1   **Understanding complexity and dynamics in the career development of eSports athletes**

2

1   **Abstract**

2   With the accelerated growth of the esports industry over the last few years, there has been a

3   corresponding increase in the number of esports athletes. Yet there is limited research examining these

4   athletes' professional career journeys. This study provides a novel investigation into their career

5   development process. This qualitative study uses a sample of 35 esports athletes from 16 professional

6   esports clubs in China. Findings from semi-structured interviews confirmed our proposition that

7   traditional career theories may be inadequate to capture the complex and dynamic nature of the newly

8   emerged careers within esports. The authors propose that Chaos Theory in Careers (CTC) provides

9   principles that may more effectively describe and explain the nature and main characteristics of esports

10   careers, compared to the more conventional linear or stage-based sports career theories. This study

11   makes a significant theoretical contribution through developing esports career theory which is

12   applicable to a contemporary setting and has practical implications to practitioners for esports talent

13   identification, recruitment and development.

14   **KEYWORDS**

15   Esports Athletes, Sports Development, Career Development, Chaos Theory in Careers, Emerging

16   Careers

17

1 Introduction

The world of professional esports has grown rapidly over the last few years and is expected to reach US$200.8 billion in value and an estimated global audience of 351 million people by 2023 (Newzoo, 2020). Despite its increasing economic and social importance, research on esports is still in its infancy, and relatively little has been written about the labor force at the center of the esports industry, i.e. the athletes involved in the games. With the accelerated growth of esports, there has been a corresponding growth in the number of esports athletes, and esports continues to gain popularity as a career option particularly among young people (Kocadağ, 2019; Salo, 2017). Yet there is limited research examining the playing of esports as a career as opposed to a pure leisure activity (Bányai et al, 2018). A void exists in terms of knowledge on career development and progression in esports; it remains unknown how individuals initiate their involvement in esports activities, their journey towards becoming professionals, as well as the challenges and opportunities they face during their career development. This study addresses this unmapped knowledge gap by proposing a framework for the career development of esports athletes. It not only provides an initial analysis of the esports athletes' transitional path to success, but also explores potential deviations from success. In addition, it responds to the call for a theoretical framework on esports athletes' careers (Cunningham et al. 2018; Salo, 2017) and adds to our existing knowledge on esports career initiation and development processes. A baseline understanding of the career development of esports athletes will support policymakers, practitioners and managers in making more effective decisions on improvements to key regulatory issues (e.g., athletes' rights and protection), disciplinary (e.g., bribery behavior and corruption) and governance matters (e.g., competition policy and regulations) and sustainability development (e.g., talent management and development programs). This has the potential to help frame the planning of and support for the optimization of esports athlete's identification and recruitment, promoting athlete commitment and the improved management of talent flow.

To understand the nature of esports as an industry is not straightforward; it is a novel field of sport driven by digital technology and therefore inherently fast-changing (Kordyaka, Jahn, & Niehaves, 2020). It is also one that merges elements of culture, technology, sports, and business (Jenny et al.,

1   2017). The industry has arisen from the amalgamation of three industries – sports, media and

2   entertainment, and therefore incorporates multiple communication platforms. The newness of the

3   industry, interconnective nature of multiple platforms and complex relationships between various

4   stakeholders (Kim & Thomas, 2015) not only lead to ambiguity in defining and understanding the

5   fundamentals of esports (Jenny et al., 2017), but also build up issues and challenges at the legal,

6   managerial and operational levels (Hollist, 2015). It is suggested that these elements all contribute to

7   more complex but also vibrant and dynamic careers for esports athletes in comparison to those of

8   conventional sports (Taylor, 2012). As a newly emerging industry, a complete picture of esports career

9   transitions does not yet exist (Hollist, 2015). Currently, there is little research attempting to chart the

10   patterns and unknowns of esports career development. The complex nature of esports implies that

11   traditional career development models (e.g. Holland, 1985; Super, 1980) may be inadequate to capture

12   the uncertainty and constantly changing nature of esports careers. This then necessitates a theoretical

13   advancement on career development, an enhanced theory and application that reflects an emergent and

14   turbulent field.

15   Originating from the natural sciences, Chaos Theory (Kauffman, 1995) is used to study the behavior of

16   complex, nonlinear dynamical systems. Bright and Pryor (2011) suggest that a complex dynamic

17   system of career development in the 21st century can be better understood through the application of

18   the Chaos Theory of Careers (CTC). Where previous studies of conventional sport career development

19   have widely used transition/stage-based career theories (see for instance work by Stambulova & Ryba,

20   2013; Wylleman, Alfermann & Lavallee, 2004), this study explores the application of CTC in an

21   attempt to decipher the complex, constantly changing and nonlinear nature of career paths within

22   esports.

23   This study seeks to fulfil three objectives: firstly, to identify the characteristics of career pathways for

24   esports athletes; secondly, to explore the key activators for esports career development; and thirdly to

25   establish a framework to elucidate the complex and dynamic process of esports career development in

26   a contemporary setting. To achieve these objectives, we first provide a review of recent studies carried

27   out on career development in esports and identify the knowledge gap. We then examine the suitability

4

1 of different career theories within extant literature to illuminate the esports career. An overview of the

2 fundamentals of CTC is also discussed. Next, the research design and methodology are presented. We

3 then present our conceptual framework alongside the findings. Finally, we conclude with the

4 contribution and implications of this study.

5 **2 Literature review and theoretical background**

6 **2.1 Esports and its career development**

7 Esports have been defined as forms of "alternative sport realities" (Hemphill, 2005, p.199), where "the

8 primary aspects of the sport are facilitated by electronic systems; the input of players and teams as

9 well as the output of the esports system are mediated by human-computer interfaces" (Hamari &

10 Sjöblom, 2017, p.211). Existing research on esports has explored the history of esports and the key

11 drivers for its growth (Himmelstein et al., 2017; Seo, 2013); whether esports should be qualified as a

12 professional sport (Taylor, 2012; Wagner, 2006); the inclusion of esports in the sport management

13 domain (Funk et al., 2018; Heere, 2018); the motivations for playing esports (Martoncik, 2015; Weiss

14 & Schiele, 2013), the consumption of esports (Hallmann & Giel, 2018) and the co-creation of the

15 experiential value of esports (Seo, 2013), the mental obstacles esports athletes face (Himmelstein et

16 al., 2017). In spite of the increase in academic attention in this area, the theorizing of esports is still

17 lacking. As Cunningham et al. (2018, p.4) suggest, "Much of the work to date is atheoretical in nature,

18 and as such, there is no firm foundation for building research questions or hypotheses, designing

19 methods, analyzing data, or drawing conclusions." In particular, scholars Bányai et al. (2018) and

20 Cunningham et al. (2018) have called for more research to capture the career aspects of esports

21 athletes within this emerging industry.

22 Of the limited studies on the career development of esports athletes, stage-based models and

23 frameworks based on traditional career theories have been used. Kim and Thomas (2015) developed a

24 five-stage theoretical model of professional video gaming players based on Activity Theory

25 (Engeström et al. 1999). Seo's research (2016) suggests that players pursue a professionalized career

26 based on the virtues of an esports ethos which provides them with a sense of self-actualization and

1   pleasure. The author then identifies three common stages within esports players' identity

2   transformations and progression from a casual participant to a professional player, including "the call

3   to adventure", "the road of trials", and "the master of two worlds" (Seo, 2016, p.271). More recently,

4   Salo's research (2017) proposed a conceptual framework for esports athletes' career transitions based

5   on the combined literature streams of sport career transitions and athletes' career narratives. His

6   framework divides esports athletes' career progression into initiation, development, mastery and

7   discontinuation.

8   **2.2   Traditional career theories**

9   Traditional approaches to careers are often characterized by their linear perspectives on career

10   development, which emphasize career decision-making as a rational and controlled process that occurs

11   in stages (e.g., Holland's person-environment fit model, 1985; Super's life span, life-space theory,

12   1980). In spite of being widely cited, these conventional models are increasingly criticized for

13   assuming a narrow range of variables relevant to an individual's career and job environment (e.g.,

14   Arnold, 2004; McMahon & Watson, 2007). Traditional career theories promote the ideas of prediction

15   and control in individuals' careers (Spokane, Meir, & Catalano, 2000). Bright and Pryor (2019)

16   suggest that these traditional career theories over-simplify the nature of decision making and career

17   development, in addition to placing an over-emphasis on career paths as logical processes, categorized

18   into discrete developmental stages. These traditional theories assume that career development can be

19   planned out based on a range of parameters in relation to, for example, personality types, occupational

20   interests, job satisfaction, stability and achievement. Nevertheless, these approaches would be

21   inadequate to predict career development paths when applied to occupations within emerging

22   industries. As a result of advances in technology which have led to the Fourth Industrial Revolution,

23   new business models and emerging industries have been generated (Yun et al., 2019), such as

24   companies applying sharing economy (e.g., Air BnB, Uber), and blockchain-driven start-up

25   businesses. Many structural changes have been seen (in relation to, for example, new suppliers,

26   customer bases, business models, products and services) confounded by the complexity of cross-sector

27   spill over (Monfardini et al., 2012). These variances have made the career paths of occupations in

1 these emergent industries more difficult to predict and control owing to both the environmental

2 complexity and lack of established data.

3 As a result of the rapid changes and development of information and technology, career development

4 theories have seen considerable changes in the last two decades. Moving away from the traditional

5 positivistic career theories (e.g., matching, linear or stage-based models), researchers have suggested

6 that modern careers rarely follow logical and linear paths (Borg et al., 2006) but could instead be

7 viewed as "a complex adaptive entity, a fractal of the human entity" (Bloch, 2005, p.194). There has

8 been a trend towards developing more comprehensive career frameworks from postmodern and

9 constructivist perspectives (Bikos et al., 2013). Systems Thinking places emphasis on recursive

10 interrelationships (McMahon & Patton, 2018) and looks at how to manage situational complexity

11 (Espejo, 1994). Drawing on this McMahon and Patton's (2018) Systems Theory Framework combines

12 modern and post-modern career theories and provides a metatheoretical framework of career

13 development. Extending on Systems Thinking, Pryor and Bright (2003) introduced CTC which

14 presented "a conceptualisation of careers that captures some of the most important aspects of work in

15 the 21st century – namely, continuous change, uncertainty, complexity, constructivism, non-linearity

16 and connectedness" (Borg et al., 2006, p. 57).

17 **2.3   Chaos theory of careers (CTC)**

18 Originally developed in the fields of mathematics and physics (Kaufman, 1995), Chaos Theory studies

19 the concept and behavior of complex, nonlinear dynamical systems. The theory indicates that complex

20 systems appear to behave in a random manner and not be governed by any law; yet, there is an

21 underlying unseen order beneath the chaos (Abraham & Gilgen, 1995). According to Pryor and Bright

22 (2011), two principles of Chaos Theory could be applied to the study of careers: self-organization

23 (accounting for stability and structure) and change. The complex dynamical system of career

24 development incorporates both self-organizing order (stability) and the unpredictability of change. The

25 research into chaotic systems in the natural sciences is now well established whilst studies of chaotic

26 behaviors in social sciences began emerging in the past three decades (Gregersen & Sailer, 1993), for

example, the application of Chaos Theory to economic systems (Savit, 1991) and strategical

management (Levy, 1994). The use of CTC in this study not only exemplifies contemporary career

development, but also provides an updated perspective on the application of CTC to career

development and contributes to the theoretical development of career theories in general.

CTC has been applied mostly in the educational context as career education and counselling

interventions, mostly with high school and university students. Studies have revealed positive

responses from students and parents on interventions based on career education programs underpinned

by CTC (Borg, Bright, & Pryor, 2014; Loader, 2011). Positive outcomes have also been reported with

university students from a career development counselling scheme informed by CTC (Prematillake &

Lim, 2018; Schlesinger & Daley, 2016). Nevertheless, a knowledge gap remains on whether Chaos

Theory itself may be appropriate for describing and explaining the patterns and characteristics of new

careers in the emergent industries. In particular, there is a call for further theoretical development of

CTC to demonstrate its relevance to career development, within a better understanding of how key

concepts such as "fractals, emergence, recursiveness and non-linearity and feedback and feed forward

impacts on decision making" (Pryor, 2001, p. 376) in modern careers. Drawing on CTC and based on

a university student sample, Prematillake and Lim's research (2018) indicates that unplanned

encounters (e.g., unexpected employment through part-time work, visa policy changes) coupled with

the complexity of influences relating to both structural influences (e.g., financial stability, educational

qualifications) and personal environmental influences (e.g., relationships) affected graduates' job

search expectations and choices. The application of CTC to date has been limited to the educational

setting. One of the contributions of our research is to enrich our current understanding of how the

fundamentals of CTC may also be applied to an alternate form of career in an emerging industry.

In summary, in the application of Chaos Theory on career development, Pryor and Bright (2011)

proposed an integrated framework that is thought to be more relevant for modern career development

than traditional linear theories. The use of the Chaos Theory model provides a new way to

conceptualize careers at a time when careers are transforming radically, driven by an increasing

dependence on technology. CTC conceptualizes career development as a dynamical system

1 characterized by complexity, interconnectedness and susceptibility to change (Pryor & Bright, 2011).

2 The theory sees the individual as a complex, dynamic system, interacting with other similarly complex

3 systems from other individuals through to political events and global disasters that influence the

4 individual in varied ways (Bright & Pryor, 2007; Pryor & Bright, 2003). On the basis of the above

5 discussion, CTC may potentially be applied to effectively capture the complex, dynamic and

6 constantly changing nature of esports and its career development process. Our research therefore sets

7 out to develop a better understanding of the esports career development process, which also adds to

8 our existing knowledge on sports careers in general. The following section discusses the theoretical

9 explanation of CTC and its defining concepts.

10 ### 2.3.1 Precepts of CTC

11 CTC is characterized by the five defining concepts of: *initial conditions; attractors; complexity,*

12 *change and chance events; patterns and fractals;* and *construction.* These concepts of Chaos Theory

13 have been proposed and applied as a framework for describing career-path phenomena in the modern

14 era (see for instance Peterson, Krumboltz & Garmon, 2005; Pryor & Bright, 2003). The theory

15 conceptualizes reality as a combination of both order and unpredictability (Schlesinger & Daley,

16 2016), which scholars (Pryor & Bright, 2011; Schlesinger & Daley, 2016) have suggested best capture

17 the main characteristics of contemporary careers.

18 A basic tenet of Chaos Theory is the sensitive dependence on *initial conditions*, known as the *butterfly*

19 *effect* (Lorenz, 1993). This concept proposes that small differences in the initial conditions can cause

20 great fluctuations in the final phenomena, drastically affecting the future outcomes of events in

21 nonlinear systems (Lorenz, 1993). According to CTC, career path development is strongly influenced

22 by initial conditions (those conditions at the beginning of the path) and turbulence (internal and

23 external).

24 Another key tenet of CTC is the identification of *attractors* which refer to certain types of consistent

25 behavior (Pryor & Bright, 2007). This describes the characteristic way in which individuals react and

26 respond to the environments in which they live. They are the habits, predispositions, traits, abilities

1 and reactions to challenge and change, which constitute the basis for counselling and interventions in

2 career development. The function of the attractor is to provide boundaries for behavior within a system

3 (Chamberlain, 1995). Even the most chaotic systems do not extend beyond certain boundaries; they

4 stay contained within a pattern that is recognized as the attractor (Wheatley, 1992). The unique traits

5 of an individual (e.g. characters and aspirations) are thought to serve as attractors in their career

6 development (Beck, 1999).

7 *Complexity*, *change* and *chance events* are the other tenets of CTC. There is a complexity of situational

8 factors involved in career decision making (Flum & Blustein, 2000; Patton & McMahon, 2006). A

9 chance event can be any event that was not planned for or expected, which serves as a trigger for

10 change (Loader, 2011). In a system which is characterized by change and unpredictability (Pryor &

11 Bright, 2003), CTC places emphasis on an individual's responsiveness to new opportunities and

12 unforeseen chance events. Chance events, which cannot be planned for, influence the outcome of

13 career development for an individual, and CTC explicitly recognizes the importance of such influences

14 on career development. Therefore, whilst it is not possible to predict the individual chance events that

15 will happen, they must be expected and taken into account in order for successful career planning to

16 occur (Pryor & Bright, 2003).

17 The concept of *patterns* and *fractals* is another key precept of CTC. It refers to the emergent patterns

18 (i.e. fractal nature) that emanate from an individual's life. Through exploring what the individual

19 already knows about him/herself and recurring themes and patterns in his/her life, an individual will be

20 able to uncover any emerging patterns that are affecting their career development process. This

21 understanding helps to facilitate his/her navigation of the complex, unpredictable nature of career

22 development – although there are limits to predicting the future, patterns and fractals inform the

23 process by providing consistency and guidance (Schlesinger & Daley, 2016).

24 *Construction*, the final main tenet of CTC, refers to the phase where individuals become active

25 participants in creating "their own futures rather than [being] pawns in a rigidly deterministic system

26 of cause and effect" (Bright & Pryor, 2011, p. 164). Because careers are subject to chance events that

1   cannot be predicted, this phase reinforces the idea of constructing a career path through an individual's

2   ability to appreciate the emerging patterns in an uncertain and complex system. As described by Bright

3   and Pryor (2011): "The lack of ultimate control or predictability opens up the opportunity for

4   individuals to become active participants in the creation of their futures" (p. 164).

5   Through these five key CTC concepts serving as a theoretical underpinning to our development of a

6   conceptual framework, this study seeks to extend the application of CTC to a newly emerged career

7   within a contemporary environment and through it, elucidate the complexity and dynamics of esports

8   career development. In the next section, we turn to the methodology of this study.

9   **3 Method**

10   This research seeks to investigate esports professional players' gaming practice, career path and self-

11   development through a qualitative study. Creswell (2014) suggests that researchers are at liberty to

12   choose the methods, techniques, and procedures of research that best meet the research needs. With the

13   lack of knowledge around career development in the field of esports, being an emerging industry in

14   which clearly defined career transitions are not yet understood, a qualitative research paradigm and an

15   inductive approach allow flexibility, attends closely to context and supports the generation of

16   new theory and understanding. In addition, the adoption of qualitative research helps to unpack and

17   shed light on the context as well as the related historical, cultural, social background that contributes to

18   an enhanced understanding of participants' actions (Weber, 1981).

19   Qualitative data were collected for this study through in-depth face-to-face interviews with esports

20   athletes. Interviews allowed for the solicitation of stories with sufficient depth and complexity to

21   emerge in the data, appropriate for a topic about which little is yet known (Warren & Karner, 2005) as

22   well as providing "a powerful point of entry into a world from another's perspective" (Mears, 2009,

23   p.13). The use of in-depth interviews meant that data collected was not limited by the expectations of

24   the researchers since participants could guide the data collection and broach topics which they deemed

25   meaningful (Charmaz, 2006). These techniques facilitated an inductive approach to the research, with

26   findings grounded in the 'voices' of the study participants (Strauss & Corbin, 1998).

1   The interview questions (see Appendix) were formulated based on two key threads – extant studies on

2   the development of esports industry (Hollist, 2015; Lu, 2016; Yang, Ye, & Kang, 2011) and CTC

3   (Bright & Pryor, 2011; Schlesinger & Daley, 2016). Five key themes were identified through a review

4   of these studies which aimed to explore the career journey of esports athletes. While these five themes

5   were intended to capture the career development of esports athletes, they were not intended to cohere

6   exactly with the five concepts of CTC. These five themes were: First, the triggers for entering esports.

7   Second, self-reflections on their own journey of becoming and working as an esports athlete including

8   development, achievements and reasons for dropouts. Third, their daily training routine, motivations

9   for remaining in esports, and aspirations for success. Fourth, career challenges and self-development

10   opportunities, support for their careers, the impact of policy, regulations and governance on their

11   career development. Fifth, their views on the development and governance of the esports industry, as

12   well as plans for retirement and post-athlete careers. To support the factual accuracy and reliability of

13   answers provided, participants were asked the same or similar questions more than once to check for

14   consistency (Heinige, 1982).

15   The interview questions were drafted in English, with the intention of administering them in Chinese

16   among the esports athletes. To assess the equivalence between the original English instrument and the

17   translated Chinese (Mandarin), a translation and subsequent back-translation process was undertaken

18   through a 'team translation' approach (Douglas & Craig, 2007). The interview questions were first

19   translated into Chinese by one of the bilingual authors, then back translated into English by the other

20   bilingual author. The results were then compared and collated. The comparison of the two versions led

21   to the conclusion that the questions were sufficiently equivalent.

22   **3.1 Sample**

23   The research participants were professional esports athletes based in China. China is currently one of

24   the most important regions in the development of the esports industry, overtaking Korea in terms of

25   revenue to become the second largest region (behind the United States) in the global development of

26   esports (Newzoo, 2020). The interviewing of esports athletes in China provided an extra layer of

contextual background to the understanding of esports development in general. The term 'esports

professionals' within this study encompasses both current and retired athletes working within the

esports industry. Interview focus was placed specifically on those who had experience and/or were

working at the front-tier of the value chain in the esports industry, including the upstream and

midstream levels. The upstream of the esports industry deals mainly with the production side of the

value chain, including game developers, content creators and esports publishers. The midstream of

esports industry is the core of esports value chain, responsible mainly for esports distribution,

represented by event operation and media channels, including esports athletes, clubs, sponsors, and

event organizers (Rong, 2019).

Currently, there are more than 5,000 e-sports teams in operation in China, and 100,000 esports

athletes, with only 20% or less having a college degree (HRSS, 2019)[1]. Over 95% of professional

players are male (Hilbert, 2019)[1]. In order to capture data to present the nature of career paths for

esports athletes and gain a better understanding of their post-retirement options within the industry, the

sample for this study comprised of current esports athletes, as well as esports entrepreneurs, club

mangers and chief coaches who were all retired esports athletes. Through purposive sampling, 16

esports clubs based in popular esports gaming cities of Chengdu, Beijing, Hangzhou, Shanghai, and

Xi'an in China were identified for the recruitment of this sample. A total of 35 interviewees from these

clubs were recruited through snowballing and word of mouth (see Table 1), including 24 esports

athletes, 4 coaches and 7 senior management executives (e.g., CEO, club directors, senior managers).

Although there was no intention to seek out male only sample, all interviewees were male. However,

this reflects the male domination of the esports industry in China (Hilbert, 2019). The interviewees'

ages ranged from 17 to 28[2]; they were either active athletes (at the time of interview) or retired from

esports between one to five years. In-depth interviews were conducted individually, with each lasting

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[1] Within our sample, 6 interviewees (17%) held undergraduate or college degrees.

[2] The average age of LPL esports athletes is 21.5 in China (www.52pkplay.com, 2019). In 2019, 83% of esports professionals were younger than 30 (www.eastday.com, 2020). The average age of our sample is 21 which is roughly consistent with the esports population in China.

1 between one and a half to three hours. While all interviewees were given the option to anonymize their

2 identities, some of them waived their rights and opted to use their gaming identities or real names.

3 **[Insert Table 1 here]**

4 **3.2   Data collection and analysis**

5 Face-to-face semi-structured interviews, which allowed for more open-ended questions supporting

6 interactions with the research participants, were conducted by the authors from January to July 2018 in

7 the respective Chinese cities where the clubs were based.

8 Interview data were first transcribed in Chinese and then translated to English. To ensure the

9 credibility and rigor of the results obtained (Silverman, 2016), reliability and validity have been

10 considered to check the consistency of the data translated. To support an unbiased interpretation of

11 data, an independent third party, a Chinese native with vast experience of translations in academic and

12 business environments, then verified the accuracy of the translation by checking differences in

13 meaning between the original and back-translated interview data.

14 The translated transcripts were first reviewed holistically by all authors to decipher the data collected.

15 A rigorous coding protocol was then observed through the data examination stage for identifying,

16 extracting, articulating, indexing and clustering the data. The analytical process involved independent

17 evaluation work by all authors followed by discussions to resolve any differences (Silverman, 2016).

18 Inter-coder reliability was established through this process, which improved "the systematicity,

19 communicability and transparency of the coding process" (O'Connor & Joffe, 2020, p.1). In the initial

20 step of the analysis, all authors went through all the interview data and coded the same data separately.

21 This process was repeated by all authors until saturation occurred where no further codes could be

22 obtained (Creswell, 2013). A comparison was then carried out on the resulting independent coding and

23 discussion was carried out to clarify definitions of the coding scheme and to work out any divergence.

24 Each author then independently categorized the data. The emergent results were then compared and

25 discussed. The data was then analyzed using thematic data analysis in reference to the five concepts of

26 CTC, where preliminary findings were drawn up. The sample codes and analytic themes, in

conjunction with illustrative quotes, are outlined in Table 2. By the end of this stage, an agreement was

reached where the whole process led to the inductive generation of the esports career development

discourses which are discussed in detail in the section that follows. The findings contain quotes that

demonstrate most effectively views and experiences reported by participants.

[Insert Table 2 here]

4 Findings and discussion

4.1 Overview of findings and conceptual framework

Our data analysis produced a set of discourses underpinned by the five fundamental conceptual themes

of CTC. These are distinctive processes, not to be mistaken as stages or steps that happened in a rigid

order requiring sequential completion, as emphasized in CTC's non-linearity. Applying these five

precepts of CTC to the esports context as introduced in section 2.4, we developed a conceptual

framework which captures the essence of the chaotic nature of esports careers (see Figure 1 below).

[Insert Figure 1 Here]

The illustration within the figure above is based on the "Lorenz attractor" image (Lorenz, 1963)

describing what is known as the "butterfly effect". The figurative butterfly coveys the concept of CTC

where a small change in starting conditions can have non-linear impacts on a complex system. The

functioning and trajectory of the system can be understood as, and identified by, its characteristics of

initial conditions; attractors; complexity, change and chance events; patterns and fractals and

construction. The interactions amongst these five themes are exemplified through the figure. Our

findings indicate that interdependencies do occur between the actors in the same environment, for

example the athletes, coaches, managers, clubs, sponsors, media, governing organizations and

governments. The following sections discuss how our findings cohere with the five elements of the

conceptual framework.

4.2 Initial conditions of entry

1   CTC theorizes that the crucial initial condition is likely to have profound implications on future career

2   development. Initial conditions that relate to the development of an individual's career path may

3   include the opportunities available, congruence between interests and work, related abilities and the

4   social connectedness that the individual has (Peterson et al., 2005; Pryor & Bright, 2003). According

5   to the narratives of our participants, the starting points of their careers were often influenced by several

6   factors. From our findings, these initial conditions can be group into two categories – internal and

7   external conditions.

8   Internal conditions are triggers relating to personal circumstances, curiosity, passion, interests and

9   attitudes that initiated one's career (Nimrod & Kleiber, 2007). Within the data, participants' interests

10   and passions were such examples commonly cited as one of the key initial conditions. We gathered

11   from the findings that most professional players started their journey into esports in their teenage years

12   as a form of leisure entertainment, hobby and/or interest. This may indicate that becoming a

13   professional player is likely to be incidental initially. As Wuya (20, Chief Coach), observed, "[For]

14   many of our players, their initial motive was purely due to their personal interest and passion for

15   playing computer games." Very often, in the early and entry phase, the interviewees viewed esports or

16   gaming as a casual leisure activity. "Playing for fun", "getting to know the gaming community",

17   "gaming with friends" were some of the reasons cited by the esports athletes. Family, friends, peers

18   and acquaintances were cited as influential sources for their initial involvement. Alex (20, Esports

19   Athlete) explained that, "When the game came out, because I didn't really know anybody playing

20   professionally, I was playing with my cousins, and friends from school. That was pretty much the

21   norm."

22   At the same time, individuals' natural talent and ability appeared to play an important part in the

23   formation of these initial conditions:

24   Firstly, they [esports athletes] are gifted in terms of their natural motor skills. They are quick

25   with their hand-eye co-ordination. Secondly, they must have excellent dynamic and static

26   vision, that is, the ability to capture and process the information in an instant from any moving

1   images. Another attribute, I think, which is also an essential part of their talent, is logical

2   thinking, although it can also be enhanced through intensive training. Some are born [with this

3   ability], they may be called 'naturally intelligent children', who can react quickly and make

4   appropriate judgements, based on a series of conditions [in the game]. These three qualities are

5   the common characteristics [in esports players] and what we call talent in fact. These are not

6   something we can train, well, only to a certain extent. Players who possess these qualities are

7   likely to continue and succeed. (Peng Jianbin, 28, Chief Coach)

8   You don't need to be physically fit. But you do have to have a sharp mind! (Li Xiaoming, 24,

9   Project Director)

10 External conditions, on the other hand, are influences outside of one's control such as the political,

11 economic, social, technological and environmental contexts (Nimrod and Kleiber, 2007). From the

12 political perspective, the first national esports team was set up by the Chinese Sports Ministry in 2018

13 representing China to compete in the 2018 Asian Games, which demonstrates evidence of the growing

14 importance of esports in the country. Looking at the Socio-economical perspective, a recurring theme

15 influencing the decision to embark on esports as a career was that of financial attractiveness. An

16 example of such an initial motive can be demonstrated by Xiao Mao (20, CEO and Chief Coach), a

17 retired esports athlete who is currently managing an esports team. He recalled that, "my mother

18 thought that since I am not doing well in school, I might as well turn my hobby into a career and try to

19 make a living out of it. Hopefully I could support myself." In fact, the draw of financial return was

20 echoed by a team coach and a club manager that prompted players' entry into esports:

21 Alongside their personal ability and interest, the economic aspects [of esports] will attract them

22 to get into this industry. Some may think they will have the chance to make a fortune just

23 overnight – this is what traditional careers won't give you.（Xiao Liao, 24, Operations

24 Director）

1   In the recent two to three years, we've seen parents voluntarily sending their children to our

2   club [to be trained to be future esports athletes] …. Because now everyone can see that the

3   industry is booming and starting to generate huge financial return. (Yi Ran, 24, Club CEO)

4 Furthermore, China is now one of the world's major players in esports after almost a decade of rapid

5 development (Lu, 2016). There are 11 Chinese streaming platforms that broadcast esports tournaments

6 and professional gamers in the country (ESC, 2019). Domestic league matches are watched on the

7 internet by millions of gaming fans globally (Newzoo, 2020). Viewership in China for popular esports

8 tournaments such as Honor of Kings (*Wang Zhe Rong Yao*) and League of Legends can attract 80m

9 viewers per match (Hancock, 2019). Our respondents suggested that such high-profile development

10 make it an appealing career path for many young people in China. The aspiration and possibility of

11 becoming famous seemingly motivate young people to embark on the journey to become esports

12 athletes:

13   Have you heard of 'fan economy'? Esports stars have millions of followers [on social media].

14   Fans are crazy for them…. [If you are a star], you will have fans follow you around [to

15   competitions], give you 'rewards' through live streaming, and no mention of the lucrative

16   income to be had from endorsement and sponsorship. (Weiwei, 20, Esports Athlete)

17 This is aided by the fact that with technological advancements and improved access to the Internet, the

18 threshold for esports initiation is low in regard to individuals' resources and efforts, as remarked by

19 Mika (23, Club CEO), "A gaming professional just needs the Internet and a console, PC or mobile

20 phone!". Young people with access to the Internet and/or games devices can start gaming rather easily

21 and spontaneously nowadays: "Every family has computers now and children all play computer games

22 from young age. It's unlike the old times when we had to go to Internet cafés [to play games]." (Xiao

23 P, 21, Esports Athlete)

24 Both these internal and external conditions may exert influence over the trajectory of an individual's

25 esports career development. Our interviewees' responses indicate that the way an esports career

26 consequently develops and takes shape has a sensitive dependence on the initial conditions, with a

1 particularly pronounced effect on undecided individuals. In other words, influences such as parental

2 support (vs opposition) and support structures (e.g. clubs) in the initial phase of a career may cause

3 great variations in the final outcome.

4 The importance of the initial conditions prompting the consequent developments was felt by

5 respondents. As one of the coaches (Peng Jianbin, 28, Chief Coach) explained, "Most players over the

6 age of 17 – they get full family support to enter this career. That way, they are more likely to make it."

7 This sentiment was echoed by Lula (21, Esports Athlete), who felt that getting scouted by a

8 professional coach gave him the confidence to turn a casual leisure activity into a full-time career:

9   I like strategy games. I was only playing casually and ended up getting picked out. I was

10   thought of as a really good player. That really helped me and provided me with the courage to

11   convince my parents to let me have a go.

12 Conversely, as more and more young people are exposed to esports, an activity that requires

13 considerable engagement time to achieve and/or maintain one's league status, gaming addiction has

14 become a widespread problem. The term 'electronic heroin' was invented to condemn the ever-

15 expanding esports industry (Lu, 2016), which was believed to be causing young people to become

16 addicted and to lose interest in their studies. Lu (2016, p. 2201) suggests that, particularly in China,

17 "parents, educationists, and doctors have expressed growing concern over the social and health costs

18 of the esports industry", where "academia, media, and the general public are becoming more cautious

19 about the development of the esports industry". The negative press and reports on gaming addiction,

20 and its effects on young people, have triggered parental dissent towards involvement in esports for

21 their children. This 'initial condition' of societal opposition and discouragement from parents has

22 inevitably impacted on and halted further involvement of some young players who have just started

23 out on their esports venture:

24   In the Chinese context, many parents still have traditional ideas and all hope that children can

25   study well, take 'Ke Ju' [national level examinations] first in everything. Sports, arts or even

26   esports, these 'San Jiao Jiu Liu' [unconventional, inappropriate activities] would not work.

1   They [parents] feel that they will lose face when chatting with friends and relatives. (Wuya,

2   20, Chief Coach)

3 Our findings indicate that the initial conditions of entry to esports are unique to individuals. This

4 individual uniqueness is a reflection of the convergent nature of esports (Jin, 2010), as an

5 amalgamation of multiple elements that are "cultural, creative and consisting of content, entertainment,

6 media, business, spectacle and sport" (Vera, Terrón, & García, 2018, p.43). This has given rise to

7 multiple means of entry into the esports industry, where the phenomenal social and mediatic boom of

8 the industry has drawn many young talents with unique and combined skills and expertise to it.

9 **4.3   Attractors**

10 Attractors in a chaotic system can be understood as characteristic trajectories of the system (Kauffman,

11 1995). An attractor indicates a system's long-term behavior, which sets the limit within which the

12 systems operate. These limits are system boundaries which guide individuals' career paths. In career

13 development, this conception applies to the limits of what may be acceptable to individuals, for

14 example, in terms of their ethics, motivation or preferences. It may also apply to the limits on their

15 capabilities as a result of their natural abilities as well as their developed skills (Pryor & Bright, 2003).

16 Applying this to esports careers, we identified individuals' values, culture, aspirations, and abilities as

17 attractors, i.e., the system boundaries keeping esports athletes' careers on the track.

18   What makes them go further … well, the most basic is teamwork, an ability to work in a team.

19   They must be able to communicate with each other too! Very important also, self-discipline,

20   right? And, they must have the aspirations to succeed, so that they can take the future into their

21   own hands. (Yi Ran, 26, CEO)

22   In addition to the talents that they have for the game itself, there are other basic qualities

23   required. They will need to be a quick learner and have strong adaptability. They need to be

24   comprehensive in all aspects. With rapid learning ability and adaptability, one can become

25   very competent [in esports]." (Peng Jianbin, 28, Chief Coach)

1   All of the esports athletes interviewed displayed a strong belief and conviction in their capabilities to

2   succeed when they first started. As Alex (20, Esports Athlete) recalled, "We were aiming only to be

3   champions! Nothing less!". Persistence and self-motivation among the esports athletes are the

4   *attractors* driving their careers forward. Some interviewees also cited the importance of role models

5   on motivating their personal career pursuit. Wuya (20), a retired pro-player currently working as a

6   team manager in the D7G esports club, explained that the Chinese esports team Invictus Gaming's

7   claim to international success with their victory in the first League of Legend World Championship in

8   2018 was a moment "all Chinese esports athletes have prepared and waited for". This achievement has

9   motivated his own esports team:

10   It is our internal motivation of nationalism that we finally beat the Koreans … It is similar to

11   the success of Liu Xiang [Chinese hurdler, Olympic gold medalist] … we all respect him and

12   we are so proud of him on the account that he has achieved a seemingly unachievable goal of

13   winning a gold medal in a sport which Chinese would never have been expected to win. This is

14   mission impossible made possible! (ADD, 19, Esports Athlete)

15   Such victories in events and role model champions serve as *attractors* that inspire players to work

16   towards their goals and provide the drive to overcome the challenges to become a successful esports

17   player:

18   They [these athletes] generally think of something … a goal, an event, a person … as their

19   innermost motivation to help get them through the relentless training or to help them maintain

20   the focus. The first one is usually their desire to become a champion. The second one is role

21   models. There are some legends and legendary players in esports. For example, Sky [Li

22   Xiaofeng, Chinese former esports athlete] and so on. These famous players are probably the

23   benchmarks and goals in the hearts of many young players. (Xuecheng, 24, Chief Coach)

24   Dedication and the mental strength necessary to handles stress also appear to serve as *attractors* in

25   building the capacity to develop an esports career:

1   They may have started because of their love and passion for the game in the early stage, but

2   after they joined the club [as an esports athlete], they would start to realize that this is a

3   profession and it requires a lot of comprehensive skills. [With this understanding], they can

4   then help themselves to become a better professional, do a better job and slowly mature. (Peng

5   Jianbin, 28, Chief Coach)

6   Although there is no lack of talent, as a manager, we prefer to stick to reliable players who can

7   handle the stress and pressure of world championship tournaments. Their patience and psyche

8   will be strained throughout the training and journey towards the championship. The

9   competitiveness and often ruthless nature of esports tournaments is very much a psychological

10   challenge which players must have the mental strength to overcome. (Mika, 23, CEO)

11   If it's not physical deterioration, then the issue must be mental stress, burnout .... These are the

12   key culprits for a short career span, forcing them into early retirement. You've got to

13   understand, these are young people you are talking about. They may have the physical alertness,

14   but not the mental or emotional maturity to process what is happening around them and to them.

15   (Xiaomao, 20, CEO and Chief Coach)

16   Scholars (Pryor & Bright, 2003; Schlesinger & Daley, 2016) emphasize that without attractors acting

17   as boundaries to a system, what results is disorder. This can also be seen within the esports context.

18   Coaches also act as the attractors in overseeing individuals in what might otherwise be a meandering

19   career journey. Coaches play the role of advisor in encouraging individuals to develop a sense of

20   purpose based on their competencies and aspirations (i.e. attractors). This way, coaches can then

21   confidently allow for fluctuations in players' career development if they know that the system

22   boundaries are in place (i.e. players will rebound and/or stay within the career trajectory):

23   Many of us who are coaches are often encouraging these talented children to persist in their

24   pursuit of esports career, especially when we can see their potential to go far. Yes, it is very

25   difficult to follow this path, we tell them … and they may not succeed even if they practice

1 hard. But one should always have faith. We always advise them that when they look back one

2 day, at least they won't regret it. (Li Chun, 28, CEO and Chief Coach)

3 **4.4   Complexity, change, and chance events**

4 Our interview data indicate that esports athletes' career paths are complex in nature. Firstly, we have

5 found that there are many variations from our respondents with regards to the era when they entered

6 the system. One of the retired athletes, Chuan Qi (28, Retired Esports Athlete) commented that the

7 support available for developing esports as a career is quite different now compared to when he first

8 started in the early 2000s:

9   Actually, the boundary between professional and non-professional was not quite a clear cut at

10   that time, unlike now. Once you have signed the contract and finalized the payment of 'Wu

11   Xian Yi Jin [Five Insurances and One Fund[3]]', it means you are already professional.

12 Owing to the lack of proper structure, governance and guidance in the early days of the esports

13 industry in China (Lu, 2016), there was a high level of uncertainty in terms of the career prospect in

14 the industry. Consequently, it resulted in different career choices and outcomes for athletes. Chuan Qi

15 (28, retired esports athlete), for example, chose to give up his esports career and further his studies

16 instead:

17   I had lots of concerns in terms of the whole [job] security of esports development and its future

18   prospect at that time when I was at my peak. But now I understand that I was being short-

19   sighted [laughing]. If I knew [esports] could take off like this, I would not have retired so

20   quickly. However, in spite of the many official research reports illustrating the bright future of

21   esports, we are only aware that the industry will be worth RMB 90 billion … a huge pie to

22   share, but no one can be certain who and which project will benefit from it…right?

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[3] Refers to China's social security system which is made up of five different types of social insurance and one mandatory housing fund. It is compulsory for anyone joining the workforce.

1 Secondly, along with the immense rise in popularity of esports over the past decade, the road to

2 becoming a professional esports athlete has become increasingly competitive. Turnover and

3 elimination rates are high for a short-lived career, as illustrated by Cat (17, Esports Athlete), "Most

4 professional players are out of a job in less than half the time it would take us to complete an

5 undergraduate degree." These sentiments were also echoed by other interviewees:

6   Competition at a professional level is fierce and the players may be dismissed at any time. As

7   the infrastructure improves, more and more people are competing to join the esports industry.

8   Compared with traditional sports, the esports entry threshold is low, but its professional

9   requirements are extremely high. This leads to the high elimination rate of professional

10   players. The proportion of successful entry [as esports athlete] is awfully low. It is a cut-throat

11   industry. (Weiwei, 20, Esports Athlete)

12   The elimination rate is very high, it is much more difficult than the [Chinese] university

13   entrance examination [to be an esports athlete], the difficulty is about 50 times higher. (Tuzi,

14   17, Esports Athlete)

15 Thirdly, although the past decades have seen the professionalization of esports and improved

16 management of its development in China (Lu, 2016), its governance structure is apparently still

17 patchy. As a young industry, due to the lack of experienced managers, some clubs are being managed

18 by inexperienced management teams, which also accounts for high turnover of athletes:

19   The reason why the management of the club is difficult is that the management personnel are

20   mostly retired professional players. They are also young and have no professional management

21   training. Not only are they managing young people not much younger than them, they often

22   rely on rules and regulations reproduced directly from the management of esports clubs in

23   Korea, and reapply them in the management of their own players. It is hardly appropriate and

24   may not be entirely applicable to the Chinese context. As a result, the outcomes are not

25   satisfactory. This is currently a huge challenge facing the esports clubs here. We do not have a

1   management system of our own … that is suitable to run the club in a better way. (Li

2   Xiaoming, 24, Project Director)

3   Fourthly, our findings also suggest that chance events also contribute to the complexity of esports

4   careers. Esports career development and outcomes can be shaped by a combination of chance events.

5   These chance events, as described by Peake and McDowell (2012), include externally imposed

6   influences, events emanating through social connections, as well as simply being in the 'right place at

7   the right time'. In this study, we identified two main types of chance events. The first is within the

8   recruitment and selection process of esports athletes. Xu Haoran (23, Project Director) mentioned three

9   main recruiting channels:

10   Firstly, clubs are always actively looking out for talent to join their team. Players who have

11   reached a high level in the game and are amongst the best in the league table, they get noticed.

12   This is the main way to select new recruits to form a team. Most of the players in the early

13   stages of a new game project are often handpicked in this way. Secondly, one can be

14   recommended by industry insiders. Professional players or coaches will encounter many

15   passer-by players in their daily training. If the players perform well in the game and have

16   displayed a willingness to play professionally, they may get the opportunity for trial training

17   through the recommendation of the coach to the club. If they performed well, they may have

18   the opportunity to be signed up by the club and registered as a professional player. Finally,

19   semi-professional or master-level players who participate in high profile competitions, who

20   have demonstrated their caliber in the competition may get invited to join a club.

21   Another main type of chance event that occurs within the industry relates to media exposure and live

22   streaming. A study by Bright et al. (2005), found that unplanned and serendipitous career decisions

23   and/or events were also commonly recognized as having an important influence on career outcomes.

24   This is illustrated through Peng Jianbin's interview (28, Chief Coach), a veteran coach who made the

25   following observations on the unplanned decisions that players took as a result of media exposure

26   which had a critical influence on their career paths:

1   Although live streaming is probably the most influential factor in promoting the development

2   of esports, the fact that it caught on too fast can be a bane too. During the outbreak, we wasted

3   a lot of time and energy on distractions brought about by the appeal of live streaming, which

4   were unnecessary. For example, some talented players were supposed to continue playing in

5   competitions, but they choose to be a streamer. Then, they disappeared completely from the

6   circuit. When asked, they said regrettably that the streaming business had not been successful.

7   This is because some players are technically skilled and not eloquent or savvy enough to be a

8   successful streamer. On the contrary, some players who were not performing well in

9   competitions, ended up as celebrity streamers.

10 Chance events appear to have a significant effect on career trajectories in esports. When embracing an

11 open system thinking, as advocated by CTC, it is important to recognize that "the unexpected can and

12 sometimes will happen" (Bright & Pryor, 2011, p.47). The professional players who have made

13 successful career transitions demonstrated that the willingness to embrace chance events and the

14 ability to effectively use the resources that are available is a key asset. Subsequently, chance events in

15 individuals' esports careers provide them with the opportunities to build up their financial capital and

16 further their careers.

17 **4.5 Patterns and Fractals**

18 Although the development process of esports careers are deemed chaotic, they can still be seen as

19 retaining an emergent orderly pattern. Through mapping the career narratives of the professional

20 players, it has revealed that there are regularities, similarities and symmetries in the individuals' career

21 experiences. One of the first key patterns mentioned in the narratives was the general consensus on

22 athletes' career longevity and age. The average age of the 24 current esports athletes involved in our

23 interviews was 19. The average of the ages they started as a professional was only 14.5 years old.

24 According to our respondents, an esports career as a professional athlete was generally extremely

25 brief, as a result of the profession's reliance on the cognitive alertness of players:

1   The age of entry [to this industry] is very young where most of them are no more than 18 years

2   old. Professional esports requires a high standard of reactionary sharpness and processing

3   speed. For this reason, most mature esports athletes are aged between 18 and 28, with an

4   average age of 19. Their prime time is just a few short years from 18 to 22 years old. (Xiao

5   Mao, 20, CEO and Chief Coach)

6   In spite of the fact that esports is dominated by professional players in their early twenties, the

7   younger players are always the best players. It's very competitive and just by being a few years

8   older, you lose the edge and it slows you down. It shows. (Youci, 17, Esports Athlete)

9 A second emergent pattern observed was that athletes have long working hours where the pressure to

10 perform is high, with a particular lack of time for any interpersonal relationships and social life outside

11 their 'gaming house':

12   Training is tough, the club's training program is mostly between 10 to 12 hours a day, from

13   noon to late at night. We have to dedicate a lot of time to practice. (Zoo, 20, Esports Athlete)

14   Esports athletes also require constant cycles of intense training and learning. Routine training

15   is required to help players develop their skills for competitive gameplay, such as team

16   management, a balanced body and composure, and understanding of the technology in use.

17   Daily practices can range anywhere from 10 hours daily, up to 16 hours in some cases. It is not

18   uncommon. (Momco, 18, Esports Athlete)

19 A third emergent pattern was that professional players face constant struggles in their paths to attain or

20 remain at the top of their leagues, often going through different stages of an 'emotional rollercoaster'

21 at some point of their career, including enjoyment, self-doubts, success, stress, slumps and recovery:

22   Esports is a young industry with unique characteristics. They are a group of young adults. The

23   development of their minds has not yet fully matured. They are easily tempted by distractions

24   in daily life. We [as coaches] have to deal with many mental and psychological problems of

25   our players. They are still kids after all. (Li Chun, 28, CEO)

1   Yes, [we] sometimes are frustrated and stressed. For example, after the end of a game, you find

2   someone you know before, he may be your former teammate, or someone you are very

3   familiar with, he was not as good as you. But when this game is over, he is the champion, and

4   your results [for this season] are very bad, or even if you are still the runner-up, you may feel it

5   is unfair, disappointed, hurt and lonely deep inside. (Dalong, 18, Esports Athlete)

6   Well, even the most experienced players sometimes have to rebuild their confidence after

7   failure. (Angel, 19, Esports Athlete)

8 A final emergent pattern was the high level of mental strength and resilience, passion for the

9 profession and the hunger to win that came through from the interviewees as defining qualities of

10 successful esports athletes:

11 Those young practitioners … they are all good at thinking, passionate, competitive, and eager for

12 success. (Xiao Liao, 24, Operations Director)

13 There are talented players who can translate nerves into adrenaline and conversely, players who

14 collapse under the weight of expectation ... or those who never recover from their defeats and failure.

15 To be able to bounce back from defeat is often the difference between mediocre players and true

16 champions. (Alex, 20, Esports Athlete)

17 **4.6   Construction**

18 As noted by Pryor and Bright (2006), despite constant change in a system and the fact that careers are

19 subjected to chance events, elements of order remain (i.e. patterns and fractals). According to Bright

20 and Pryor (2011), "The lack of ultimate control or predictability opens up the opportunity for

21 individuals to become active participants in the creation of their futures" (p. 164). Because esports

22 careers are nonlinear and cannot be easily predicted, esports players found it essential to focus on the

23 emerging order. The appreciation of the emerging patterns of order in the midst of change allows

24 players to move on and construct their own career paths. Within the complex and dynamic system of

25 an esports career, our findings suggest that players became active participants in creating "their own

futures rather than [being] pawns in a rigidly deterministic system of cause and effect" (Pryor & Bright, 2011, p.164):

> Players understand that their success is not based on a single decision, but on a multiplicity of decisions. With no guarantee that they will make it to the top, players will eventually realize that what they can do is pull all the stops out and put in their best efforts in everything they do in order to stand a chance at succeeding. (Xuecheng, 24, Chief Coach)

Players react to the unpredictability by focusing on and gaining comfort with the uncertainty of the emerging order. A way of doing it is to remain flexible and adaptable to changes, for instance, rising to the constant challenge of new game patches (i.e. updates) by game developers:

> Adaptation is crucial in gaming because game developers often tweak their product or patch the game to adjust the way it's played, on a very regular basis. This is to ensure that no single player is dominating the gameplay. This is also to create a reason for non-professional amateur players to return to the game and try to master the game after the tweak. As a professional player, you just have to adapt fast enough." (Qiuqiu, 18, Esports Athlete)

Although long-term forecasting is almost impossible and dramatic change can occur unexpectedly, players are able to focus by following the emerging patterns and creating short-term flexible goals to construct their career. This is illustrated through an example cited by one of the interviewees, reflecting on his journey towards becoming an esports athlete:

> We all [aspiring players] knew that we wanted to be signed up by large esports clubs. That's the first step. There you get supported by coaches, analysts and managers. You get professional support from people who can help you move closer to the dream of becoming champions. This is what we were working towards to … what kept us going. (Karin, 19, Esports Athlete)

The narratives of the interviewed athletes suggest that from the initial stages onwards, they start to focus on systematic progression, i.e. rising through the 'ranks', as explained by one of the coaches:

When establishing a team, there are six recruitment stages in most clubs in China. A group in the youth system has about 30 people and I may only select, at most, one or two people. Even if they were to stay and go on to become the main force and a star of the club… they would still have to face many stages of progressive screening. They would have to be promoted to the parallel team, then to progress to the substitute players of the main team and then to progress to be the main players, and at last you may have chance to become a star player. They all go through such a journey." (Xiao Hei, 22, Chief Coach)

4.7   Inference

Our findings suggest that there is no direct entry point for esports athletes looking to develop a professional career. The career path does not appear to follow any prescribed stages of progression, and not all esports athletes have followed a similar career path. There is an apparent lack of a 'typical' career path. These discoveries indicate that traditional career theories, based on linear transition and/or stage-based developmental paths, are ill-equipped to elucidate esports career development. Instead, it is suggested that a more fluid and flexible theory, demonstrated by the principles of CTC is more suited to capture the contemporary, complex nature and variation of esports career paths.

Inferring from the observations that emerged from our data, it reflects the inter-connections of the five seemingly disparate themes. Firstly, *initial conditions of entry* can affect future esports career development and there are multiple entry routes into the esports profession. Esports career development is also subjected to, and interacts with, variances such as *attractors* and *chance events*, which render an individual's career development complex and unpredictable. Secondly, when *chance events* in the individuals' esports careers emerged they provided athletes with the opportunities to build up their financial and career capital. It is these capabilities that allow successful esports athletes to further their career *construction*. Thirdly, whilst the esports career development system exhibits its *complex and changing* nature, there is also an underlying order beneath the chaos, which is demonstrated by athletes following similar *fractal patterns* in their individual career experiences. A career in esports is, in essence, a chaotic system that is influenced by very small changes. This makes

1   it difficult to predict the future, as the successes and failures of esports athletes can appear random. All

2   esports career trajectories are effectively erratic from the point of view of practical prediction. Any

3   small difference (e.g., motivations, encouragements) in the initial condition individuals are subjected

4   to can cause a big difference in where they end up. Preparation for a future and seeing the logic in the

5   chaos of a career in esports is not easy.

6   **5 Implications, contributions, and conclusions**

7   This study has sought to answer the need for theorizing on esports careers and move the discipline of

8   sport development forward by fostering the application of CTC to the understanding of the

9   development of a sports career in a contemporary environment. Our research suggests that classic

10 theories and frameworks may no longer be adequate to reflect the characteristics of new forms of

11 careers within the emerging industry of esports, where established career transitions are not yet in

12 existence, nor progressing in distinct and/or linear stages. Esports, at its current developmental stage,

13 presents a complex, dynamic, uncertain and changing contemporary environment, that cannot be

14 described or explained using traditional linear models. The use of CTC we propose here may also

15 provide an effective tool to demonstrate contemporary sport career development pathways and

16 therefore has the potential to contribute to the theoretical development of sport development theories

17 in general. Through an exploratory approach to applying the key elements and principles of CTC to

18 the esports context, we have developed a framework which provides a constructive approach to

19 understanding esports careers paths.

20 There are two key contributions. Firstly, our research extends the current application of CTC which

21 previously has relied on directly examining the outcomes of the theory-informed interventions on the

22 student population (e.g, Borg, Bright, & Pryor, 2014; Loader, 2011; Schlesinger & Daley, 2016). We

23 revisited the key tenets of Chaos Theory and critically assessed their application to a real-world

24 example of the esports industry. Through doing this, this research brings new insights to the theory

25 based on primary data, and hence contributes to the theoretical development of CTC.

1   Secondly, through examining the career pathways of esports athletes, this study has drawn attention to

2   the challenges of developing a career of great uncertainty within a complex contemporary world. Our

3   findings provide insights into the process of becoming an esports athlete and draw attention to the new

4   research field of a professional esports career. Although entry into esports is haphazard and does not

5   appear to be governed by any predetermined pathways, there lies an unseen order hidden beneath the

6   apparent chaotic process. Developments in an esports career are brought about not by careful planning

7   but by seizing opportunities (e.g., through chance event) that arise. Through the complexity of

8   influences, choices are made by players with varying outcomes which result in their career movements

9   (into or out of esports). This demonstrates the "butterfly effect" as advocated by CTC which has a

10   bearing on the outcome of their career development. The practical implication to managers, coaches

11   and players then is that uncertainty in careers should not necessarily be viewed as a negative thing that

12   must simply be endured, but rather could be viewed as a positive force, that when embraced may drive

13   a career forward. This understanding may help stakeholders (e.g., players, coaches, managers, and

14   supporting organizations) to manage and deal with chance events in the players' careers in terms of

15   how to develop the right way of thinking and how to respond to the change. It may also help

16   stakeholders to better predict the outcome of complex situations by assessing what is currently known,

17   what is not known, and what can be learned.

18   Additionally, this study has provided an exemplar of interdisciplinary collaboration, applying the

19   often-disparate study of sports, digital gaming and career management to the case of esports

20   development. This opens a new line of inquiry into research on sport development and management,

21   encouraging the application of theory and methods between previously distinct disciplines. In addition,

22   this study provides initial insights into the application of CTC in a new career beyond the student

23   population that has been the subject of previous studies. CTC could be incorporated into future

24   research studying other emerging industries (e.g., blockchain driven start-up businesses and others

25   facilitated by new technologies within the sharing economy) to better understand the career

26   development processes within newly formed occupations.

1 We also acknowledge the limitations of this research. Firstly, esports has emerged as a growing

2 economic and business sector for which a complete industry life cycle has not yet been achieved

3 (Chikish, Carreras, & Garci, 2019; Monfardini et al., 2012). The current research offers an initial

4 exploration of how the characteristics of esports careers at this early stage of the industry life cycle can

5 be described and explained by the application of CTC. We have argued that classic career theories do

6 not apply to esports *at present*, but in the future it remains to be seen, as the esports industry becomes

7 more established and transitions become more defined. Being aware of this potential limitation,

8 longitudinal qualitative interviews may be adopted in future studies to explore the change of career

9 recruitment, development and retention over time. This would provide further evidence and theoretical

10 contributions to the development of existing career theories.

11 Secondly, this qualitative study has a small sample size. As such, our findings are preliminary and no

12 claims about generalizability can be made. In addition, all participants were recruited in China. The

13 limitation imposed by the cultural context would have to be taken into consideration. Although the

14 scale of development and the importance of esports in Asia is more established than that of the

15 Western countries (Vera et al., 2018), future studies may explore the similarities and variation between

16 the Eastern and Western contexts in order to capture a fuller picture of esports career development.

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1 **Table 1　　　　Participants Information**

ID	Club	Position	Age	City
Li Xiaoming	Oh My God	Project Director	24	Chengdu
Wuya	D7G	CEO and Chief Coach	20	Guangzhou
Xiao P	D7G	Esports Athlete	21	Guangzhou
Sunny	D7G	Esports Athlete	19	Guangzhou
Peng Jianbin	AllGamers	Chief Coach	28	Chengdu
Xiao Liao	AllGamers	Operations Director	24	Chengdu
Chuan Qi	AllGamers	Esports Athlete	28	Chengdu
Xiao Mao	Crystal Luster	CEO and Chief Coach	20	Chengdu
Xu Haoran	Crystal Luster	Project Director	23	Chengdu (have since moved to Xi'an)
Yi Ran	Dream Rhythm	CEO	26	Chengdu
Xiao Hei	Dream Rhythm	Chief Coach	22	Chengdu
Clearlove	EDward Gaming	Esports Athlete	18	Shanghai
MACO	EDward Gaming	Esports Athlete	18	Shanghai
LULA	iR	Esports Athlete	21	Shanghai
Mu Ye	iR	Esports Athlete	19	Shanghai
Cheng Chujie	iR	Esports Athlete	20	Shanghai
Mika	TeamWE	CEO	23	Shanghai
Xuecheng	TeamWE	Chief Coach	24	Shanghai
Karin	Topsports gaming	Esports Athlete	19	Shanghai
Qiuqiu	Topsports gaming	Esports Athlete	18	Shanghai
ADD	Bilibili Gaming	Esports Athlete	19	Hangzhou
Jackairay	Bilibili Gaming	Esports Athlete	18	Hangzhou
Alex	Fun Plus X	Esports Athlete	20	Beijing
Li Chun	Fun Plus X	CEO and Chief Coach	28	Beijing
Chuanzhang	xia (RW)	Esports Athlete	18	Shanghai
Dalong	xia (RW)	Esports Athlete	18	Shanghai
Song	QG Repers	Esports Athlete	18	Shanghai
Momco	QG Repers	Esports Athlete	18	Shanghai
Cat	Estar Pro	Esports Athlete	17	Xi'an
Tuzi	Estar Pro	Esports Athlete	17	Xi'an
Weiwei	Sunning Gaming	Esports Athlete	20	Shanghai
Angel	Sunning Gaming	Esports Athlete	19	Shanghai
Yagao	Jingdong Gaming	Esports Athlete	17	Shanghai

Zoo	Jingdong Gaming	Esports Athlete	20	Shanghai
Youci	Jingdong Gaming	Esports Athlete	17	Shanghai

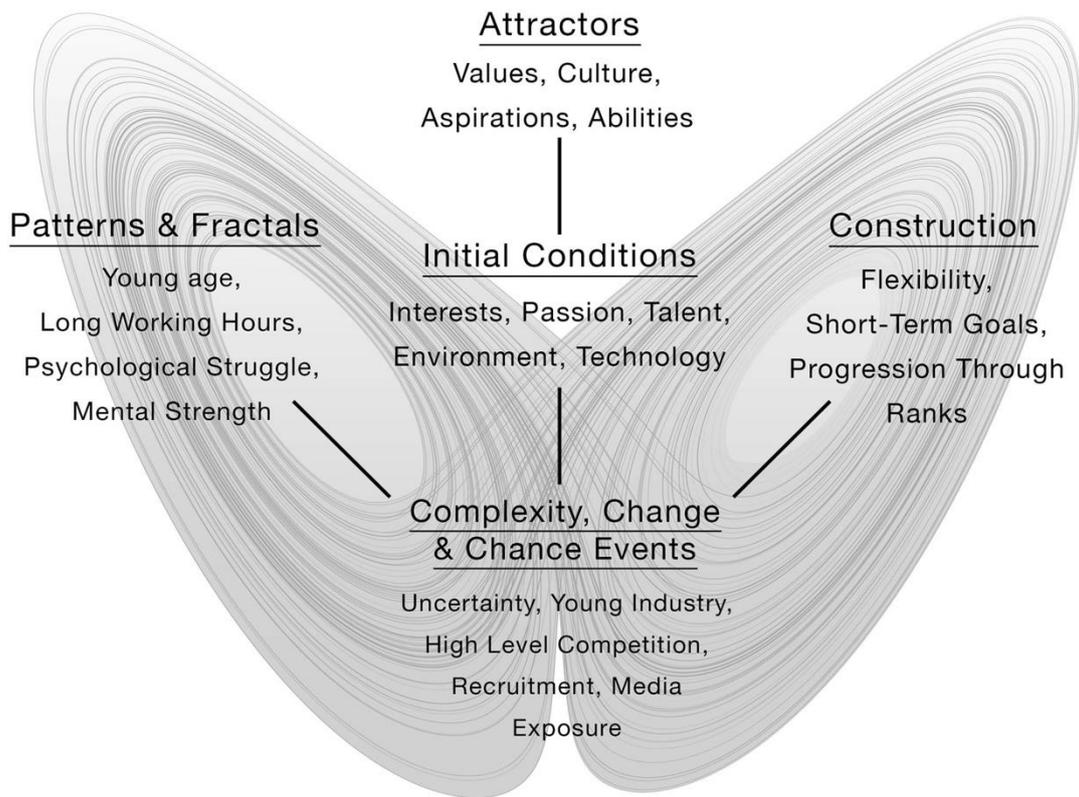1 **Table 2   Data Analysis - Sample Codes and Themes**

Quote	Level 1 Code	Level 2 Code	Analytical Theme
"many of our players, their initial motive was purely due to their personal interest and passion for playing computer games." (Chief Coach 1)	Playing for fun	Interest	Initial Conditions
"Alongside their personal ability and interest, the economic aspects will attract them to get into this industry." (Operations Director)	Personal ability	Interest	Initial Conditions
"In the recent two to three years, we've seen parents voluntarily sending their children to our club [to be trained to be future esports athletes]" (Club CEO)	Parental support	Supporting Condition	Initial Conditions
In addition to the talents that he has for the game itself, there are other basic qualities required. He will need to be a quick learner and have strong adaptability. He needs to be comprehensive in all aspects. With rapid learning ability and adaptability, one can become very competent [in esports]." (Chief Coach)	Quick learner and adaptability	Qualities for Success	System Requirement
"What makes them go further [...] Very important also, self-discipline, right? And, they must have the aspirations to succeed, so that they can take the future into their own hands." (CEO)	Self-Discipline and Aspirations	Qualities for Success	System Requirement

2

3

4

Figure 1 Conceptual Framework of the Chaotic System of Esports Careers

Attractors
Values, Culture,
Aspirations, Abilities

Patterns & Fractals
Young age,
Long Working Hours,
Psychological Struggle,
Mental Strength

Initial Conditions
Interests, Passion, Talent,
Environment, Technology

Construction
Flexibility,
Short-Term Goals,
Progression Through
Ranks

Complexity, Change
& Chance Events
Uncertainty, Young Industry,
High Level Competition,
Recruitment, Media
Exposure

1 **Appendix Interview Schedule**

2 **Demographics and Background**

3 1. Can you please state your name/gamer ID, age, associated club, current employment and job role?

4 2. Retired? (Yes/No)

5 3. What is your highest educational qualification?

6 4. How many years of professional esports experience do you have/have you had?

7 5. What (other) job experience do have prior to turning professional as an esports athlete?

8 6. How many clubs have you been with prior to the current one?

9 **Career Entry**

10 1. At what age did you get into esports?

11 2. What prompted you to start engaging with esports?

12 3. At what age did you turn professional?

13 4. How did you become professional?

14 5. Any particular influencing person and/or factor? (Prompt – schools, friends, parents)

15 6. Any events or results that particularly inspired you?

16 7. As a coach/manager, what are the qualities of an esports athlete you look for when you decide to

17   select him/her as a professional? (Prompt - skills, characteristics) - *where appropriate*

18 **Self-Reflections of Journey**

19 1. What do you think are the differences between a professional esports athlete and amateur gamer?

20 2. What is your normal practice or work routine in your esports club?

21 3. Is there a norm (practice) for most people? A norm for other esports clubs as well?

22 4. What do you think are some of the essential qualities to succeed as an esports athlete?

23 5. Why do people dropout? What are the common reasons for dropping out?

24 6. What is the relationship like between you, your team members, your coach/trainee and your

25   manager/CEO?

26 **Motivations and Aspirations**

27 1. What is your daily training routine like?

28 2. What is the most important event you have trained for? Any particularly memorable events?

29 3. Were there any impressive experiences that motivated (or are still motivating) you to train?

30 4. What motivates you to train or coach and stay in esports?

31 5. Do you have a role model that you look up to?

6. Do you treat this as a job? And why?

7. Is there any social stigma associated with this career?

8. If yes, what is it?

Governance, Guidance and Support

1. What are the challenges in your career?

2. What kind of support is there to deal with these challenges? (Prompt: from government, club, coach, teammates, parents, friends)

3. What do you think, in terms of policy, regulations and governance, can be improved?

4. Do you undertake any self-development training activities related to your career?

5. If yes, what are they? What is the purpose? Who are the providers?

On the Industry

1. What do think of how the esports industry has developed, and where is it heading?

2. How do you feel about the business of esports livestreaming? (Prompt: fans culture, salary, importance, limitations)

3. When do you think you will retire and why? - *where appropriate*

4. Why did you retire as professional esports athlete? How did you feel? Any regrets? - *where appropriate*

5. What is your plan after retirement? - *where appropriate*