, A., Javierre, C., et al. (2002). Heritability of explosive power and anaerobic capacity in humans. *European Journal of Applied Physiology*, *86,* 218–225.

Carlson, R. (1988). The socialization of elite tennis players in Sweden: an analysis of the player's backgrounds and development. *Sociology of Sport Journal*, *5,* 241–256.

Central Intelligence Agency (CIA). (2014). *The World Factbook*. The Central Intelligence Agency (CIA). Retrieved 29th October 2011 from https://www.cia.gov/library/publications/the-world-factbook/

Child, J. (1972). Organizational structure, environment and performance: The role of strategic choice. *Sociology, 6*(1), 1–22.

China Culture. (2012). *China State General Administration of Sport.* Retrieved 27th January, 2012 from http://www1.chinaculture.org/library/2008-01/16/content_127447.htm

Chow, C. W., Shields, M. D., & Wu, A. (1999). The importance of national culture in the design of and preference for management controls for multi–national operations. *Accounting, Organizations and Society, 24*, 441–461.

Christi, C. J. (2012). The Physical Demands of Batting and Fast Bowling in Cricket. In K. R. Zaslav (Ed.). *An International Perspective on Topics in Sports Medicine and Sports Injury*. Retrieved 24th December, 2014 from http://ads.ad-center.com/offer?prod=101&ref=4981811&q=An_International_Perspective_on_Topics_in_Sports_Medicine_and_Sports_Injury.pdf

Christie, C. J., Todd, A. I., & King, G. A. (2008). Selected physiological responses during batting in a simulated cricket bout: A pilot study. *Journal of Science and Medicine in Sport, 11*, 581–584.

Cobb, P., Confrey, J., diSessa, A., Lehrer, R., & Schauble, L. (2003). Designing experiments in educational research. *Educational Researcher, 32,* 9–13.

Coe, R. (2002). It's the effect size, stupid: What effect size is and why is it important. *EDUCATION–LINE*. Retrieved 13th December 2014 from http://www.leeds.ac.uk/educol/documents/00002182.htm

Collins, D., & Bailey, R. (2012). 'Scienciness' and the allure of second–hand strategy in talent identification and development. *International Journal of Sport Policy and Politics*, DOI:10.1080/19406940.2012.656682.

Collins, D., Bailey, R., Ford, P. A., MacNamara, Á., Toms, M., & Pearce, G. (2012). Three worlds: New directions in participant development in sport and physical activity. *Sport, Education and Society, 17*, 225–243.

Côté, J. (1999). The influence of the family in the development of talent in sport. *The Sport Psychologist, 13*, 395–417.

Côté, J., Baker J., & Abernethy B. (2007). Practice and Play in the Development of Sport Expertise. In G. Tenenbaum and R. C. Eklund (Eds.). *Handbook of Sport Psychology* (3rd ed, pp. 184–202). New Jersey: Wiley & Sons.

Côté, J., Ericsson, K. A, & Law, M. P. (2005). Tracing the development of athletes using retrospective interview methods: a proposed interview and validation procedure for reported information. *Journal of Applied Sport Psychology, 17*, 1–19.

Council of Europe. (2001). *The European Sports Charter* (revised). Brussels: Council of Europe. Retrieved 16th June, 2014 from http://www.sportdevelopment.info/index.php/browse-all-documents/87-council-of-europe-2001-the-european-sports-charterrevised-brussels-council-of-europe-

Crandall, E. J. (2007). *Why children play sports? A parent's, coach's and athlete's perspective* (Master's Thesis). Retrieved 14th May 2013 from http://rave.ohiolink.edu/etdc/view?acc_num=marietta1177444973.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1997). *Talented teenagers: The roots of success & failure*. New York: Cambridge University Press.

Cycling Australia. (2012). *State institutes and academies.* Retrieved 13th June 2012 from http://www.cycling.org.au/default.asp?id=8935 (Retrieved 13.01.12).

De Bosscher, V., De Knop, P., & Heyndels, B. (2003). Comparing tennis success among countries. *International Sports Studies, 25*(1), 49–68.

De Bosscher, V., De Knop, P., van Bottenburg, M., & Shibli, S. (2006). A conceptual framework for analysing sports policy factors leading to international sporting success. *European Sports Management, 6*(2), 185–215.

De Bosscher, V., De Knop, P., van Bottenburg, M., Shibli, S., & Bingham, J. (2009). Explaining international sporting success: An international comparison of elite sport systems and policies in six countries. *Sport Management Review, 12*, 113–136.

De Bosscher, V., Shibli, S., van Bottenburg, M., De Knop, P., & Truyens, J. (2010). Developing a method for comparing the elite sport systems and policies of nations: A mixed research methods approach. *Journal of Sport Management*, *24,* 567–600.

Delorme, N., & Raspaud, M. (2009). The relative age effect in young French basketball players: A study on the whole population. *Scandinavian Journal of Medicine & Science in Sports, 19*(2), 235–242.

De Bosscher, V., Shilbury, D., Theeboom, M., van Hoecke, J., & De Knop, P. (2011). Effectiveness of national elite sport policies: A multidimensional approach applied to the case of Flanders. *European Sport Management Quarterly*, *11*(2), 115–141.

De Mooij, M., & Hofstede, G. (2010). The Hofstede Model: Applications to global branding and advertising strategy and research. *International Journal of Advertising, 29*(1), 85–110.

De Mooij, M., & Hofstede, G. (2011). Cross-cultural consumer behaviour: A review of research findings. *Journal of International Consumer Marketing, 23*, 181–192.

Detterman, D. K. (2014). Introduction to the intelligence issue on the development of expertise: Is ability necessary? *Intelligence, 45*, 1–5.

Digel, H. (2002). A comparison of competitive sport systems. *New Studies in Athletics, 17*, 37–49.

DiMaggio, P. (1997). Culture and cognition. *Annual Review of Sociology, 23*(1), 263–287.

Dolowitz, D., & Marsh, D. (1996). Who learns from whom: A review of the policy transfer literature. *Political Studies, 44,* 343–357.

Douda, H. T., Toubekis, A. G., Avloniti, A. A., & Tokmakidis, S. P. (2008). Physiological and anthropometric determinants of rhythmic gymnastics performance. *International Journal of Sports Physiology and Performance, 3*, 41–54.

Drogendijk, R., & Slangen, A. (2006). Hofstede, Schwartz or managerial perceptions? The effects of different cultural distance measures on establishment mode choices by multinational enterprises. *International Business Review, 15*, 361–380.

Duffield, R., Carney, M., & Karppinen, S. (2009). Physiological responses and bowling performance during repeated spells of medium–fast bowling. *Journal of Sports Sciences, 27*(1), 27–35.

Du Randt, R. (2008). Talent identification in sport: Practices and issues. *Continuing Medical Education, 26*(7), 352.

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students' exercise motivation of physical activity. *Journal of American College Health, 59*(5), 399–406.

Elling, A., Van Hilvoorde, I., & Van Den Dool, R. (2012). Creating or awakening national pride through sporting success: A longitudinal study on macro effects in the Netherlands. *International Review for the Sociology of Sport, 0*(0), 1–23.

Ericsson, K. A., Krampe, R. T., & Tesch–Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100*, 363–406.

Eriksson, N., Macpherson, J. M., Tung, J. Y., Hon, L. S., Naughton, B., Saxonov, S. (2010). Web–based, participant–driven studies yield novel genetic associations for common traits. *PloS One*, 6(6).e1000993., doi:10.1371/journal.pgen.1000993

European Union. 2014). Sport as a Growth Engine for the EU Economy. Retrieved 25th January 2015 from http://europa.eu/rapid/press-release_MEMO-14-432_en.htm

Falk, B., Lidor, R., Lander, Y., & Lang, B. (2004). Talent identification and early development of elite water–polo players: A 2–year follow up study. *Journal of Sports Sciences, 22*(4), 347–355.

Fellay, S. (2014). Saved by the goalkeeper. Soccer and elections. *Harvard International Review, 36*(1), 33–35.

Fernandez, D. R., Carlson, D. S., Stepina, L. P., & Nicholson, J. D. (1997). Hofstede's country classification 25 years later. *The Journal of Social Psychology, 137*(1), 43–54.

Fernández–Río, J., & Méndez–Giminénez, A. (2014). Talent detection and development in soccer: A review. *Journal of Sport and Health Research, 6*(1), 7–18.

Ford, P.R., Le Gall, F., Carling, C., & Williams, A. M. (2007). A cross–cultural comparison of the participation histories of English and French elite youth soccer players. *Journal of Sports Science and Medicine, 10*, 139–142.

Ford, P. R., Ward, P., Hodges, N. J., & Williams, A. M. (2009). The role of deliberate practice and play in career progression in sport. The early engagement hypothesis. *High Ability Studies, 20*, 65–75.

Foster, C., Hillsdon, M., Cavill, N., Allender, S., & Cowburn, G. (2005). *Understanding participation in sport – A systematic review*. London: Sport England.

Frey, J. H. & Eitzen, D. S. (1991). Sport and society. *Annual Review of Sociology, 17*, 503–522.

Gabbett, T., Georgieff, B., & Domrow, N. (2007). The use of physiological, anthropometric, and skill data to predict selection in a talent–identified junior volleyball squad. *Journal of Sports Sciences, 25*(12), 1337–1344.

Gagné, F. (2008). Talent development: Exposing the weakest link. *Revista Espaňola de Pedagogia, 240*, 221–240.

Gelfand, M., Nishii, L., & Raver, J. L. (2006). On the nature and importance of cultural tightness. *Journal of Applied Psychology, 91*, 1225–1244.

Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., et al. (2011). Differences between tight and loose cultures: A 33-nation study. *Science, 332*, 1100–1104.

Gibson, C. B. (1994). The implications of national culture for organizational structure: An investigation of three perspectives. *Advances in International Comparative Management, 9*, 3–38.

Gonaus, C., & Müller, E. (2012). Using physiological data to predict future career progression in 14– to 17–year–old Austrian soccer academy players. *Journal of Sports Sciences, 30*(15), 1673–1682.

Government Human Resource Services (GHRS). (n.d.). *Scholarships*. Retrieved 15th September, 2011 from http://www.ghrs.gov.tt/resources/article.aspx?id=5256

Government of Trinidad and Tobago (GOTT). (2002). *National Sport Policy of Trinidad and Tobago*. Port of Spain, Trinidad: Government Printers.

Government of Trinidad and Tobago (GOTT). (2006). *Vision 2020: Draft National Strategic Plan*. Port of Spain, Trinidad: Government Printers.

Grandjean, A. C. (1989). Macronutrient intake of US athletes compared with the general population and recommendations made for athletes. *American Journal of Clinical Nutrition, 49*, 1070–1076.

Grandjean, A. C. (1989). Macronutrient intake of US athletes compared with the general population and recommendations made for athletes. *American Journal of Clinical Nutrition, 49*, 1070–1076.

Gray, H. J. (2010). “She’s a natural”: Identifying and developing athletic talent. *Journal for the Education of the Gifted, 33*(3), 361–380.

Green, M. (2005). Integrating macro– and meso–level approaches: A comparative analysis of elite sport development in Australia, Canada and the United Kingdom. *European sport management quarterly, 5*(2), 143–166.

Green, M. (2006). From ‘sport for all’ to not about ‘sport’ at all? Interrogating sport policy interventions in the United Kingdom. *European Sport Management Quarterly, 6*(3), 217–238.

Green, M. (2007). Policy transfer, lesson drawing and perspectives of elite sport development systems. *International Journal of Sport Management and Marketing, 2*, 426–441.

Green M., & Houlihan, B. (2004). Advocacy coalitions and elite sport policy change in Canada and the United Kingdom. *International Review for the Sociology of Sport, 39*(4), 387–403.

Green, M., & Houlihan, B. (2005). *Elite sport development: Policy learning and political priorities*. London: Routledge.

Green, M., & Oakley, B. (2001). Elite sport development systems and playing to win: Uniformity and diversity in international approaches. *Leisure Studies, 20*, 247–267.

Gu, C., Borecki, I., Gagnon, J., Bouchard, C., Leon, A. S., Skinner, J. S., et al. (1998). Familial resemblance for resting blood pressure with particular reference to racial differences: Preliminary analyses from the HERITAGE Family Study. *Human Biology, 70*(1), 77–90.

Gulev, R. E. (2009). Are national and organizational cultures isomorphic? Evidence from a four country comparative study. *Managing Global Transitions, 7*, 259–279.

Güllich, A. (2011a). Evaluation of institutional support for young athletes in elite sports systems. *Paper presented at the Science for Success Conference, Jyväskylä*, 11–12th October, 2011 (pp. 26–30). Finland: Research Institute for Olympic Sports.

Güllich, A. (2011b). Training quality in high–performance youth sport. *Paper presented at the Science for Success Conference, Jyväskylä*, 11–12 October (pp. 17–21). Finland: Research Institute for Olympic Sports.

Güllich, A., & Emrich, E. (2014). Considering long–term sustainability in the development of world class success. *European Journal of Sport Science, 14*, S383–S397.

Hamel, P., Simoneau, J. A., Lortie, G., Boulay, M. R., & Bouchard, C. (1986). Heredity and muscle adaptation to endurance training. *Medicine and Science in Sports and Exercise, 18*, 690–696.

Hedstrom, R., & Gould, D. (2004). *Research in Youth Sports: Critical Issues in Status*. Retrieved 17th November 2014 from http://www.educ.msu.edu/ysi/project/CriticalIssuesYouthSports.pdf

Helsen, W. F., Hodges, N. J., Van Winckel, J., & Starkes, J. L. (2000). The roles of talent, physical precocity and practice in the development of soccer expertise. *Journal of Sports Sciences, 18,* 727–736.

Helsen, W. F., Starkes, J. L., & Hodges, N. J. (1998). Team sports and the theory of deliberate practice. *Journal of Sport and Exercise Psychology, 20*, 12–34.

Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise, 11*(3), 212–222.

Henry, I. (2009). European models of sport: Governance, organisational change and sports policy in the EU. *Hitotsubashi Journal of Arts and Sciences, 50*, 41–52.

Hickson, D. J., & Pugh, D. S. (1995). *Management worldwide: The impact of societal culture on organizations around the globe*. London: Penguin.

Hill, G. M. (1993). Youth sport participation of professional baseball players. *Sociology of Sport Journal, 10,* 107–114.

Hoare, D. G. (2000). Predicting success in junior elite basketball players – the contribution of anthropometric and physiological attributes. *Journal of Science and Medicine in Sport, 3*(4), 391–405.

Hoare, D. G., & Warr, C. R. (2000). Talent identification and women's soccer: An Australian experience. *Journal of Sports Sciences, 18*(9), 751–758.

Hodge, T., & Deakin, J. (1998). Deliberate practice and expertise in the martial arts: The role of context in motor recall. *Journal of Sport and Exercise Psychology, 20*, 260–279.

Hodges, N. J., & Starkes, J. L. (1996). Wrestling with the nature of expertise: A sport specific test of Ericsson, Krampe and Tesch–Römer's (1993) theory of deliberate practice. *International Journal of Sport Psychology, 27*, 400–424.

Hodgkins, C. (2013). *Designing organisational structures that work*. Retrieved 12th December, 2014 from http://www.philosophyib.com/3/wholebrain/designing-os-that-work

Hodgson, A., Siemieniuch, C. E., Hubbard, E. M., & Sinclair, M. A. (2010). Modelling the human components of complex systems*. Proceedings of the 5th International Conference on System of Systems Engineering (SoSE), Loughborough*, 22–24 June 2010. Retrieved 16th May 2013 from 10.1109/SYSOSE.2010.5544068 (Retrieved 07.05.12).

Hoffman, R., Ging, L. C., & Ramasamy, B. (2002). Public policy and Olympic success. *Applied Economic Letters, 9*, 545–548.

Hoffman, R., Ging, L. C., & Ramasamy, B. (2004). Olympic success and ASEAN countries. *Journal of Sports Economics, 5*(3), 262–276.

Hofstede, G. (1980). *Culture's consequences: International differences in work related values*. London: Sage.

Hofstede, G. (1985). The interaction between national and organizational value systems [1]. *Journal of Management Studies, 22*(4), 347–357.

Hofstede, G. (1998). Attitudes, values and organizational culture: Disentangling the concepts. *Organization Studies, 19*(3), 477–493.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). California: Sage.

Hofstede, G. (2003). What is culture? A reply to Baskerville. *Accounting, Organizations and Society, 28*, 811–813.

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede Model in context. *Online readings in psychology and culture: International Association for Cross–*

Cultural Psychology. Retrieved 17th June, 2013 from http://dx.doi.org/10.9707/2307-0919.1014

Hofstede, G., & McCrea, R. R. (2004). Personality and culture revisited: Linking traits and dimensions of culture. *Cross–Cultural research, 38*, 52–88.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations. Software of the mind* (3rd ed.). New York: McGraw-Hill.

Hogan, K., & Norton, K. (2000). The 'price' of Olympic gold. *Journal of Science and Medicine in Sport, 3*, 203–218.

Hohmann, A., & Seidel, I. (2003). Scientific aspects of talent development. *International Journal of Physical Education*, 40(1), 9–20.

Holt, N. L. (2003). Coping in professional sport: A case study of an experienced cricket player. *Athletic Insight: The Online Journal of Sport Psychology, 5*(1), 1–11.

Holt, N. L., Kingsley, B. C., Tink, L. N., Scherer, J. (2011). Benefits and challenges associated with sport participation with children and parents from low–income families. *Psychology of Sport and Exercise, 12*(5), 490–499.

Hong, F., Wu, P., & Xiong, H. (2005). Beijing ambitions: An analysis of the Chinese elite sports system and its Olympic strategy for the 2008 Olympic games. *The International Journal of the History of Sport, 22*(4), 510–529.

Houlihan, B. (2009). Mechanisms of international influence on domestic elite sport policy. *International Journal of Sport Policy and Politics, 1*, 51–69.

Houlihan, B., & Green, M. (2008). Comparative elite sport development. In B. Houlihan and M. Green (Eds.). *Comparative elite sport development: Systems, structures and public policy*. Oxford: Butterworth–Heinemann.

Houlihan, B., & Green, M. (2009). Modernization and sport: The reform of Sport England and UK Sport. *Public Administration, 87*, 678–698.

House, R., Javidan, M., Hanges, P., & Dorfman, P. (2002). Understanding cultures and implicit leadership theories across the globe: An introduction to project GLOBE. *Journal of World Business, 37*, 3–10.

House of Commons. (2010). *Olympic and Paralympic Games 2012: Legacy – Culture, Media and Sport Committee Contents.* Retrieved 10th October, 2011 from http://www.publications.parliament.uk/pa/cm200910/cmselect/cmcumeds/416/416we08.htm

Howe, M. J. A., Davidson, J. W., & Sloboda, J. A. (1998). Innate talents: Reality or myth? *Behavioral and Brain Sciences, 21*, 399–442.
Howell, R. (1975). The USSR: Sport and politics intertwined. *Comparative Education, 11*(2), 137–145.

Hoye, R., Smith, A., Westerbeek, H., Stewart, B., & Nicholson, M. (2006). *Sport management: Principles and applications*. Oxford: Elsevier.

International Amateur Athletics Federation (IAAF). (2009). *Statistics: Records by event*. Retrieved 15th September, 2011 from http://www.iaaf.org/statistics/records/inout=o/discType=5/disc=100/detail.html

International Olympics Committee (IOC). (2009). *Trinidad and Tobago.* Retrieved 15th September, 2011 from http://www.olympic.org/trinidad-and-tobago

Johnson, M. B., Castillo, Y., Sacks, D. N., Cavazos Jr., J., Edmonds, W. A., & Tenenbaum, G. (2008). “Hard work beats talent until talent decides to work hard”: Coaches’ perspectives regarding differentiating elite and non–elite swimmers. *International Journal of Sports Science and Coaching, 3*(3), 417–430.

Jones, M. (1998). Talent selection in throwing events. *Track Coach, 142*, 4530–4535.

Jones, M. L. (2007). *Hofstede – culturally questionable?* In Oxford Business & Economics Conference, 24–26 June, 2007.

Jones, H., Millward, P., & Buraimo, B. (2011). *Adult participation in sport: Analysis of the taking part survey*. London: Department for Culture, Media and Sport.

Jones, L. L., Petlichkoff, L. M. (2008). Early specialization versus quality physical education. *The Chronicles of Kinesiology and Physical Education in Higher Education*, 19(2), 5–7.

Julien, J. (2012). A house for Mr. Walcott. Retrieved 14th February, 2015 from http://www.trinidadexpress.com/news/A_HOUSE_FOR_MR_WALCOTT-166066756.html

Keogh, J. (1999). The use of physical fitness scores and anthropometric data to predict selection in and elite under 18 Australian Rules Football team. *Journal of Science and Medicine in Sport, 2*(2), 125–133.

Keogh, J. W. L., Weber, C. L., & Dalton, C. T. (2003). Evaluation of anthropometric, physiological, and skill–related tests for talent identification in female hockey. *Canadian Journal of Applied Physiology, 28*(3), 397–409.

Kirk, D., Carlson, T., O'Connor, A., Burke, P., Davis, K., & Glover, S. (1997). The economic impact on families of children's participation in junior sport. *Australian Journal of Science and Medicine, 29(2)*, 27–33.

Kirkman, B. L., Lowe, K. B., & Gibson, C. B. (2006). A quarter century of culture's consequences: A review of empirical research incorporating Hofstede's cultural values framework. *Journal of International Business Studies, 37*, 285–320.

Klissouras, V., Casini, B., Di Salvo, V., Faina, M., Marini, C., Pigozzi, F., Pittaluga, M., et al. (2001). Genes and Olympic performance: A co–twin study. *International Journal of Sports Medicine, 22*(4), 250–255.

Kock, R., & Burke, M. (2008). Managing talent in the South African public service. *Public Personnel Management, 37*(4), 457–470.

Koivula, N. (1999). Sport participation: Differences in motivation and actual participation due to gender typing. *Journal of Sport Behaviour, 22*(3), 360–380).

Kondrič, M., Sindik, J., Furjan–Mandić, G., & Schiefler, B. (2013). Participation motivation and student's physical activity amongst sport students in three countries. *Journal of Sports Science and Medicine, 12*, 10–18.

Krasilshchikov, O. (2011). Talent recognition and development – elaborating on a principle model. *International Journal of Developmental Sport Management, 1*, 1–11.

Krebs, R. J. (2009). Bronfenbrenner's bioecological theory of human development and the process of development of sports talent. *International Journal of Sport Psychology, 40*, 108–135.

Krokosz–Krynke, Z. (1988). *Organizational structure and culture: Do individualism/collectivism and power distance influence organizational structure? Proceedings of the Academy of Business and Administrative Sciences – Emerging Economies International Conference, Budapest, Hungary*, 13–15 July 1998. Retrieved 12th December 2011 from http://www.sba.muohio.edu/ABAS/1998/krokosz.pdf

Lander, E. S., Linton, L. M., Birren, B., Nusbaum, C., Zody, M. C., Baldwin, J., Devon, K., et al. (2001). Initial sequencing and analysis of the human genome: International Human Genome Consortium. *Nature, 409*(6822), 860–921.

Leitch Review of Skills. (2006). *Prosperity for all in the global economy – World class skills*. Retrieved 14th November, 2006 from http://www.delni.gov.uk/leitch_finalreport051206[1]-2.pdf

Leite, N., Sampaio, J. (2010). Early sport involvement in young Portuguese basketball players. *Perceptual and Motor Skills, 111,* 669–680.

Levermore, R., & Beacom, A. (2008). *Sport and International Development*. UK: Palgrave Macmillan.

Lincoln, J. R., Olson, J., & Hanada, M. (1978). Cultural effects of on organizational structure: The case of Japanese firms in the United States.* *American Sociological Review, 43*(6), 829–847.

Lidor, R., Côté, J., & Hackfort, D. (2009). ISSP position stand: To test or not to test? The use of physical skill tests in talent detection and early phases of sport development. *International Journal of Sport and Exercise Psychology, 9*, 131–146.

Lippi, G., Longo, U., & Maffulli, N. (2010). Genetics and sports. *British Medical Bulletin, 93*, 27–47.

Liu, W. (2003). Field dependence–independence and sports with a preponderance of closed or open skill. *Journal of Sport Behaviour, 26,* 285–297.

Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children: reviewed of associated health benefits. *Sports Medicine, 40,* 1019–1035.

MacArthur, D. G., & North, K. N. (2005). Genes and human elite athletic performance. *Human Genetics, 116*, 331–339.

MacDonald, D., Cronin, J., Mills, J., McGuigam, M., & Stretch, R. (2013). A review of cricket fielding requirements. *South African Journal of Sports Medicine, 25*(3), 87–92.

Maes, H. H., Beunen, G. P., Vlietinck, R. F., Neale, M. C., Thomis, M., Vanden Eynde, B., et al. (1996). Inheritance of physical fitness in 10–yr–old twins and their parents. *Medicine and Science in Sports and Exercise, 28*, 1479–1491.

Malcolm, D. (2012). The social construction of the sociology of sport: A professional project. *International Review of the Sociology of Sport, 17*, doi: 10.1177/1012690212452362.

Malina, R. (2010). Early sports specialization: Roots, effectiveness, risks. *Current Sports Medicine Reports, 9*(6), 364–371.

Mamchan, V. (2014). World class aquatic centre for Couva. Trinidad and Tobago Guardian. Retrieved 14th January, 2015 from http://www.guardian.co.tt/sport/2014-05-13/world-class-aquatic-centre-couva

Martindale, R. J. J., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest, 57*, 353–375.

McCree, R. (2009). Sport policy and the new public management in the Caribbean: Convergence or resurgence? *Public Management Review, 11*(4), 461–476.

McCree, R. (n.d.). *The Exclusion of Sport From Caribbean Economic Development*. The University of the West Indies' (Trinidad). Retrieved 15th September, 2011 from http://sta.uwi.edu/salises/workshop/csme/paper/rmccree.pdf

McCullagh, P., Matzkanin, K. T., Shaw, S. D. & Maldonado, M. (1993). Motivation for participation in physical activity: A comparison of parent–child perceived competencies and participation motives. *Pediatric Exercise Science, 5*, 224–233.

McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences: A triumph of faith – a failure of analysis. *Human Relations, 55*(1), 89–118.

Medland, S. E., & Hatemi, P. K. (2009). Political science, biometric theory, and twin studies: A methodological introduction. *Political Analysis, 17*, 191–214.

Meyers, M. C., Van Woerkom, M., & Dries, N. (2013). Talent – innate or acquired? Theoretical considerations and their implications for talent management. *Human Resource Management Review, 23*, 305–321.

Miah, A., & Rich, E. (2006). Genetic tests for ability? Talent identification and the value of an open future. *Sport, Education and Society, 11*(3), 259–273.

Ming–Xiang, L. (2012). Comparison of the studies on intercultural communication*. US–China Foreign Language, 10(5), 1207–1213.

Ministry of Planning and Development. (2006). *Vision 2020: Draft National Strategic Plan*. Government of Trinidad and Tobago: Ministry of Planning and Development.

Ministry of Sport Trinidad and Tobago (MOSTT). (n.d.a)The Sports Company of Trinidad and Tobago. Retrieved July 2nd, 2013 from: http://www.sportt-tt.com/Whoweare.aspx

Ministry of Sport Trinidad and Tobago (MOSTT). (n.d.b). *Request funding.* Retrieved 19th November, 2014 from http://www.sport.gov.tt/

Ministry of Sport and Youth Affairs. (2002). *National Sport Policy of Trinidad and Tobago*. Government of Trinidad and Tobago: Ministry of Sport and Youth Affairs.

Ministry of Sport and Youth Affairs (MYSA). (2008). Elite Athlete Assistance Programme. Retrieved 15th September, 2011 from http://www.msya.gov.tt/home/index.php?option=com_content&task=view&id=86&Itemid=112

Moesch, K., Elbe, A., Hauge, M. T., & Wikman, J. M. (2011). Late specialization: The key to success in centimeters, grams, or seconds (cgs) sports. *Scandinavian Journal of Medicine and Science in Sports, 21*(6), e282–e290. doi: 10.1111/j.1600-0838.2010.01280.x.

Moesch, K., Hauge, M. T., Wikman J. M., & Elbe, A. (2013). Making it to the top in team sports: Start later, intensify, and be determined. *Talent Development & Excellence, 5*(2), 85–100.

Mohamed, H., Vaeyens, R., Matthys, S., Multael, M., LeFerve, J., Lenoir, M., (2009). Anthropometric and performance measures for the development of a talent detection and identification model in youth handball. *Journal of Sports Sciences, 27*(3), 257–266.

Murcia, J. A. M., Blanco, M. L. S. R., Galindo, C. M., Villodre, N. A. & Coll, D. G. (2007). Effects of the gender, the age and the practice frequency in the motivation and the enjoyment of the physical exercise. *Fitness and Performance, 6*(3), 140–146.

Myslinski, T. (2002). The Russian Conjugate Sequence System. Retrieved 15th September, 2010 from http://www.elitefts.com/documents/TomMyslinski.pdf

Nakamura, Y. (1996). Sports Policy in Japan. In L. Chalip, A. Johnson and L. Stachura (Eds.). *National sports policies: An international handbook*. Connecticut: Greenwood Press.

Nathan, G. (2015). A non–essentialist model of culture: Implications of identity, agency and structure within multinational/multicultural organizations. *Cross Cultural Management, 15*(1), 101–124.

National Audit Office. (2008). *Preparing for sporting success at the 2012 Olympic Games and Paralympic Games and beyond*. London: The Stationery Office.

National Library Information Services (NALIS). (2015). *The History of Cricket*. Retrieved 12th January, 2015 from http://www.nalis.gov.tt/Research/SubjectGuide/Sport/Cricket/tabid/181/Default.aspx

Nauright, J. (2004). Global games: Culture, political economy and sport in the globalised world of the 21st century. *Third World Quarterly*, *25*(7), 1325–1336.

Nelson, M. (2005). Sports history as a vehicle for social and cultural understanding in American history. *The Social Studies, 96*, 118–125.

Nelson, R. R., & Winter, S. G. (1982). An evolutionary theory of economic change. London: Belknap Press.

Nevill, A. M., Balmer, N. J., & Winter, E. M. (2009). Why Great Britain's success in Beijing could have been anticipated and why it should continue beyond 2012. *British Journal of Sports Medicine, 43*, 1108 – 1110.

Newman, K. L., & Nollen, S. D. (1996). Culture and congruence: the fit between management practices and national culture. *Journal of International Business Studies, 27*(4), 753–779.

Newmark, A. J. (2002). An integrated approach to policy transfer and diffusion. *Review of Policy Research, 19*(2), 151–178.

Nieuwenhuis, C. F., Spamer, E. J., & Van Rossum, J. H. A. (2002). Prediction function for identifying talent in 14– to 15–year–old female field hockey players. *High Ability Studies, 13*(1), 21–33.

Noakes, T. D., & Durandt, J. J. (2000). Physiological requirements of cricket. *Journal of Sports Sciences, 18*, 919–929.

Oakley, B., & Green, M. (2001). The production of Olympic champions: International perspectives on elite sport development. *European Journal for Sport Management, 8*, 83–105.

Orchard, J., James, T., Kountouris, A., & Portus, M. (2010). Changes to injury profile (and recommended cricket injury definitions) based on the increased frequency of Twenty20 cricket matches. *Open Access Journal of Sports Medicine, 1*, 63–76.

Pankhurst, A., & Collins, D. (2013). Talent identification and development: The need for coherence between research, system, and process. *Quest, 65,* 83–97.

Pankhurst, A., Collins, D., & MacNamara, Á. (2013). Talent development: Linking the stakeholders to the process. *Journal of Sport Sciences*, *31,* 370–380.

Parker, D., Burns, P., & Natarajan, H. (2008). Player valuations in the Indian premier league [online version]. *Frontier Economics*. Retrieved 16th November 2014 from http://www.frontier-economics.com/documents/2008/10/player-valuations-in-the-indian-premier-league-frontier-paper.pdf

Paszokowska, G. (1998). *Does the degree of uncertainty avoidance and social masculinity influence organizational structure? Proceedings of the Academy of business and administrative sciences – emerging economies international conference proceedings, Budapest, Hungary*, 13–15 July 1998. Retrieved 12th December, 2011 from http://www.sba.muohio.edu/ABAS/1998/paszkowska.pdf

Payne, W. R., Hoy, G., & Carlson, J. S. (1986). *Exercise Physiology and Cricket Performance: Summary Report*. Australia: Australian Sports Commission.

Pearson, D. T., Naughton, G. A., & Torode, M. (2006). Predictability of physiological testing and the role of maturation in talent identification for adolescent team sports. *Journal of Science and Medicine in Sports*, 9, 277–287.

Perkins, D. N., & Salomon, G. (1992). Transfer of learning. *International Encyclopaedia of Education, 2* [Online version]. Retrieved 17 December, 2014 from: https://learnweb.harvard.edu/alps/thinking/docs/traencyn.htm

Pérusse, L., Gagnon, J., Province, M. A., Rao, D. C., Wilmore, J. H., Leon, A. S., et al. (2001). Familial aggregation of submaximal aerobic performance in the HERITAGE Family Study. *Medicine and Science in Sports and Exercise, 33*(4), 597–604.

Petersen, C., Pyne, D. B., Portus, M. J., & Dawson, B. (2008). Analysis of Twenty/20 cricket performance during the 2008 Indian premier league. *International Journal of Performance Analysis in Sport, 8*(3), 63–69.

Petry, K., Steinbach, D., Toskarski, W. (2004). Sport systems in the countries of the European Union: Similarities and differences. *European Journal for Sport and Society, 1*, 15–21.

Pfeffer, J., & Leblebici, H. (1973). The effect of competition on some dimensions of organizational structure. *Social Forces, 52*(2), 268–279.

Phillips, E., Davids, K., Renshaw, I., & Portus, M. (2010). Expert performance in sport and the dynamics of talent development. *Sports Medicine, 40*(4), 271–283.

Pink, B. (2008). *Defining Sport and Physical Activity, a Conceptual Model*. Australia: Australian Bureau of Statistics.

Puthucheary, Z., Skipworth, J. R. A., Rawal, J., Loosemore, M., Van Someren, K., Montgomery, H. E. (2011). The ACE gene and human performance: 12 years on. *Sports Medicine, 41*(6), 433–448.

Pyne, D. B., Gardner, A. S., Sheehan, K., & Hopkins, W. G. (2005). Fitness testing and career progression in AFL football. *Journal of Science and Medicine in Sport, 8*, 321–332.

Reade, I. L., & Edwards, J. R. (n.d.). Structure and governance in the Alberta system: Who is accountable? Retrieved July 2nd, 2013 from: http://www.sportmanagement.ca/docs/105/Structure%20gov%20and%20account%20in%20AB%20sport%20system%20sept-08.pdf

Reilly, T., Williams, A. M., Nevill, A., & Franks, A. (2000). A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences, 18*, 695–702.

Rose, R. (2005). *Learning from comparative public policy*. London: Routledge.

Rosenbaum, D. A., Carlson, R. A., & Gilmore, R. O. (2001). Acquisition of intellectual and perceptual–motor skills. *Annual Review of Psychology, 52,* 453–470.

Roth, S. M. (2012). Critical overview of applications of genetic testing in sport talent identification. *Recent Patents on DNA & Gene Sequences, 6*, 247–255.

Ryan, R. M. and Deci, E. L. (2000). Self–determination theory and the facilitation of intrinsic motivation, social development, and well–being. *American Psychologist, 55,* 68–78.

Schorer, J., Baker, J., Büsch, D., Wilhelm, A., & Pabst, J. (2009). Relative age, talent identification and youth skill development: Do relatively younger athletes have superior technical skills? *Talent Development & Excellence, 1*(1), 45–56.

Schorer, J., Wattie, N., & Baker, J. R. (2013). A new dimension to relative age effects: Constant year effects in German youth handball. *PLS One*, 8(4), DOI: 10.1371/journal.pone.0060336

Schwartz, S. H. (1992). Universals in the context and structure of values: Theoretical advances and empirical tests in 20 countries. In M.P. Zanna (Ed.). *Advances in experimental psychology* (pp 1–62). San Diego: Academic Press.

Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology, 48*(1), 23–47.

Seefeldt, V., Ewing, M., & Walk, S. (1993). Overview of youth sports programs in the United States. Retrieved 16th November, 2014 from http://files.eric.ed.gov/fulltext/ED360267.pdf

Shearer, D. To play ball, not make war. Sports, diplomacy and soft power. *Harvard International Review, 36*(1), 53–57.

Sherar, L. B., Baxter–Jones, A. D. G., Faulkner, R. A., & Russell, K. W. (2007). Do physical maturity and birth rate predict talent in male youth ice hockey players? *Journal of Sports Science, 25*(8), 879–886.

Silventoinen, K., Magnusson, P. K. E., Tynelius, P., Kaprio, J., & Rasmussen, F. (2008). Heritability of body size and muscle strength in young adulthood: A study of one million Swedish men. *Genetic Epidemiology, 32*, 341–349.

Singh, R. (2012). Holiday for a hero. Retrieved 14th February, 2015 from http://www.trinidadexpress.com/news/HOLIDAY_FOR_A_HERO-165939366.html

Sirard, J. R., Pfeiffer, A. and Pate, R. R. (2006). Motivational factors associated with sports participation in middle school students. *Journal of Adolescent Health, 38*, 696–703.

Smircich, L. (1983). Concepts of culture and organisational analysis. *Administrative Science Quarterly, 28*, 339–358.

Sorokowski, P. (2009). Influence of culture on sports achievements: The case of sprint relay teams from Japan, Brazil, the USA and Great Britain. *Human Movement, 10*(2), 176–181.

Sotiriadou, P., & Brouwers, J. (2012). A critical analysis of the impact of the Beijing Olympic Games on Australia's sport policy direction. *International Journal of Sport Policy and Politics, 4*(3), 321-341.

Sotiriadou, K., & Shilbury, D. (2009). Australian elite athlete development: An organisational perspective. *Sport Management Review, 12*, 137–148.

Sotiriadou, K., Shilbury, D., & Quick, S. (2008). The attraction, retention/transition and nurturing process of sport development: Some Australian evidence. *Journal of Sport Management, 22*, 247–272.

Smeeton, N. J., Ward, P., & Williams, A. M. (2004). Do pattern recognition skills transfer across sports? A preliminary analysis. *Journal of Sports Sciences*, 22, 205–213.

Spray, C. M., John Wang, C. K., Biddle, S. J. H., & Chatzisarantis, N. L. D. (2006). Understanding motivation in sport: An experimental test of achievement goal and self determination theories. *European Journal of Sport Science, 6*(1), 43–51.

Starkes, J. L. (2003). The magic and the science of sport expertise: Introduction to sport expertise research and this volume. In J. L. Starkes, & K. A. Ericsson (Eds.). *Expert Performance in sports: Advances in research on sport expertise* (pp. 3–15). Champaign, Ill: Human Kinetics.

Starkes, J. L., Deakin, J. M., Allard, F., Hodges, N. J., & Hayes, A. (1996). Deliberate practice in sports: What is it anyway? In K. A. Ericsson (Ed.). *The Road to Excellence: The acquisition of expert performance in the arts, sciences, sports and games* (pp. 81–106). New Jersey: Lawrence Erlbaum Associates.

St Clair Gibson, A., Broomhead, S., Lambert, M. I., & Hawley, J. A. (1998). Prediction of maximal oxygen uptake from a 20–m shuttle run test as measured directly in runners and squash players. *Journal of Sports Sciences, 16*, 331–335.

Strenze, T. (2013). Allocation of talent in society and its effect on economic development. *Intelligence, 41*, 193–202.

Strauch, B. (2010). Can cultural differences lead to accidents? Team cultural differences and sociotechnical system operations. *Human Factors, 52*, 246–263.

Stuelcken, M., Pyne, D., & Sinclair, P. (2007). Anthropometric characteristics of elite cricket fast bowlers. *Journal of Sports Sciences, 25*(14), 1587–1597.

Swidler, A. (1986). Culture in action: Symbols and strategies. *American Sociological Review, 51*, 273–286.

Talented Athletes Scholarship Scheme (TASS). (n.d.). *About us: What is the Talented Athlete Scholarship Scheme?* Retrieved 21st March, 2011, from http://www.tass.gov.uk/pages/about-us.html

Taras, V., Kirkman, B. L, & Steel, P. (2010). Examining the impact of culture's consequences: A three-decade, multi-level, meta-analytic review of Hofstede's cultural value dimensions. *Journal of Applied Psychology, 95*, 405–439.

Taras, V., Steel, P., & Kirkman, B. L. (2011). Three decades of research on national culture in the workplace: Do the differences still make a difference? *Organizational Dynamics, 40*, 189–198.

Tavakoli, A. A., Keenan, J. P., Crnjak–Karanovic, B. (2003). Culture and whistleblowing an empirical study of Croatian and United States managers utilizing Hofstede's cultural dimensions. *Journal of Business Ethics, 43*, 49–64.

Tayeb, M. (1994). Organizations and national culture: Methodology considered. *Organization Studies, 15*, 429–445.

Tcha, M., & Pershin, V. (2003). Reconsidering performance at the Summer Olympics and revealed comparative advantage. *Journal of Sports Economics, 4*(3), 216–238.

Terzi, A. R. (2011). Relationship between power distance and autocratic–democratic tendencies. *Educational Research and Reviews, 6*(7), 528–535.

Teixeira, L. A. (2000). Timing and force components in bilateral transfer of learning. *Brain and Cognition, 44,* 455–469.

The Committee on Science, Engineering and Public Policy. (2007). *Beyond bias and barriers: Fulfilling the potential of women in academic science and engineering*. Retrieved 14th November, 2014 from http://www.nap.edu/openbook.php?record_id=11741

The Sports Company of Trinidad and Tobago (SPORTT). (n.d.). *Who we are*. Retrieved 15th September, 2011 from http://www.sportt-tt.com/Whoweare.aspx

Thomis, M. A., Beunen, G. P., Maes, H. H., Blimkie, C. J., Vane Leemputte, M., Claessens, A. L., et al. (1998). Strength training: Importance of genetic factors. *Medicine and Science in Sports and Exercise, 30*, 724–731.

Thomspon, A. H., Barnsley, R. H., & Stebelsky, G. (1991). “Born to play ball”. The relative age effect and Major League Baseball. *Sociology of Sport Journal, 8*, 146–151.

Thompson, J. D., 1967. *Organizations in action*. New York: McGraw–Hill.

Till, K., Cobley, S., O’Hara, J., Brightmore, A., Cooke, C., & Chapman, C. (2011). Using anthropometric and performance characteristics to predict selection in junior UK Rugby League players. *Journal of Science and Medicine in Sport, 14*(3), 264–269.

Tourism Development Company (TDC). (2014). *Cricket*. Retrieved 12th October, 2014 from http://www.gotrinidadandtobago.com/trinidad/sports/

Tranckle, P., & Cushion, C. J. (2006). Rethinking giftedness and talent in sport. *Quest, 58*, 265–282.

Trinidad & Tobago Cricket Board (TTCB). (2011). *About Us*. Retrieved 14th December, 2014 from http://ttcb.co.tt/ttcb/AboutUs.aspx

Trinidad and Tobago Newsday (TTN). (2008). Football, athletics get lions' share. Retrieved 15th December, 2014 from http://www.newsday.co.tt/businessday/0,86018.html

Trinidad and Tobago Newsday (TTN). (2013). Lewis wants 10 Olympic golds by 2024. Retrieved 15th December, 2014 from http://www.newsday.co.tt/sport/0,179967.html

Trinidad Express Newspapers. (2015). *Bassarath: Lack of Funds to Blame for 2014*. Retrieved 14th February, 2015 from http://www.trinidadexpress.com/sports/Bassarath-Lack-of-funds-to-blame-for-2014-287300371.html

Trinidad Guardian. (2015a). *Achieving value for sporting facilities*. Retrieved 14th February, 2015 from http://www.guardian.co.tt/sport/2015-01-25/achieving-value-sporting-facilities

Trinidad Guardian. (2015b). *Lack of funding for women's football team*. Retrieved 2015 from http://m.guardian.co.tt/editorial/2014-10-10/lack-funding-women%E2%80%99s-football-team

TTConnect. (2015). *Sports*. Retrieved 14th February 2015 from https://www.ttconnect.gov.tt/gortt/portal/ttconnect/SharedDetail/?WCM_GLOBAL_CONTEXT=/gortt/wcm/connect/GorTT%20Web%20Content/ttconnect/home/about+t+and+t/general+information/sports

Tucker, R., & Collins, M. (2012). What makes champions? A review of the relative contribution of genes and training to sporting success. *British Journal of Sports Medicine*, 46, 555–561.

Tung, R. L., & Verbeke, A. (2010). Beyond Hofstede and GLOBE: Improving the quality of cross–cultural research. *Journal of International Business Studies, 41*, 1259–1274.

UK Sport. (2003). *'Investing in change' – high-level review of the modernisation programme for governing bodies of sport*. London: Deloitte & Touche.

UK Sport. (2011a). *About UK Sport.* Retrieved 20th November, 2011 from http://www.uksport.gov.uk/pages/about-uk-sport/

UK Sport. (2011b). *Talent identification and development.* Retrieved 20th November, 2011 from http://www.uksport.gov.uk/pages/talent-id/

UK Sport. (2011c). *Talent id – past campaigns.* Retrieved 20th November, 2011 from http://www.uksport.gov.uk/pages/past-campaigns/ (Retrieved 20.11.11).

UK Sport. (2015). *How the funding works*. Retrieved 20th November 2014 from http://www.uksport.gov.uk/pages/how-the-funding-works/

UK Sport, & English Institute of Sport (EIS). (n.d.). *World class talent, confirmation & development: A framework for talent managers and coaches*. London: UK Sport.

UNESCO. (2003). *Study of the Situation of Sport in Least Developed Countries*. Retrieved May 5, 2011, from http://portal.unesco.org/en/ev.php-URL_ID=2163&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html

United Nations. (n.d.). Small Island Developing States: Country Profiles. Retrieved May 5, 2011, from http://www.unohrlls.org/en/sids/44/

United Nations Development Programme (UNDP). (2014). *Human Development Report 2014*. Retrieved 23rd February 2014 from http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/TTO.pdf

Vaeyens, R., Güllich, A., Warr, C. R., & Philippaerts, R. (2009). Talent identification and promotion programmes of Olympic athletes. *Journal of Sports Sciences, 27*(13), 1367–1380.

Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport. *Sports Medicine, 38*(9), 703–714.

Vaeyens, R., Malina, R. M., Janssens, M., Van Renterghem, B., Bourgois, J., Virjens, J., et al. (2006). A multidisciplinary selection model for youth soccer: the Ghent Youth Soccer Project. *British Journal of Sports Medicine, 40*, 928–934.

Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology, 11*(1), 142–169.

Van Oudenhoven, J. P. (2001). Do organizations reflect national cultures? A 10–nation study. *International Journal of Intercultural Relations, 25*, 89–107.

Veale, J. P., Pearce, A. J., Buttifant, D., & Carlosn, J. S. (2010). Anthropometric profiling of elite junior and senior Australian Football players. *International Journal of Sports Physiology and Performance, 5*, 509–520.

Veale, J. P., Pearce, A. J., Koehn, S., & Carlson, J. S. (2008). Performance and anthropometric characteristics of prospective elite junior Australian footballers: A case study in one junior team. *Journal of Science and Medicine in Sport, 11*(2), 227–230.

Venter, J. C., Adams, M. D., Myers, E. W., Li, P. W., Mural, R. J., Sutton, G. G., & Smith, H. O. (2001). The sequence of the human genome. *Science, 291*(5507), 1304–1351.

VOCASPORT Research Group. (2004). Vocational education and training in the field of sport in the European Union: Situation, trends and outlook. Retrieved 20th November, 2011 from http://www.eose.org/ktmlpro/files/uploads/Final%20Report%20English%20Version.pdf (Retrieved 08.03.14).

Ward, P., Hodges, N. J., Williams, A. M., & Starkes, J. L. (2002). *Deliberate practice and expert performance: defining the path to excellence.* Retrieved 20th November, 2011 from http://hkin.educ.ubc.ca/faculty/hodgesn/msl/docs/ward_chap.pdf (Accessed on March 21 2011).

Washington, R. E., & Karen, D. (2001). Sport and society. *Annual Review of Sociology, 27*, 187–212.

Wikipedia. (2013). *All–time Olympic Games medal table.* Retrieved 15th May, 2013 from http://en.wikipedia.org/wiki/All-time_Olympic_Games_medal_table

Williams, A. M., & Ericsson, K. A. (2005). Perceptual–cognitive expertise in sport: Some considerations when applying the expert performance approach. *Human Movement Science, 24,* 283–307.

Williamson, D. (2002). Forward from a critique of Hofstede's model of national culture. *Human Relations, 55*(11), 1373–1395.

Wilson, D., & Ramchandani, G. (n.d.). *Home advantage in the Commonwealth Games*. Retrieved 9th June, 2013 from http://easm.net/index.php?option=com_rubberdoc&view=doc&id=619&format=raw

Wolfle, D. (1960). Diversity of talent. *The American Psychologist, 15*(8), 535–545.

Wolstencroft, E. (2002). *Talent Identification and Development: An Academic Review*. Edinburgh: SportsScotland.

Woods, J. (2005). Talking sport or talking balls? Realising the value of sports heritage. *Industrial Archaeology Review*, *27,* 137–144.

Woodside, A. G., Hsu, S., & Marshall, R. (2011). General theory of cultures' consequence on international tourism behaviour. *Journal of Business Research*, *64,* 785–799.

Xu, X. (2006). Modernizing China in the Olympic spotlight: China's national identity and the 2008 Beijing Olympiad. *The Sociological Review, 54*(2), 90–107.

Yamamoto, M. Y. (2008). Japan. In B. Houlihan and M. Green (Eds.). *Comparative elite sport development: Systems, structures and public policy*. Oxford: Butterworth–Heinemann.

Yan, J. H. and McCullagh, P. (2004). Cultural influence on youth's motivation of participation in physical activity. *Journal of Sport Behaviour, 27*, 378–390.

Yeh, C. M., & Taylor, T. (2008). Issues of governance in sport organisations: A question of board size, structure and roles. *World Leisure, 1*, 33–45.

Yelvington, K. A. (1990). Ethnicity 'not out': The Indian cricket tour of the West Indies and the 1976 elections in Trinidad and Tobago. *Arena Review, 14*(1), 1–12.

Young, M. (n.d.). *Psychological characteristics of elite athletes.* Retrieved from 16th May, 2013 from http://www.elitetrack.com/article_files/sportpsych.pdf.

Young, B. W., Jemczyk, K., Brophy, K., & Côté, J. (2009). Discriminating skilled coaching groups: quantitative examination of developmental experiences and activities. *International Journal of Sports Science and Coaching, 4,* 397–414.

Żyśko, J. (2008). Poland. In B. Houlihan and M. Green (Eds.). *Comparative elite sport development: Systems, structures and public policy*. Oxford: Butterworth–Heinemann.

APPENDIX A

PHYSIOLOGICAL TESTING IN ELITE AND NON–ELITE JUNIOR MALE CRICKETERS

PARTICIPANT INFORMATION SHEET

Department of Life Sciences,
Kingston University,
Penrhyn Road,
Kingston-upon-Thames,
KT1 2EE

Date:

Title of Study: Differences in physiological profiles between elite and sub–elite junior athletes

Dear Parent / Guardian,

Your son/daughter/ward is being invited to take part, as a volunteer, in a study being conducted by Joel Paul, a postgraduate student in the School of Life Sciences, Kingston University, Kingston upon Thames. The study involves a series of fitness tests and we would like to ask your permission for your son/daughter/ward to participate. Before you consent to your son's/daughter's/ward's participation, it is important that you understand why the research is being done, what it involves and the risks and benefits to your son/ward. Should you have any questions, please do not hesitate to contact me or one of my supervisors using the contact information below.

What is the purpose of this study?

This study is being conducted to examine whether differences exist between the performance of elite and inexperienced male and female athletes in a series of fitness tests.

What is required of your child?

Your son/daughter/ward will be required to attend Kingston University on *(insert date)* to complete a series of fitness tests. Please see below for the list of tests.

Body Composition

1) height
2) weight
3) arm span
4) skinfold measurements at eight selected sites on the right side of the body

Physical/Fitness Tests

1) sit–up test
2) push–up test
3) seated chest pass
4) vertical jump

5) 505 agility test (child runs to the end of a 15 metre course and returns to the starting position as quickly as they can)
6) 20 metre sprint
7) 20 meter Multistage Fitness Test (Beep Test)

Two additional tests will be conducted before your child/ward commences the above tests. Firstly, a sample of their saliva will be taken. Saliva sampling provides a way assessing the pubertal development of your child/ward. Recent research has shown that success in several fields, including music and sport is related to the ratio between the second and fourth fingers in males and females. To test this theory, a copy of your child's/ward's left and right hands will be taken.

Before commencing the Fitness Tests, your son/daughter/ward will warm-up for 10 minutes and practice the tests before any information is recorded. We will make sure that they have the opportunity to rest and have some refreshments between tests (please be advised that refreshments will not be provided the researcher). Your son/daughter/ward will be required to wear a pair of shorts, trainers and light t–shirt. They are also required to bring a drink. The researcher will be accompanied by qualified assistants, both of whom have been CRB (Police) checked. You are also invited to attend the sessions.

What are the risks and benefits of participating?

Every possible precaution will be taken to ensure that risks to your son/daughter/ward are small. We will make sure that your son/daughter/ward is properly warmed up before commencing activities and that all activities and rules are clearly explained. The intensity of the fitness tests involved is typically equivalent to the activities involved in your son's/daughter's/ward's training session. However, there is always a small risk that your son/daughter/ward could accidentally fall or injure himself and experience sickness due to physical exertion. In the unlikely event of this occurring, a qualified First Aider will also be on hand throughout the duration of the test.

As a token of our appreciation, your son/daughter/ward will be given a £5 iTunes music voucher for successfully completing all the tests. Additionally, we can provide your son/daughter/ward a copy of his test results which provides an idea of their fitness level if he/she requests it. This will also be made available to the coach if your son/daughter/ward agrees to it.

You and your child/ward's privacy

While you son's/daughter's/ward's name will be collected, every effort will be made to ensure their privacy. Your son/daughter/ward will be assigned a special number and his/her name will be kept separate from his/her results to prevent the data from being personally identifiable to him/her. The data will also be encrypted and password protected. The collected information will be transferred to a password protected computer and kept for 5 years. Only my supervisors and I will have access to this information. The information will not be shared with any third parties, stored or used for any unrelated analysis. All printed copies of the information will be destroyed. The results of your son's/daughter's/ward's fitness test will only be made available to their coach if he/she agrees to it.

What will happen to the results of this study?

The results of this study will be submitted to scholarly journals for publication, presented at meetings and conferences, and used for the completion of my postgraduate studies.

Do you require further information before participating in the study?

If you would like anything clarified, have any questions or require further information about the study please do not hesitate to contact me or my supervisor using the information below:

Researcher:

Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 020 8417 2476

Study Supervisors:

Professor Andrea Petroczi – **email:** A.Petroczi@kingston.ac.uk – **phone:** 020 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk
– **phone:** 020 8417 7097

What should you do if you want to take part in the study?
If you are happy to allow your child/ward to take part in the study, please

- Explain to your child the contents of this letter and check they are happy to take part.
- Read and sign the Parental Consent Form
- Please get them to write their name and sign where indicated on the Child Consent Form
- Complete the short Medical History Information sheet
- Bring all of the above on the first day of testing

Please be advised that participation in this study is entirely voluntary and you are free to withdraw or your child/ward is free to withdraw himself/herself without prejudice. Thank you for supporting this project.

Yours sincerely

Joel Paul,
PhD student.

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

PARENTAL CONSENT FORM

Title of Project: Differences in physiological profiles between elite and sub–elite junior athletes

Researcher

Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 020 8417 2476

Project Supervisors

Professor Andrea Petroczi – **email:** A.Petroczi@kingston.ac.uk
phone: 020 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk
phone: 020 8417 7097

I (name of parent/guardian) .... am the parent/guardian of .... (name of son/daughter/ward).

Please read the following and initial the boxes at the end of each.

1. I confirm that I have read and understand the attached Information Sheet dated .... for the above study. I have had the opportunity to consider the information, to ask questions and have had these answered satisfactorily.

2. I certify that I understand the procedures to be used and have fully explained them to the above named child/ ward.

3. I understand that my son's/daughter's/ward's participation is voluntary and that he/she is free to withdraw at any time without giving a reason and without his/her legal rights being affec

4. I have had explained to me and understand that neither I nor my dependents will have any claim in law on Kingston University or its employees for any injury or misadventure, except when that injury or misadventure is caused by negligence.

5. I understand that consent is specific to the particular study outlined in the Information Letter , and shall not be taken to imply my consent to participate in any subsequent study or derivation from that detailed here.

Name of Parent/Guardian

Signature Date

Name of Researcher

Signature Date

WHEN COMPLETED – ONE COPY FOR PARTICIPANT, ONE COPY FOR RESEARCHER

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

PARTICIPANT CONSENT FORM

Title of Project: Differences in physiological profiles between elite and sub–elite junior athletes

Researcher
Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 020 8417 2476

Project Supervisors
Professor Andrea Petroczi – **email:** A.Petroczi@kingston.ac.uk
phone: 020 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk
phone: 020 8417 7097

Please tick **YES** or **NO** for each question

1. Have you read or had read to you the attached Information Sheet?

   □ Yes □ No

2. Do you understand what you will have to do for this study?

   □ Yes □ No

3. Do you understand that it is ok to stop taking part at any time?

   □ Yes □ No

4. Are you happy to take part in this study?

   □ Yes □ No

5. Are you happy for your coach to be given the results of your fitness test?

   □ Yes □ No

If you answer **NO** to any of questions 1-4 above or do not wish to take part in the study, then do not sign your name below.

Your Name Date

Signature

Name of Researcher

Signature Date

WHEN COMPLETED – ONE COPY FOR PARTICIPANT, ONE COPY FOR RESEARCHER

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

MEDICAL QUESTIONNAIRE

Title of Project: Differences in physiological profiles between elite and sub–elite junior athletes

Name of Son/Daughter/Ward:

Date of Birth:

Is your son/daughter/ward currently taking any medication?

□ Yes □ No

If YES, please provide details below

....

....

Does your child/ward suffer from or has suffered from:

Asthma □ Yes □ No

Type I Diabetes	□ Yes	□ No
Type II Diabetes	□ Yes	□ No
Bronchitis	□ Yes	□ No
Epilepsy	□ Yes	□ No
Any form of heart complaint	□ Yes	□ No

Do you know of any reason that may prevent your son/daughter/ward from participating in this study? □ Yes □ No

If YES, please provide details below

....

....

Name of Parent/Legal Guardian

Signature Date

Name of Researcher

Signature Date

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

Differences in physiological profiles between elite and sub–elite junior athletes.

ASSESSMENT PROTOCOLS

VOLUNTEER INFORMATION BOOKLET

Lead Researcher: Joel Paul BSc (HONS), MSc, PhD Candidate.

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

1. Study Information

1.1. What is the purpose of this study?

The purpose of this study is to examine whether differences exist between the performance of elite and sub–elite junior male cricketers in a series of physical tests.

1.2. What is the purpose of this booklet?

This booklet has been designed to provide volunteers and other personnel involved in the supervision and delivery of the battery of assessments. The assessments have been developed to:

- Provide the researcher with a physical/fitness profile of each athlete that will be assessed based on the qualities being tested
- Develop benchmarks that can be used for future assessments
- Supply a possible basis for future monitoring of the progress of the athlete

1.3. What is required of you?

- Please **FOLLOW ALL PROTOCOLS CLOSELY!** This booklet includes a list of all the tests that will be conducted and their related procedures. As you will notice the tests involved are “field tests” which means they have been designed to be used for as many people as possible. It is imperative that you follow the protocols for each test closely so as to ensure consistency of collection and recording of information from athlete to athlete, and test to test. Each test must be conducted in exactly the same way on each occasion to ensure that any variation in results is as a result of genuine differences in the ability of each athlete and not due to changes in measurement technique.
- Please **GIVE PROPER INSTRUCTION!** You should endeavour to ensure that each athlete understands exactly what is being measured, why it is being measured and what is required of them of them. Athletes will be provided with information on this during the pre–test briefing by the lead researcher.
- You are advised to **WEAR APPROPRIATE CLOTHING** which includes tracksuit bottom, t shirt and trainers (provided these are available to you).
- Please **STICK TO YOUR ASSIGNED ROLE THROUGHOUT THE ASSESSMENT DAY** unless you have been re–assigned by the lead researcher.
- Please ensure that you are **PROFESSIONAL AND ENCOURAGING** to all individuals attending the assessment day, regardless of their competency.
- At no point during the assessment should any volunteer disagree about the way a test is being conducted publicly. Should any issue arise, please report it to the lead researcher **QUIETLY AND IMMEDIATELY**.

2. Anthropometric

2.1. Standing Height

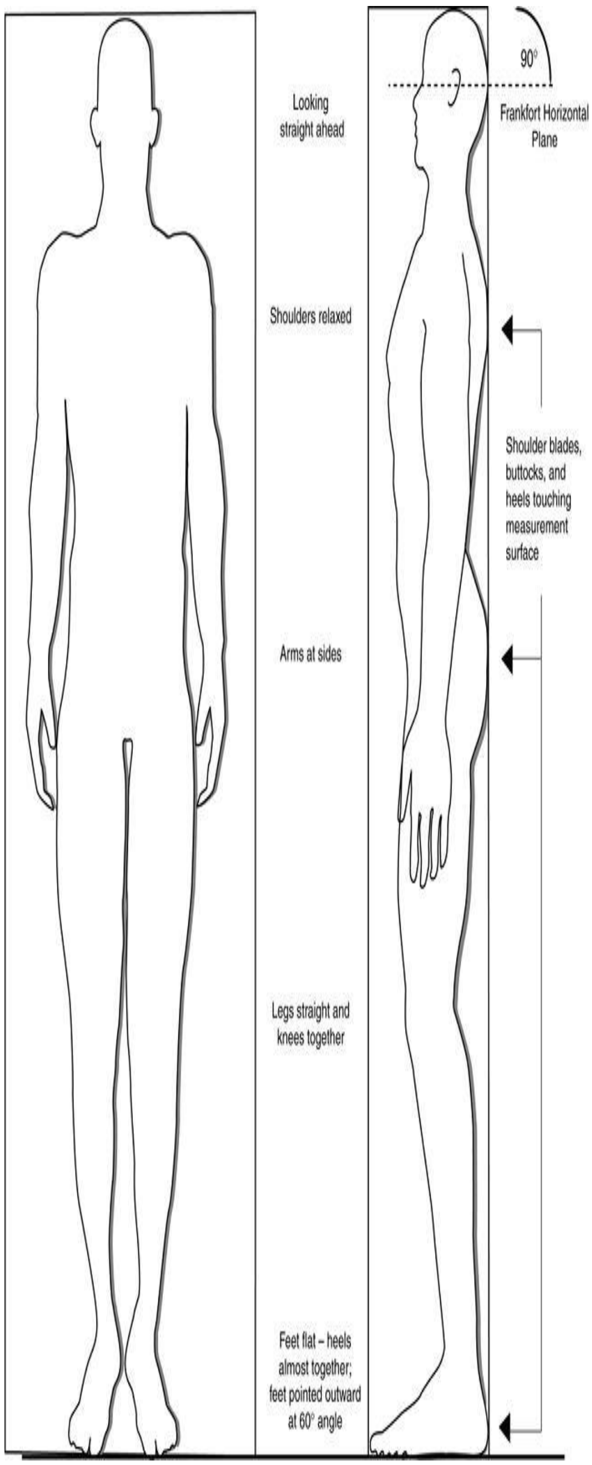
Equipment

- Stadiometer.

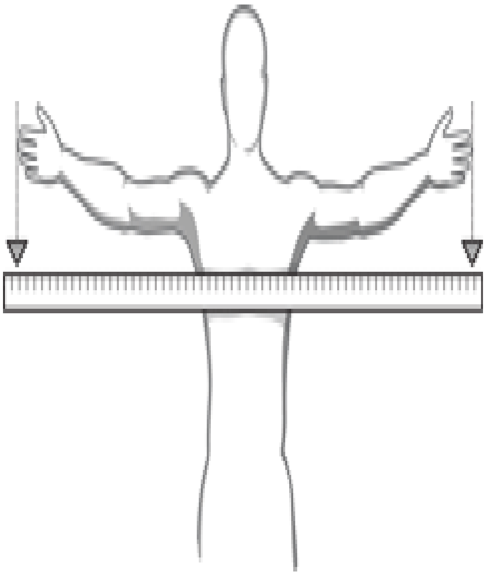
Set–Up

- Set up stadiometer against wall according to the included instruction manual.

Method


Looking straight ahead
Shoulders relaxed
Arms at sides
Legs straight and knees together
Feet flat – heels almost together; feet pointed outward at 60° angle
90°
Frankfort Horizontal Plane
Shoulder blades, buttocks, and heels touching measurement surface

2.2. Arm Span



Equipment

- Tape measure
- Rulers

Set–up

- Mount tape measure on flat, stable surface of wall

Method

- Have athlete stand with their back against the wall and heels together. Heels, buttocks and upper back should be in direct contact with the wall.
- Ask athlete to extend their hands horizontally (till shoulder height) and maximally. Palms should be facing out and knuckles touching the wall. The middle finger of the left hand should be at the zero point of the tape measure.
- Measurement should be taken about 5 seconds after the athlete assumes the position. Measure the distance between the dactylions of the right and left hands.
- If the participant is too short or tall, a ruler should be held up vertically so as to line up the distance of the dactylions and the tape measure.

Results

- Record arm span to the nearest 0.1cm.

2.3. Body Mass

Equipment

- Scales

Set–Up

- Place scale on a flat surface.
- Ensure that it is set to zero.

Method

- Athlete should be measured without shoes.
- Ask athlete to stand on the centre of the scale, as still as possible and looking straight ahead.

Result

- Body mass is recorded to the nearest 0.1kg.

3. Warm Up

Equipment

- Cones
- Gym mats

Set – Up

- Use cones to set up warm up perimeter.
- Ready gym mats for stretching sessions.

Method

- Have the athletes jog for 5 minutes.
- Lead the athletes through a 5 minute dynamic stretch session which should include **(1)** Walking Calf Raises **(2)** High Knee Skips **(3)** Lunges **(4)** Hamstring Walks **(5)** Bum Flicks.

- Allow the athletes 2 minutes of static stretching (assist if required).
- Allow athletes to have a drink (if required) before starting sprint sessions.

4. Speed Test

4.1. 20m Sprint Test

Equipment

- Timing gates
- Cones
- Measuring tape
- Marking tape

Set–Up

- Set the start line with marking tape and cones.
- Measure out a distance of 20m and place timing gates at the finish line.
- Timing gates should be set up at approximately hip height to avoid the leading leg or hand to break the beam.

Method

- The test is done from a standing start. Have athlete stand with feet behind the start line (no rocking movements are allowed).
- On your command, the athlete sprints to the finish line as fast as they can.
- Have the athlete complete 3 runs.

Results

- Record times to the nearest 0.01s.

5. Strength Tests

5.1. Push–Up Test.

Equipment

- N/A

Set–Up

- N/A

Method

- Have athlete lie prone on the floor with their hands placed at the level of their shoulders.
- Ask the athlete to fully extend their arms so that they are up on the palm of their hands and toes (legs must be fully extended and feet together).
- On your command, the athlete lowers their body till their elbows are at 90°. The athlete then extends their arms and returns to the start position.
- The athlete then continues this process for 30s or until volitional exhaustion (whichever occurs first).

Results

- The maximum number of positions completed in 30s (or until exhaustion) is recorded.

5.2. Pull–Up Test

Equipment

- Pull up bar

Set–Up

- Ensure pull up bar is attached to wall.

Method

- Have athlete hang from the bar with arms facing away from them and arms are extended (start position).
- Ask the athlete to pull up till the chin is above the bar. The athlete then returns to the start position.
- The athlete then continues this process for 30s or until volitional exhaustion or lets go of the bar (whichever occurs first).

Results

- The maximum number of positions completed in 30s (or until exhaustion) is recorded.

6. Power Tests

6.1. Standing Long Jump

Equipment

- Jump mat

Set–Up

- Place jump mat on flat, stable surface.

Method

- Ensure the athlete is standing behind the zero line on the jump mat with feet shoulder width apart.
- Inform athlete that they should take off and land with both feet.
- Athletes are allowed to bend their knees and swing their arms to provide forward momentum when jumping.
- Instruct the athlete to jump as far forward as possible, landing on both feet without falling backwards.
- Athletes are required to perform 3 jumps.
- Measurements are taken from the take off line to the nearest point of contact on the landing (the back of the heels).

Results

- Jumps are recorded to the nearest 0.1m.

7. Agility

7.1. 505 Agility Test

Equipment

- Timing gates
- Marking tape
- Cones
- Measuring tape

Set–Up

- Measure out a distance of 15m.
- Place cones at the zero (the start line), 10m and 15m.
- Place timing gates at the 10m line.

Method

- The test is done from a standing start. Have athlete stand with feet behind the start line (no rocking movements are allowed).
- On your command, the athlete sprints to the finish line as fast as they can.
- The time is recorded when the participant runs through the timing gates and stops on their return (i.e. the time it takes the athlete to get from the 10m line and back).
- Have the athlete complete 3 runs.

Results

- Record times to the nearest 0.01s.

8. Aerobic Endurance

8.1. 20m Multistage Shuttle Run Test (Beep Test)

Equipment

- Beep Test CD
- CD Player
- Cones
- Measuring tape
- Marking Tape

Set–Up

- Measure out a distance of 20m.
- Place cones and marking tape at the zero (the start line) and 20m lines.
- Place CD in CD player.

Method

- Have athletes line up at the start line. Participants are required to run the 20m course back and forth continuously
- Running pace will be regulated by the beeps emitted CD player.
- Advises athletes that the pace of the ‘beep’ increases as the CD progresses.
- Each successful run of the 20m course will be considered as the completion of a shuttle.
- Volunteers will be placed at either end of the course to monitor athlete progress. Volunteers are also encouraged to provide verbal encouragement to participants.
- Athletes will receive a verbal warning the first time they fall behind the shuttle. Their participation in the test will cease if they fail to complete the shuttle on 2 consecutive occasions or as a result of volitional exhaustion.

Results

- Record the last successful shuttle completed.

APPENDIX B

BASE AND CURRENT SPORT IN COMPETITIVE ATHLETES

PARTICIPANT INFORMATION SHEET

Identification of Base Sports in Talented Athletes: A Retrospective Analysis.

INFORMATION FOR POTENTIAL PARTICIPANTS

You are being invited to take part, as a volunteer, in a study being conducted by Joel Paul, a postgraduate student in the School of Life Sciences, Kingston University, London, United Kingdom. Before you decide whether or not you wish to participate in this study, it is important that you understand why the research is being done and what it involves. Please take time to read the following information carefully. Should you have any questions, please do not hesitate to contact me or one of my supervisors using the contact information above.

What is the purpose of this study?

This study is being conducted to examine whether a relationship exists between the sports played by an athlete during their childhood and the one they competed in as an elite adult athlete.

Who can participate?

This study is open to male and female athletes, 18 years and above and currently enrolled in the Talented Athlete Scholarship Scheme at universities across the United Kingdom.

What is required of you?

You will be asked to complete an online questionnaire on www.survey monkey.com. The survey consists of 34 questions designed to achieve an idea of the sports you competed in during your early years. The questionnaire should take approximately 15 - 20 minutes to complete.

What are the risks and benefits of participating?

There are no foreseeable risks to your physical or psychological health arising out of your involvement in this study. There is no direct benefit to you but this research is likely to be used to develop athletes in the future. It may also lead to future research investigating other effects of early sports on participation.

Do I have to take part in this study?

Your participation in this study is completely voluntary, hence the decision as whether to participate or not is entirely yours. By clicking “YES” below you are agreeing to take part in this study as a volunteer. Please be advised that you are free to discontinue this study at any time, without giving any reason. A decision to withdraw will not affect your rights, nor will any penalties be levied against you.

Your privacy

Any information collected in this study will be treated as privileged and confidential. All information collected will be anonymised using a special coding system and the results achieved will not be personally identified to you, shared with any third party, or stored/used for unrelated analysis. Data is stored on a password protected computer and kept for 5years, unless you specifically wish it to be deleted. Only my supervisors and I will have access to the information collected.

What will happen to the results of this study?

The results of this study will be submitted to scholarly journals for publication, presented at meetings and conferences, and used for the completion of my postgraduate studies.

Do you require further information before participating in the study?

If you would like anything clarified, have any questions or require further information about the study please do not hesitate to contact me or my supervisor using the information below.

What should you do if you want to take part in the study?

If you are happy to take part in the study, please click "Yes" below. Alternatively, if you do not wish to participate, click "No" and you will be taken to the exit page.

Researcher:

Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 020 8417 2476

Study Supervisors:

Professor Andrea Petroczi – email**:** A.Petroczi@kingston.ac.uk

– **phone:** 020 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk

– **phone:** 020 8417 7097

This study has been reviewed and approved by the Ethics Committee, School of Life Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

ATHLETIC CAREER HISTORY QUESTIONNAIRE

1. What is your date of birth (dd/mm/year)? □□**/**□□**/**□□□□

2. What institution do you attend? **(drop down list provided)**

3. What is your age? □□ years

4. What gender are you?

□ Male □ Female

5. To which of the following racial or ethnic groups do you belong?

□ White □ Black

□ Indian □ Pakistani

□ Bangladeshi □ Chinese

□ Arab □ Black–White Mix

□ Other. Please State: ____________________

□ Prefer not to answer

6. What is your highest educational level?

□ Primary (Junior) School

□ Secondary (High) School

□ University Undergraduate (e.g., BA, BSc, BS, BEng)

□ University Postgraduate (e.g., MA, MBA, MSc, PhD)

CURRENT SPORT BACKGROUND

7. What sport(s) do you currently compete in?

Aquatics

- □ Diving
- □ Swimming
- □ Synchronised Swimming
- □ Water Polo

□ **Archery**

□ **Athletics**

□ **Biathlon**

□ **Badminton**

□ **Boxing**

Pentathlon

Canoe/Kayak

- □ Slalom
- □ Sprint

Cycling

- □ BMX
- □ Road
- □ Track
- □ Mountain Bike

Equestrian

- □ Dressage
- □ Eventing
- □Jumping
- □ Fencing

□ **Other. Please State.**

□ **Football**

□ **Golf**

Gymnastics

□ Artistic

□ Rhythmic

□ Trampoline

□ **Handball**

□ **Hockey**

□ **Judo**

□**Modern**

□ **Rowing**

□ **Rugby**

□ **Sailing**

□ **Shooting**

□ **Taekwondo**

□ **Table Tennis**

□ **Tennis**

□ **Triathlon**

Volleyball

□ Volleyball

Beach Volleyball

□ **Weightlifting**

□ **Wrestling**

8. How old were you when you first started playing your current sport? □□years

9. What factors assisted you in starting and continuing to play your current sport?

□ Parents wanted you to participate

□ Friends wanted you to participate

□ To get out of the house

□ To be with friends

□ To meet new friends

□ To stay in shape

□ Popularity of the sport

□ To gain popularity/recognition

□ To have fun

□ Wanted a new challenge

□ To improve skills

Logistics

- □ Transport
- □ Facilities
- □ Cost

□ Other. Please state:

10. How many hours per week do you train?

- □ > 5
- □ 5 – 10
- □ 10+

11. How many days per week do you train? □□days

- □ > 3
- □ 3 – 5
- □ 6 – 7

12. What is your current highest level of competition?

□ County

□ National

□ European

□ World (e.g., World Cup, World Championships)

□ Olympic

□ Other. Please State:

13. What is the highest level you think you may be able to achieve in the next 10 years?

□ County

□ National

□ European

□ World (e.g., World Cup, World Championships)

□ Olympic

□ Other. Please State:

14. What is your best record?

□ Personal Best: ________

□ European Record: ________

□ World Record (e.g., World Championship Record): _____

□ Olympic Record: _____

□ Other Record. Please State: ______

PAST SPORT BACKGROUND

15. Did you participate in any sport before taking up your current sport?

□ Yes □ No

16. If **YES**, please state sport, year started, how many years you played it for.

Sport	Year Started	How many years were you involved in the sport	Reasons for taking up sport

17. Did you play any of these sports at a competitive level?

□ Yes □ No

18. If **YES**, please state sport, level of competition and awards?

Sport	Level of Competition (e.g., County, National, Regional)	Awards (e.g., Gold, Silver, Bronze; All Star County Team)

OTHER SPORTS

19. Do you currently play any other sport(s)?

□ Yes □ No

20. If **YES**, please state what other sport(s) you play **(Drop down list provided)**

21. How many hours per week do you play this sport?

□ > 5

□ 5 – 10

□ 10+

22. Do you play is this sport(s) on a competitive or recreational level?

□ Competitive □ Recreational

23. If this sport is played on a **competitive** level, at what level do you compete?

□ County

□ National

□ European

□ World (e.g., World Cup, World Championships)

□ Olympics

□ Other. Please state:

24. Have you ever medalled or received any major recognition for this sport(s)?

□ Yes □ No

25. If **YES**, please state year, event, discipline and medal/recognition received.

Year	Sport	Level (County, National, European)	Medal/Recognition (gold, silver; All Star County Team)

FAMILY SPORTING HISTORY

26. Did any of your following family members compete in your current sport(s)?

□ Father

□ Mother

□ Aunt

□ Uncle

□ Grandmother

□ Grandfather

□ Other. Please state:

27. If **YES**, at what level did they compete?

□ County

□ National

□ European

□ World

□ Olympics

□ Other. Please state:

28. Did they ever medal or receive any major recognition for this sport(s)?

□ Yes □ No

29. If **YES**, please state year, event, discipline and medal/recognition received.

Year	Sport	Level (County, National, European)	Medal/Recognition (gold, silver; All Star County Team)

30. Did any of your immediate family members compete in any other sport(s)?

□ Yes □ No

31. If **YES**, please state sport(s) **[Drop down list provided]**?

32. Did they ever medal or receive any major recognition for this sport(s)?

□ Yes □ No

33. If **YES**, please state year, event, discipline and medal/recognition received.

Year	Sport	Level (County, National, European)	Medal/Recognition (gold, silver; All Star County Team)

34. Apart from talent, what do you consider to be the most important factor that contributes to success in sport?

Thank you taking the time to participate in this study. Your participation is greatly appreciated. Good luck to you for the rest of your training and competitive season.

Statistical Analyses

Descriptive Statistics: All Athletes Combined

Frequencies

		Age	Gender	Ethnicity	Education Level	Which university do you attend?
N	Valid	67	67	67	67	67
	Missing	0	0	0	0	0
Mean		21.70	1.70	2.24	2.07	
Std. Error of Mean		.315	.056	.259	.039	
Median		21.00	2.00	2.00	2.00	
Mode		21	2	2	2	
Std. Deviation		2.576	.461	2.118	.317	
Variance		6.637	.213	4.488	.100	
Skewness		.731	-.901	3.057	4.658	
Std. Error of Skewness		.293	.293	.293	.293	
Kurtosis		.647	-1.226	8.501	23.102	
Std. Error of Kurtosis		.578	.578	.578	.578	
Range		11	1	9	2	
Minimum		17	1	1	2	
Maximum		28	2	10	4	
Sum		1454	114	150	139	
Percentiles	25	20.00	1.00	1.00	2.00	
	50	21.00	2.00	2.00	2.00	
	75	23.00	2.00	2.00	2.00	

Statistics

		What is your current highest level of participation?
N	Valid	67
	Missing	0
Mean		2.39
Std. Error of Mean		.146
Median		2.00
Mode		1[a]
Std. Deviation		1.193
Variance		1.423
Skewness		.246
Std. Error of Skewness		.293
Kurtosis		-1.469
Std. Error of Kurtosis		.578
Range		3
Minimum		1
Maximum		4
Sum		160
Percentiles	25	1.00
	50	2.00
	75	4.00

a. Multiple modes exist. The smallest value is shown

Frequency Table

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	3	4.5	4.5	4.5
	18	3	4.5	4.5	9.0
	19	4	6.0	6.0	14.9
	20	8	11.9	11.9	26.9
	21	20	29.9	29.9	56.7
	22	10	14.9	14.9	71.6
	23	8	11.9	11.9	83.6
	24	2	3.0	3.0	86.6
	25	2	3.0	3.0	89.6
	26	1	1.5	1.5	91.0
	27	3	4.5	4.5	95.5
	28	3	4.5	4.5	100.0
	Total	67	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	20	29.9	29.9	29.9
	Male	47	70.1	70.1	100.0
	Total	67	100.0	100.0	

Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	22	32.8	32.8	32.8
	Black	39	58.2	58.2	91.0
	Indian	1	1.5	1.5	92.5
	Black-White Mix	1	1.5	1.5	94.0
	Other	1	1.5	1.5	95.5
	Prefer not to say	3	4.5	4.5	100.0
	Total	67	100.0	100.0	

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	University Undergraduate	63	94.0	94.0	94.0
	University Postgraduate	3	4.5	4.5	98.5
	Other	1	1.5	1.5	100.0
	Total	67	100.0	100.0	

Which university do you attend?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bath	1	1.5	1.5	1.5
	Cardiff	1	1.5	1.5	3.0
	Durham	4	6.0	6.0	9.0
	Kingston	9	13.4	13.4	22.4
	Leeds	1	1.5	1.5	23.9
	LJMU	1	1.5	1.5	25.4
	Newcastle	2	3.0	3.0	28.4
	No Response	1	1.5	1.5	29.9
	Not Stated	3	4.5	4.5	34.3
	Nottingham	2	3.0	3.0	37.3
	Portsmouth	1	1.5	1.5	38.8
	UTT	41	61.2	61.2	100.0
	Total	67	100.0	100.0	

What is your current highest level of participation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	County/State/Zonal Team	20	29.9	29.9	29.9
	National Team	20	29.9	29.9	59.7
	Regional (Caribbean/European)	8	11.9	11.9	71.6
	World (e.g., World Cup, World Championships)	19	28.4	28.4	100.0
	Total	67	100.0	100.0	

What sport do you currently compete in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	2	3.0	3.0	3.0
	Boxing	1	1.5	1.5	4.5
	Cricket	7	10.4	10.4	14.9
	Football (Soccer)	7	10.4	10.4	25.4
	Golf	1	1.5	1.5	26.9
	Handball	2	3.0	3.0	29.9
	Hockey	2	3.0	3.0	32.8
	Modern Pentathlon	1	1.5	1.5	34.3
	Netball	5	7.5	7.5	41.8
	Rowing	3	4.5	4.5	46.3
	Rugby	3	4.5	4.5	50.7
	Shooting	2	3.0	3.0	53.7
	Swimming	3	4.5	4.5	58.2
	Table Tennis	9	13.4	13.4	71.6
	Triathlon	2	3.0	3.0	74.6
	Volleyball	4	6.0	6.0	80.6
	Weightlifting	5	7.5	7.5	88.1
	basketball	3	4.5	4.5	92.5
	Skiing	1	1.5	1.5	94.0
	Ice Hockey	2	3.0	3.0	97.0
	Fencing	1	1.5	1.5	98.5
	Lacrosse	1	1.5	1.5	100.0

	Total	67	100.0	100.0	

Gender = Female

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	5.0	5.0	5.0
	Golf	1	5.0	5.0	10.0
	Handball	1	5.0	5.0	15.0
	Hockey	1	5.0	5.0	20.0
	Modern Pentathlon	1	5.0	5.0	25.0
	Netball	5	25.0	25.0	50.0
	Rowing	1	5.0	5.0	55.0
	Shooting	1	5.0	5.0	60.0
	Table Tennis	1	5.0	5.0	65.0
	Volleyball	4	20.0	20.0	85.0
	Weightlifting	1	5.0	5.0	90.0
	Ice Hockey	1	5.0	5.0	95.0
	Fencing	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

a. Gender = Female

Gender = Male

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	2.1	2.1	2.1
	Boxing	1	2.1	2.1	4.3
	Cricket	7	14.9	14.9	19.1
	Football (Soccer)	7	14.9	14.9	34.0
	Handball	1	2.1	2.1	36.2
	Hockey	1	2.1	2.1	38.3
	Rowing	2	4.3	4.3	42.6
	Rugby	3	6.4	6.4	48.9
	Shooting	1	2.1	2.1	51.1
	Swimming	3	6.4	6.4	57.4
	Table Tennis	8	17.0	17.0	74.5
	Triathlon	2	4.3	4.3	78.7
	Weightlifting	4	8.5	8.5	87.2
	basketball	3	6.4	6.4	93.6
	Skiing	1	2.1	2.1	95.7
	Ice Hockey	1	2.1	2.1	97.9
	Lacrosse	1	2.1	2.1	100.0
	Total	47	100.0	100.0	

a. Gender = Male

ANOVA

Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.084	1	31.084	4.965	.029
Within Groups	406.946	65	6.261		
Total	438.030	66			

```
ONEWAY Age BY Gender
  /MISSING ANALYSIS.
```

Descriptive Statistics: T&T

Frequencies

Country Survey Conducted in = T&T

Statistics[a]

		Age	Gender	Ethnicity	Education Level	Which university do you attend?
N	Valid	41	41	41	41	41
	Missing	0	0	0	0	0
Mean		22.24	1.78	2.56	2.12	
Std. Error of Mean		.387	.065	.305	.062	
Median		22.00	2.00	2.00	2.00	
Mode		21	2	2	2	
Std. Deviation		2.478	.419	1.950	.400	
Variance		6.139	.176	3.802	.160	
Skewness		.660	-1.407	3.466	3.535	
Std. Error of Skewness		.369	.369	.369	.369	
Kurtosis		.519	-.023	10.832	12.959	
Std. Error of Kurtosis		.724	.724	.724	.724	
Range		11	1	8	2	
Minimum		17	1	2	2	
Maximum		28	2	10	4	
Sum		912	73	105	87	
Percentiles	25	21.00	2.00	2.00	2.00	
	50	22.00	2.00	2.00	2.00	
	75	23.00	2.00	2.00	2.00	

Statistics[a]

		What is your current highest level of participation?
N	Valid	41
	Missing	0
Mean		2.17
Std. Error of Mean		.167
Median		2.00
Mode		2
Std. Deviation		1.070
Variance		1.145
Skewness		.543
Std. Error of Skewness		.369
Kurtosis		-.898
Std. Error of Kurtosis		.724
Range		3
Minimum		1
Maximum		4
Sum		89
Percentiles	25	1.00
	50	2.00
	75	3.00

a. Country Survey Conducted in = T&T

Frequency Table

Age[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	1	2.4	2.4	2.4
	18	1	2.4	2.4	4.9
	19	1	2.4	2.4	7.3
	20	4	9.8	9.8	17.1
	21	12	29.3	29.3	46.3
	22	7	17.1	17.1	63.4
	23	6	14.6	14.6	78.0
	24	2	4.9	4.9	82.9
	25	2	4.9	4.9	87.8
	26	1	2.4	2.4	90.2
	27	2	4.9	4.9	95.1
	28	2	4.9	4.9	100.0
	Total	41	100.0	100.0	

a. Country Survey Conducted in = T&T

Gender[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	9	22.0	22.0	22.0
	Male	32	78.0	78.0	100.0
	Total	41	100.0	100.0	

a. Country Survey Conducted in = T&T

Ethnicity[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Black	37	90.2	90.2	90.2
	Indian	1	2.4	2.4	92.7
	Black-White Mix	1	2.4	2.4	95.1
	Prefer not to say	2	4.9	4.9	100.0
	Total	41	100.0	100.0	

a. Country Survey Conducted in = T&T

Education Level[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	University Undergraduate	37	90.2	90.2	90.2
	University Postgraduate	3	7.3	7.3	97.6
	Other	1	2.4	2.4	100.0
	Total	41	100.0	100.0	

a. Country Survey Conducted in = T&T

Which university do you attend?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UTT	41	100.0	100.0	100.0

a. Country Survey Conducted in = T&T

What is your current highest level of participation?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	County/State/Zonal Team	13	31.7	31.7	31.7
	National Team	15	36.6	36.6	68.3
	Regional (Caribbean/European)	6	14.6	14.6	82.9
	World (e.g., World Cup, World Championships)	7	17.1	17.1	100.0
	Total	41	100.0	100.0	

a. Country Survey Conducted in = T&T

What sport do you currently compete in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	2.4	2.4	2.4
	Boxing	1	2.4	2.4	4.9
	Cricket	6	14.6	14.6	19.5
	Football (Soccer)	7	17.1	17.1	36.6
	Hockey	2	4.9	4.9	41.5
	Netball	4	9.8	9.8	51.2
	Rugby	2	4.9	4.9	56.1
	Swimming	3	7.3	7.3	63.4
	Table Tennis	9	22.0	22.0	85.4
	Volleyball	3	7.3	7.3	92.7
	basketball	3	7.3	7.3	100.0
	Total	41	100.0	100.0	

Gender = Female

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hockey	1	11.1	11.1	11.1
	Netball	4	44.4	44.4	55.6
	Table Tennis	1	11.1	11.1	66.7
	Volleyball	3	33.3	33.3	100.0
	Total	9	100.0	100.0	

a. Gender = Female

Gender = Male

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	3.1	3.1	3.1
	Boxing	1	3.1	3.1	6.3
	Cricket	6	18.8	18.8	25.0
	Football (Soccer)	7	21.9	21.9	46.9
	Hockey	1	3.1	3.1	50.0
	Rugby	2	6.3	6.3	56.3
	Swimming	3	9.4	9.4	65.6
	Table Tennis	8	25.0	25.0	90.6
	basketball	3	9.4	9.4	100.0
	Total	32	100.0	100.0	

a. Gender = Male

Country Survey Conducted in = T&T

ANOVA[a]

Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	40.203	1	40.203	7.635	.009
Within Groups	205.358	39	5.266		
Total	245.561	40			

a. Country Survey Conducted in = T&T

Descriptive Statistics: UK

Statistics[a]

		Age	Gender	Ethnicity	Education Level	Which university do you attend?
N	Valid	26	26	26	26	26
	Missing	0	0	0	0	0
Mean		20.85	1.58	1.73	2.00	
Std. Error of Mean		.498	.099	.453	.000	
Median		21.00	2.00	1.00	2.00	
Mode		21	2	1	2	
Std. Deviation		2.541	.504	2.308	.000	
Variance		6.455	.254	5.325	.000	
Skewness		1.169	-.331	3.319		
Std. Error of Skewness		.456	.456	.456	.456	
Kurtosis		2.350	-2.055	10.014		
Std. Error of Kurtosis		.887	.887	.887	.887	
Range		11	1	9	0	
Minimum		17	1	1	2	
Maximum		28	2	10	2	
Sum		542	41	45	52	
Percentiles	25	19.00	1.00	1.00	2.00	
	50	21.00	2.00	1.00	2.00	
	75	22.00	2.00	1.00	2.00	

Statistics[a]

		What is your current highest level of participation?
N	Valid	26
	Missing	0
Mean		2.73
Std. Error of Mean		.258
Median		3.00
Mode		4
Std. Deviation		1.313
Variance		1.725
Skewness		-.262
Std. Error of Skewness		.456
Kurtosis		-1.765
Std. Error of Kurtosis		.887
Range		3
Minimum		1
Maximum		4
Sum		71
Percentiles	25	1.00
	50	3.00
	75	4.00

a. Country Survey Conducted in = UK

Frequency Table

Age[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	2	7.7	7.7	7.7
	18	2	7.7	7.7	15.4
	19	3	11.5	11.5	26.9
	20	4	15.4	15.4	42.3
	21	8	30.8	30.8	73.1
	22	3	11.5	11.5	84.6
	23	2	7.7	7.7	92.3
	27	1	3.8	3.8	96.2
	28	1	3.8	3.8	100.0
	Total	26	100.0	100.0	

a. Country Survey Conducted in = UK

Gender[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	11	42.3	42.3	42.3
	Male	15	57.7	57.7	100.0
	Total	26	100.0	100.0	

a. Country Survey Conducted in = UK

Ethnicity[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	22	84.6	84.6	84.6
	Black	2	7.7	7.7	92.3
	Other	1	3.8	3.8	96.2
	Prefer not to say	1	3.8	3.8	100.0
	Total	26	100.0	100.0	

a. Country Survey Conducted in = UK

Education Level[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	University Undergraduate	26	100.0	100.0	100.0

a. Country Survey Conducted in = UK

Which university do you attend?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bath	1	3.8	3.8	3.8
	Cardiff	1	3.8	3.8	7.7
	Durham	4	15.4	15.4	23.1
	Kingston	9	34.6	34.6	57.7
	Leeds	1	3.8	3.8	61.5
	LJMU	1	3.8	3.8	65.4
	Newcastle	2	7.7	7.7	73.1
	No Response	1	3.8	3.8	76.9
	Not Stated	3	11.5	11.5	88.5
	Nottingham	2	7.7	7.7	96.2
	Portsmouth	1	3.8	3.8	100.0
	Total	26	100.0	100.0	

a. Country Survey Conducted in = UK

What is your current highest level of participation?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	County/State/Zonal Team	7	26.9	26.9	26.9
	National Team	5	19.2	19.2	46.2
	Regional (Caribbean/European)	2	7.7	7.7	53.8
	World (e.g., World Cup, World Championships)	12	46.2	46.2	100.0
	Total	26	100.0	100.0	

a. Country Survey Conducted in = UK

What sport do you currently compete in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	3.8	3.8	3.8
	Cricket	1	3.8	3.8	7.7
	Golf	1	3.8	3.8	11.5
	Handball	2	7.7	7.7	19.2
	Modern Pentathlon	1	3.8	3.8	23.1
	Netball	1	3.8	3.8	26.9
	Rowing	3	11.5	11.5	38.5
	Rugby	1	3.8	3.8	42.3
	Shooting	2	7.7	7.7	50.0
	Triathlon	2	7.7	7.7	57.7
	Volleyball	1	3.8	3.8	61.5
	Weightlifting	5	19.2	19.2	80.8
	Skiing	1	3.8	3.8	84.6
	Ice Hockey	2	7.7	7.7	92.3
	Fencing	1	3.8	3.8	96.2
	Lacrosse	1	3.8	3.8	100.0
	Total	26	100.0	100.0	

Gender = Female

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Athletics	1	9.1	9.1	9.1
	Golf	1	9.1	9.1	18.2
	Handball	1	9.1	9.1	27.3
	Modern Pentathlon	1	9.1	9.1	36.4
	Netball	1	9.1	9.1	45.5
	Rowing	1	9.1	9.1	54.5
	Shooting	1	9.1	9.1	63.6
	Volleyball	1	9.1	9.1	72.7
	Weightlifting	1	9.1	9.1	81.8
	Ice Hockey	1	9.1	9.1	90.9
	Fencing	1	9.1	9.1	100.0
	Total	11	100.0	100.0	

a. Gender = Female

Gender = Male

What sport do you currently compete in?[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cricket	1	6.7	6.7	6.7
	Handball	1	6.7	6.7	13.3
	Rowing	2	13.3	13.3	26.7
	Rugby	1	6.7	6.7	33.3
	Shooting	1	6.7	6.7	40.0
	Triathlon	2	13.3	13.3	53.3
	Weightlifting	4	26.7	26.7	80.0
	Skiing	1	6.7	6.7	86.7
	Ice Hockey	1	6.7	6.7	93.3
	Lacrosse	1	6.7	6.7	100.0
	Total	15	100.0	100.0	

Country Survey Conducted in = UK

ANOVA[a]

Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.415	1	8.415	1.320	.262
Within Groups	152.970	24	6.374		
Total	161.385	25			

a. Country Survey Conducted in = UK

APPENDIX C

FUTURE STUDIES

Sports Governance in Trinidad and Tobago

PARTICIPANT INFORMATION SHEET

INFORMATION FOR POTENTIAL PARTICIPANTS

You are being invited to take part, as a volunteer, in a study being conducted by Joel Paul, a postgraduate student in the School of Life Sciences, Kingston University, London, United Kingdom. Before you decide whether or not you wish to participate in this study, it is important that you understand why the research is being done and what it involves. Please take some time to read the following information carefully. Should you have any questions, please do not hesitate to contact me or one of my supervisors using the contact information below.

What is the purpose of this study?

This study is being conducted to examine the management structure and practices of sporting organisations in Trinidad and Tobago.

Who can participate?

This study is open to heads (or their representatives) of the following organisations: Ministry of Sport, SPORTT, Olympic and Paralympic Associations, National Governing Bodies for Sports (NGBs) and selected community based sports clubs.

What is required of you?

You will be invited to participate in the study via Skype. You will be asked a series of questions regarding the governance practice of your organisation. The interview should take approximately 15 - 20 minutes to complete.

What are the risks and benefits of participating?

There are no foreseeable risks to your physical or psychological health arising out of your involvement in this study. It is hoped that by providing information relating to the structure and governance of your respective organisation, this will improve understanding of your sporting organisation. This information can then be used by your group to make changes to your organisation if you deem it necessary.

Do I have to take part in this study?

Your participation in this study is completely voluntary, hence the decision as whether to participate or not is entirely yours. By agreeing to participate in the interview via Skype you are giving your consent to take part in this study as a volunteer. Please be advised that you are free to discontinue this study at any time, without giving any reason. A decision to withdraw will not affect your rights, nor will any penalties be levied against you.

Your privacy

Any information collected in this study will be treated as privileged and confidential. Apart from your Skype address, no personally identifiable information will be collected. Furthermore, all information collected will be anonymised using a special coding system ensuring that the results achieved will not be personally identified to you. No information will be shared with any third party, or stored/used for unrelated analysis. Interviews will be recorded on a password protected device which will be stored in a key–locked cabinet on Kingston University premises. The data on this device will be encrypted as a further security measure. Written data will be stored on a password protected computer and kept for 3 years, unless you specifically wish it to be deleted. Only my supervisors and I will have access to the information collected on the recording device and the computer.

What will happen to the results of this study?

The results of this study will be submitted to scholarly journals for publication, presented at meetings and conferences, and used for the completion of my postgraduate studies.

Do you require further information before participating in the study?

If you would like anything clarified, have any questions or require further information about the study please do not hesitate to contact me or my supervisor using the information below.

What should you do if you want to take part in the study?

If you are happy to take part in the study, please indicate your willingness (or lack thereof) by responding to the email that this Information Sheet was attached to. Additionally click “Yes” below. Alternatively, if you do not wish to participate, click “No” and you will be taken to the exit page.

Researcher:

Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 020 8417 2476

Study Supervisors:

Professor Andrea Petroczi – **email:** A.Petroczi@kingston.ac.uk

– **phone:** 020 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk

– **phone:** 020 8417 7097

This study has been reviewed and approved by the Science, Engineering and Computing Faculty Research Ethics Committee, Kingston University, Penrhyn Road, Kingston KT1 2EE.

Sports Governance Questionnaire

Governance

1) What is the role of your organisation?
2) How many members sit on the Board of SPORTT?
3) Can you identify their roles of these members?
4) Is there any legislation which governs the composition of SPORTT?
5) Is there any existing legislation which governs the composition of NGB Boards?

Funding

6) What is your main source of funding?
7) Can you identify any other sources of funding you may have?
8) Is there an even distribution of funds between organisations?
9) What are your criteria for allocating funds to national governing bodies for sports?
10) What are your criteria for allocating funds to clubs?
11) Is there any existing legislation which governs the maximum amount of funds that can be allocated to an NGB?
12) Is there any existing legislation which governs the minimum amount of funds that can be allocated to an NGB?
13) What are your criteria for allocating funds to athletes?
14) Using percentages, can you identify below how funding is allocated? (answer must add up to 100%)

    - Board members fees/stipends

- club allocations
- affiliation to international organisation(s)
- athlete identification and development programmes
- national competitions
- regional/international competitions
- coach development programmes
- community outreach programmes (e.g. sport awareness programmes)
- facility upgrade and construction

Athlete Identification and Development

15) Do you have an athlete talent identification programme in place?
16) What factors influence the distribution of funds to NGBs?
17) Is SPORTT directly involved in the identification of athletic talent?
18) If yes to above, please state SPORTT's role below?
19) Is SPORTT directly involved in the development of athletic talent?
20) If yes to above, please state role below?
21) Who is responsible for identifying talented athletes? NGBs? Sports clubs? Other?
22) Do you have an athlete development programme in place?

This study has been reviewed and approved by the Science, Engineering and Computing Faculty Research Ethics Committee, Kingston University, Penrhyn Road, Kingston KT1 2EE.

Sports Provision in Secondary Schools in Trinidad and Tobago

PARTICIPANT INFORMATION SHEET

INFORMATION FOR POTENTIAL PARTICIPANTS

You are being invited to take part, as a volunteer, in a study being conducted by Joel Paul, a postgraduate student in the School of Life Sciences, Kingston University, London, United Kingdom. Before you decide whether or not you wish to participate in this study, it is important that you understand why the research is being done and what it involves. Please take time to read the following information carefully. Should you have any questions, please do not hesitate to contact me or one of my supervisors using the contact information above.

What is the purpose of this study?

This study is being conducted to examine what sports are offered during Physical Education (P.E.) classes at various schools in Trinidad and Tobago.

Who can participate?

This study is open to male and female P.E. teachers in Trinidad and Tobago, 18 years and above and with a minimum of 1 years' experience.

What is required of you?

You will be asked to complete a paper–based survey consisting of 24 questions designed to gain an idea of the sports offered during P.E. classes. The questionnaire should take approximately 10 – 15 minutes to complete.

What are the risks and benefits of participating?

There are no foreseeable risks to your physical or psychological health arising out of your involvement in this study. There is no direct benefit to you but this research is likely to be used to provide an idea of factors that limit sports provision in secondary schools in Trinidad and Tobago. It may also lead to future research investigating possible solutions to enhance this.

Do I have to take part in this study?

Your participation in this study is completely voluntary, hence the decision as whether to participate or not is entirely yours. By completing and returning the attached questionnaire you are agreeing to take part in this study as a volunteer. Please be advised that you are free to discontinue this study at any time, without giving any reason. A decision to withdraw will not affect your rights, nor will any penalties be levied against you.

Your privacy

Any information collected in this study will be treated as privileged and confidential. All information collected will be anonymised using a special coding system and the results achieved will not be personally identified to you, shared with any third party, or stored/used for unrelated analysis. The data will be stored and kept on a password protected computer for 5 years. Only my supervisors and I will have access to the information collected.

What will happen to the results of this study?

The results of this study will be submitted to scholarly journals for publication, presented at meetings and conferences, and used for the completion of my postgraduate studies. Every effort will be made to ensure that your confidentiality is maintained. All information will be aggregated and presented as a group and all statements made will be generalised.

Do you require further information before participating in the study?

If you would like anything clarified, have any questions or require further information about the study please do not hesitate to contact me or my supervisor using the information below.

What should you do if you want to take part in the study?

If you are happy to take part in the study, please complete the attached Consent Form and Sport in Secondary Schools survey. When finished, please both in the self–addressed stamped envelope and drop it off at any post office.

Researcher:

Joel Paul – **email:** k1044881@kingston.ac.uk **phone:** 011 44 208417 2476

Study Supervisors:

Professor Andrea Petroczi – **email:** A.Petroczi@kingston.ac.uk

– **phone:** 011 44 20 8417 2436

Professor Declan Naughton – **email:** D.Naughton@kingston.ac.uk

– **phone:** 011 44 20 8417 7097

This study has been reviewed and approved by the Science Faculty Ethics Committee, Faculty of Sciences, Kingston University, Penrhyn Road, Kingston KT1 2EE.

Sport in Secondary School Questionnaire

Participant Identification Number □□□□

PERSONAL INFORMATION

35. Do you hold any coaching qualifications?

□ Yes □ No

36. If YES, please state in what sport(s), the qualification earned and level of the qualification (an example is given below).

Sport	**Qualification & Level**
e.g., Football	The FA Goalkeeping Coaching Licence B

TEACHING BACKGROUND

37. Considering the school at which you teach, to which educational district does it belong?

□ Caroni

□ North Eastern

□ Port of Spain & Environs

□ St. George East

□ St. Patrick

□ South Eastern

□ Tobago

□ Victoria

38. Is this school

□ boys only □ girls only □ boys–girls mixed

39. How long have you been teaching? □□ years

40. How long have you been teaching Physical Education? □□ years

41. Do you teach any other subjects?

□ Yes □ No

42. If YES, what other subject(s) do you teach?

Please list: ___________________________

43. On average, how many hours are allotted for P.E. per class each week? □□ hours

44. How is P.E. class structured? e.g., 40% Theory 60% Practical

□ Theory □ Practical

45. Are all students required to participate in P.E. classes?

□ Yes □ No

46. What sport(s) are taught during P.E. classes?

Please list: _______________________________

47. Are the same sports taught throughout the year or do they change (e.g., based on the season, restrictions placed by school, Ministry of Education)?

□ Yes, the same sports are taught throughout the year

□ No, different sports are taught. (Please indicate below how this is structured, e.g., Cricket is taught during the Dry Season while table tennis is taught during the Rainy Season)

48. What factors affect the decision as to what sports to teach?

- □ availability of equipment
- □ availability of facilities
- □ closeness of facilities
- □ qualifications of P.E. teachers
- □ qualifications of other teachers
- □ it is a sport that school has traditionally taught
- □ it is a sport that the school has traditionally excelled in
- □ popularity of the sport
- □ personal preference of sport

49. Are there opportunities available to obtain or upgrade your coaching qualifications?

□ Yes □ No

50. Is the school affiliated with any National Sporting Organisation(s)?

□ Yes □ No

51. What are your sources of funding for sport programmes?

- □ Ministry of Education
- □ Ministry of Sport
- □ Local Government/Municipal Corporations
- □ From the local community
- □ Parents
- □ From the school at which you teach
- □ Fundraising Events
- □ Other? Please state: ___________________

52. Are you supported by any other teachers?

□ Yes □ No

53. Are there any after school clubs currently in operation at the school at which you teach?

□ Yes □ No

54. If Yes, can you list the clubs below.

55. What is your date of birth (dd/mm/year)? □□/□□/□□□□

56. What gender are you?

□ Male □ Female

57. To which of the following racial or ethnic groups do you belong?

□ White □ Afro–Trinidadian

□ Indo–Trinidadian □ Chinese

□ Mixed

□ Other. Please State: ____________________

□ Prefer not to say

58. What is your highest completed level of educational level?

□ Secondary (High) School

□ University Undergraduate (e.g., BA, BSc, BS, Bed, BEng)

□ University Postgraduate (e.g., PgDip, MA, MBA, MSc, PhD)

□ Other. Please State: ____________________

Thank you for taking the time to complete this questionnaire. Your participation is greatly appreciated.

This study has been reviewed and approved by the Science, Engineering and Computing Faculty Research Ethics Committee, Kingston University, Penrhyn Road, Kingston KT1 2EE.