CHAPTER 2

Disrupting Video Games: A Conceptual Framework for Managerial Skills Building

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Introduction

New technologies have changed the way actors interact in markets. Particularly, disruptive innovations are new products that change the fundamental ways of competing and attending customers. These disruptive innovations have a twofold effect on markets. On one hand, disruptive innovations create new markets. These innovations accomplish this goal by including less-than-optimal attributes that relate to lower prices. Due to this reason, fringe markets are the first to adopt this type of product since they look for basic functionality at a low price. The new product may be oversighted by big incumbent companies that typically overshoot their products by increasingly adding attributes that lack delivering marginal value to consumers. On the contrary, disruptive innovations as low-price,

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low-performance products can jump from the market fringe to the mainstream market and displace incumbent companies (Christensen et al., 2018). Additionally, disruptive innovations create new value networks by altering competition dynamics in this way that new players—even from outside traditional industries—and offer completely new products. New entrant to industries changes interaction not only by offering a new product, but also by developing networks with suppliers and customers in new organizational arrangements (Christensen et al., 2018). Examples of products considered as disruptive include personal computers, which were initially disregarded by manufacturers of mainframes as a threat to their product. Eventually, personal computers became the standard of computers. In this line, video games may represent a disruption to markets, not only due to their high economic value, but also due to the different audiences being attracted to the product. Video games were originally designed for kids, but more mature audiences have also been engaged to spend time playing different genres of video games. In this line, the product may become a disruptive innovation for activities outside the gaming industry.

Technology has gained a prominent place in the current global business environment. Learning is not aside. Half of worldwide population has access to Internet. Although Internet penetration rates show heterogeneity among countries, developing information and communication technologies (ICT) have taken the ubiquitous form of networked mobile devices as tablets and mobile phones, as well as laptops and video game consoles. Young people depend profoundly on technology to accomplish both utilitarian goals (e.g., search for car maintenance or learn how to fix water pipes) and hedonic activities (e.g., watch a movie or play a video game). Workplaces now include two generations: digital natives—the younger generation who "flow" and "immerse" in technology on an all-day-connected basis—engage in activities as social networking, texting, and video gaming, dimensions that shape digital competencies and skills (Prensky, 2001). Alongside this generation, digital immigrants—for whom technological development may represent a disruption—also use technology at varying degrees of skillfulness. These two groups may engage in workplace activities as problem-solving, team building, data analysis, and, hence the degree to which generations acquire and develop skills while playing video games, may be transferred to the workplace.

Existing research shows that managers acquire and develop skills through formal training, courses, coaching, and mentoring. The results

of these sometimes mandatory interventions are related to job performance and career progression. Little is known about more leisure-like activities as video gaming and its impact on managers' skills formation. Existing research focuses on classroom settings for young generations (Adachi & Willoughby, 2013; Blumberg & Fisch, 2013) and hence this paper borrows from such literature. Specifically, researchers have studied how skills as spatial performance (Okagaki & Frensch, 1994), speed of processing (Dye et al., 2009), and learning, and attentional control (Green & Bavelier, 2012).

By discussing flow theory, theory of reasoned action, and personality traits theory, and using the manager as study unit, this paper aims to analyze relationships between video games usage and the resulting outcomes at the workplace. Flow theory maintains that people may engage in a state of focused attention while performing a task. Using such theoretical approaches, this paper aims to frame research proposals worth investigating:

- What is the antecedent relationship between video games usage and managers' flow?
- What are the effects of flow while video gaming on acquisition and development of managerial performance?
- What is the degree to which skills acquired and developed through flow are transferred toward workplace settings?

This paper is structured as follows: section two offers a discussion of relevant learning theories suitable to analyze how managers may acquire skills and proposes a conceptual framework along with research proposals. Section three discusses some possible paths for further testing the conceptual model. Section four closes the paper with concluding comments.

Literature Review

This section analyzes three theories deemed as suitable to research aspects of learning, personality, self-efficacy to leverage managerial skills at the workplace. Theory of flow helps explain how managers can achieve flow moments, which are important to further elaborate on learning outcomes. Personality traits may explain regarding individuals more prone to achieve flow instants and thus more prone to develop managerial performance.

Finally, theory of reasoned action helps include variables that may close a volitional gap for managers not so prone to get involved into flow.

Theories to Analyze Skills Leverage

Flow Theory

Flow theory maintains that individuals may engage in a particular mental state while performing an activity or task. Such mental state represents a moment of complete involvement, energized focus, and is related to joy and other positive emotions (Csikszentmihalyi & Nakamura, 1979). During flow, persons channel and align these emotions with the task. As emotions flow, a number of outcomes appear as meaningful learning, self-awareness, creativity, among others. Individuals perceive the task as self-rewarding, an aspect in which performing the task seems more important than achieving a particular goal. Individuals experience flow when personal skills and task challenge balance. When personal skills are low but task challenge is high, anxiety is present. In contrast, when personal skills are high but task challenge is low, relaxation appears. According to flow theory, a low-skill, low-task challenge scenario leads to apathy, whereas a high-skill, high-task challenge presents flow appears (Csikszentmihalyi, 1997). As video games are hedonic voluntary activities in which individuals engage in a number of single and collective activities, it is reasonable to expect that they get fully immersed in the game while keeping aside other peripheral activities. Video games usually present different scenarios with increasing levels of difficulty. Individuals start playing the easier difficulty levels to get familiar with the video game logic and structure and also engage with other players with similar levels of experience. This helps them to self-adjust their own level of expertise with that of the game and hence avoid strong frustration feeling derived from playing at a difficult level. The previous suggests that experience of relaxation or anxiety in managers playing video games may be indicative of an adjustment in the video game difficulty for flow to succeed. If relaxation appears, there is opportunity to build upon previous skills, and adjust video game toward a more difficult setting so a more robust set of personal skills can be achieved. On the opposite, if anxiety appears, an adjustment toward a less difficult video game needs to be set to reach a balance on the actual skills-challenge gap.

Important assumptions are made for the flow moment to occur (Csikszentmihalyi, 2014): (1) individuals should set a clear of progress

and goals upon the task, (2) immediate feedback on accomplishing goals should appear, and (3) there should be a fit between challenges posed by the task and individual skills. After the individual has entered the flow moment, there are specific subjective features that appear: focused concentration on the task, a merge of action and awareness, loss of self-awareness as main actor, a heightened sense of control, a feeling that time passes at faster pace, loss of ego, and feeling the experience as self-rewarding (Nakamura & Csikszentmihalyi, 2009). Merging action and awareness refers to the fact that full attention is devoted to the task, whereas the self and other surrounding objects are left out of awareness. This is possible by focusing attention on a limited number of external stimuli. A sense of control is also developed during flow moments, in that individuals perceive themselves as lack of anxiety during performing the task; it refers more a perceived sense of control rather than actual control of the situation. When individuals are fully involved in a task, awareness on time passing is surpassed as the task poses a challenge to be solved, and hence it is perceived as passing more quickly. Loss of ego refers to the considering ego as an interactive dimension between the external demands and the internal needs, which stops mediating when the individual is fully engaged in a task (Csikszentmihalyi, 2014).

In all, the flow experience may be associated with autotelic experience, in which the road to be followed in rewarding for its own sake, alongside with a strong intrinsic motivation. Video games appear to follow above assumptions: A clear goal for chapters and missions and it is explicitly stated at the beginning. Players know what can be considered as success or failure while they are progressing in the video game. Moreover, feedback on progress in most video games is immediate. The player is made aware of missing items and accomplished partial goals. Finally, as previously discussed, players can set the difficulty level according to their expertise. In learning contexts, flow has been found to increase team game performance in students while being in flow states while playing a 1-day educational video game; distracting activities as technology problem-solving and navigating the virtual city diminished learning levels. Moreover, the less the students were distracted, the more engaged in competition they seemed to be (Admiraal et al., 2011). From the previous discussion, it is reasonable to expect that video game players who perceive a fit between video game challenge and personal skills, immediate feedback on progress, and goal clarity may engage in cognitive processes associated with flow, as concentration, quicker passing of

time, and autotelic experience. From the previous discussion, two research proposals can be framed:

RP1: Higher levels of task-challenge fit, feedback, and goal clarity lead video game players to present perceptual changes in concentration, passing of time, and autotelic experience.

RP2: Video game players who present high perceptual changes in concentration, passing of time and autotelic experience may lead to high changes in learning self-perceptions by trial and error and risk-taking attitudes.

Theory of Planned Behavior

Regarding cognitive frameworks, Theory of Reasoned Action (Ajzen, 1985) lacks complete explanations of intentions and actual behaviors, that is, individuals showing high intentions to perform a specific behavior are not effectively explained only by beliefs, attitudes, and intentions. Such gap appears to be the result of a twofold mechanism: on one hand, the individuals' incomplete volitional control lead to open the gap between intentions to perform and actual performance, on the other hand, the gap also appears because non-motivational factors—time, money, and skills—become critical limitations in performing the desired behavior. Deriving from the self-efficacy theory, Bandura (1977) argues that perceived behavioral control was a construct useful to explain the extent to which a particular behavior is perceived as easy or difficult to perform according to the person's subjective self-perception. According to this view, the more ability the individual perceives to possess to perform behavior, the more likely he will succeed in performing such behavior. In specific, the link between video gaming and self-efficacy to accomplish certain results have been researched, ranging from health-related behaviors (Baranowski et al., 2008) to knowledge (Meluso et al., 2012) and learning (Huffman et al., 2013). For example, video game players with lower levels of self-efficacy as the individual perception on personal skills to play video games and the challenge posed by a high perceived difficulty of such video game may lead to a misfit between the task challenge aspects of flow. This can be detrimental for personal outcomes as learning and attitude change. In contrast, a person with high perceived high self-efficacy may be associated with higher levels of learning and attitude change. The underlying

mechanism is that they have more volitional control on their own task performance in spite of actual use of video games. From the previous discussion, a research proposal can be framed as:

RP3: Video game players with high levels of self-efficacy led to higher levels of personal outcomes as learning by trial and error and risk-taking attitudes.

Personality Traits Theory

Personality traits refer to individual features that shape enduring and consistent ways of reacting toward external stimuli and are expressed as a response to situational and contextual situations. For example, job needs, social demands, behavioral norms (Tett & Burnett, 2003). The five-factor model of personality (McCrae & Costa, 1987) provides a popular description of personality using openness, conscientiousness, extraversion, agreeableness, and neuroticism. Openness refers to imaginative, original, and daring interests. Conscientiousness relates to individuals who are hardworking, ambitious, energetic, and persevering. Individuals who score high in extraversion relate to being sociable, fun-loving, affectionate, friendly, and talkative. Agreeableness refers to ruthless, callous, antagonistic, and critical people. Neuroticism describes a worrying, insecure, self-conscious, and temperamental person. Existing literature linking personality traits and flow (Ullén et al., 2012) has found a negative relationship between flow-proneness and neuroticism, whereas the relationship between flow-proneness and conscientiousness was found positive. Other personality traits lack further relationships. Conscientiousness is associated with variables as problem coping, satisfaction with life and happiness. Hence conscientiousness people, motivational and emotional mechanisms that make them more likely to engage in flow state. The neuroticism dimension is related to negative emotions that may hinder individuals from entering flow, and their associated enjoyment, control, and focus. The same study found that flow-proneness is more associated to personality traits rather than intelligence (Ullén et al., 2012).

Another set of relevant, unexplored personality traits that may explain individual differences of the relationship between focus and performance outcomes may include innovativeness, perceived ease to use the video game, and need for cognition. Innovativeness refers to the individual

preferences for engaging in novel experiences to reach the goal of stimulating the mind; individuals like spending time on thinking and solving problems they face (Venkatraman & Price, 1990). Above all, the focus is on engaging in stimulant activities that demand cognitive attention and seem to be related to flow features, and consequently individuals with high cognitive innovativeness are more likely to engage in flow moments. Perceived ease of use is a concept borrowed from technology adoption modeling. Perceived ease of use of information technologies is the extent to which technology users think using a particular information system would be free of effort (Davis, 1989; Davis et al., 1989). Perceived ease of use has been associated to higher levels of in-classroom learning (Bourgonjon et al., 2010) and gamification tasks (Koivisto & Hamari, 2014). It is reasonable to expect that the easier the video game is to use, the more likely users would engage more deeply in flow while playing video games. Need for cognition is the tendency that leads people to engage and enjoy in thinking (Cacioppo & Petty, 1982). As such, individuals high in need for cognitions are more influenced by the quality of advertisements in publicity. As video games provide new experiences, individuals may try different settings that provide high immersion levels, which are indicative of flow (Przybylski et al., 2012). It is reasonable to expect that managers who score high in need for cognition are more involved in learning new aspects of the virtual reality provided by video games. From the previous discussion, the following research proposals can be framed:

RP4: Managers with high levels of openness, conscientiousness, and extraversion are more likely to engage in flow activities whereas managers with high levels of agreeableness and neuroticism are less likely to engage in flow activities.

RP5: Managers with high levels of innovativeness, perceived ease of use, and need for cognition are more likely to engage in flow activities.

Maladaptive Behaviors

The discussion so far has dealt with what can be considered as adaptive behaviors—desirable, positive learning, and attitudinal changes. However, existing literature also shows that video game players may engage in maladaptive behaviors—antisocial, aggressive, and negative behaviors to

be considered the antithesis of managerial performance. For example, in youth settings, video games may be correlated with anti-social behaviors as aggressiveness. Studies suggest that gaming cognitive and behavioral aspects play a role in developing these types of behaviors. Perfectionism, cognitive and behavioral salience, along with regret are correlated with problematic gamers (Forrest et al., 2016). Moreover, similar studies report that addition to video games associates with decreased academic performance, self-esteem, and self-confidence, mainly in males (Toker & Baturay, 2016). This suggests that there is a gaming time before which individuals can derive value from playing but, from this gaming time on, there is a decreased performance. Therefore, a research proposal linking time playing video games with maladaptive behaviors can be framed as:

RP6: Time spent by video game players present a U-inverted shape in which adaptive behaviors present (learning, team building, and problem-solving) before the upper limit of time and maladaptive behaviors present after passing such upper time limit (aggressiveness, isolation, goal confusion, and personal loss of control).

A final word on the development is to say that reaching flow moments may be moderated by a number of individual characteristics, as gender, age, and experience playing video games. Most video game players refer to young men who develop more experience than women of any age; hence it is reasonable to expect that the relationships from task challenge fit, feedback, and goal clarity toward flow may be stronger for experienced young men games. Hence, a last research proposal can be framed as:

RP7: Experienced young men present a stronger relation of flow antecedents (fit with task challenge, feedback, and goal clarity) than women of any age and experience.

Conceptual Framework

As discussed previously, a fit between task challenge and individual skills, immediate feedback, and goal clarity are antecedents of flow (research proposal 1, RP1). As second antecedents, player traits as big five (RP4) and other traits as personal innovativeness, need for cognition, and

perceived ease of use of the video games represent another antecedent of flow (RP5). Flow can be represented by variables as concentration, self-efficacy, sense of time, and autotelic experience. Outcomes of flow include a three-fold instance. First, personal outcomes of keeping flow while video gaming may include learning by trial and error and risk-taking attitudes (RP2). Second, personal skills acquired and developed may be leveraged to workplace settings in the form of team-building, problem-solving, innovative thinking, and design thinking (RP8) with aid of self-efficacy (RP3). Third, spending too much time playing video games may lead to maladaptive behaviors such as isolation, goal confusion, and loss of control (RP6). Finally, drawing for information systems theory, the relationships between antecedents and flow can be moderated by player's age, gender, and experience on a particular video game (RP7) (Fig. 2.1).

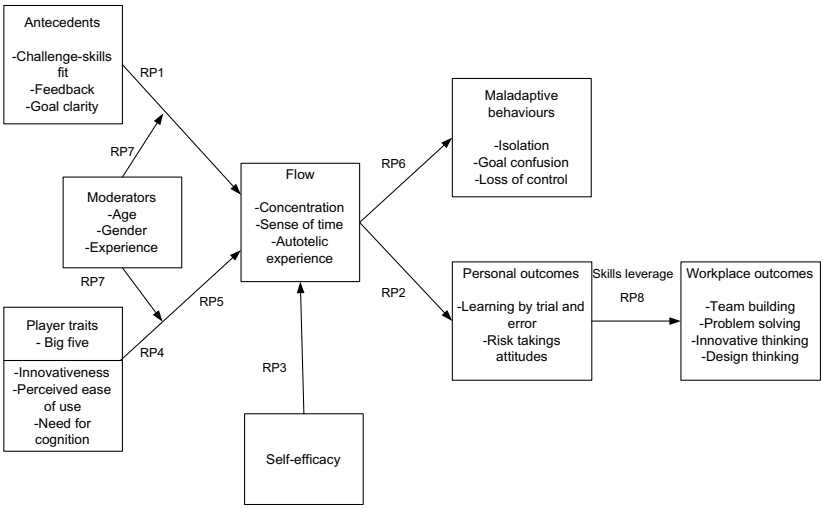

Fig. 2.1 Conceptual framework to study antecedents and consequences of video game flow (*Source* Author)

General Discussion

Prospects for Empirical Testing

There is a wide variety of multiplayer video games available in the market. One example is "Black Desert Online" in which players perform in a conflict between two countries. Through developing collaborative actions, players require to develop the skills of shooters and use limited healing capacities and potions to conquer the opponent country. While playing, there are physical obstacles and events like typhoons, which add challenges to the gaming experience. Another example is "World of the Living Dead", a game based on the actual Open Street Map platform, in which players are tasked with protecting groups of survivors after a zombie apocalypse. Players' roles include commanding troops, deploying surveillance operatives, defend survivors from zombie attacks, and radioing orders to other players. From these two examples, it seems apparent that these two video games follow the assumptions for flow to occur. So a framework can be proposed to depict the flow moments in which players engage while playing video gaming and how skills may be leveraged to the workplace.

A further empirical test may shed light of the actual antecedent influencing the formation of manager's skills. There are at least three different approaches to frame study designs on the proposed research questions. By sampling a suitable number of managers engaged in video gaming, the relationships between variables can be assessed using analytical techniques as partial least squares (PLS). This will shed light on the net effects of one variable over another. By collecting data on managers working in manufacturing, service, and professional services, interesting multigroup comparisons can be achieved. Another interesting comparison among groups would include digital natives and digital immigrants—two different generations with differing attitudes toward technology and usage levels. Items for each discussed variable may be considered as either continuous or discrete. Linear regression would be useful to test individual effects for each variable, over personal learning, attitudes, and perceived risks, as well as maladaptive outcomes. Similarly, player traits may be associated with flow, focus, and immersion. In the same line, structural equation modeling would be helpful to analyze simultaneous relationships of variables in more comprehensible models. Particularly, analytical tools as Partial Least Squares (PLS) may shed light on such relationships without restraining the data to follow stringent requirements from covariance-based models.

Alternatively, qualitative comparative analysis (QCA)—an analytical technique that departs the mainstream tools—may show all possible combinations between antecedent variables that lead to acquisition and formation of skills. Importantly, QCA does not rely on net effect and size effect as standard regression techniques and PLS does. Instead, QCA focuses on finding combinations among flow antecedents and player's traits that lead to flow. Similarly, this technique would allow analyzing which combinations of the dimensions of flow (concentration, self-efficacy, sense of time, and autotelic experience) lead to personal outcomes, workplace outcomes, and maladaptive behaviors. Noteworthy QCA would enable the researcher to analyze those antecedents leading to skill formation, but also would show those combinations which do not lead to skill formation. Another analytical approach includes performing a qualitative comparative analysis (QCA). QCA explores combinations of causal contribution of different conditions—similar to independent variables in linear regression—to a specified outcome of interest. It begins by conveying diverse configurations of conditions, i.e., the logical combinations associated with each case in which the outcome—similar to dependent variable in linear regression—can be studied. Afterward, QCA captures the simplest set of Boolean conditions that can account for all studied outcomes or their absence. For instance, the Boolean condition A and B or the combination of conditions C and D that leads to outcome X can be expressed as: A * B + C * D = X. In a sense, QCA answers the question what are the combinations (or groups of cases) in A, B, C, and D that produce X?

Finally, experimental designs may be framed to isolate the most relevant antecedents that lead to learning and skill development (Baranowski et al., 2008). Despite internal validity as criteria to choose experiments, video games are very diverse. Features of video games as scenarios, paths, and player teams may differ in difficulty, time, and complexity for each player. The task of designing a suitable manipulation to explore the impact of one antecedent variable on the outcome becomes challenging.

Implications for Researchers

This framework has implications for researchers. Testing the proposed framework empirically would craft an initial theory on how to deploy critical skills to the workplace through using a hedonic, non-work-related

tool. This is a critical aspect for business to survive and grow. Importantly, implications for emerging economies may be even stronger since such economies are younger than more developed countries. A first implication is the link between personality-focus-learning. The number of theories addressing learning issues is vast. This paper has addressed focus theory, flow theory, immersive theory, and social cognitive theory. Future studies may shed light on learning managerial skill through video gaming, using other theories as constructivism and multiple intelligences. Second, our propositions focus on the moderating effect of age, gender, and experience, but we excluded mediating processes. Other studies may engage in analyzing other moderators as tenure, type of industry and firm, and managerial or technical roles. Third, scope for this study has included a number of outcomes, namely learning, risk attitudes, and maladaptive behaviors. A logical next step in advancing research on the topic is to include other dimensions of learning as collaborative learning, co-creating, team-building, and collaborative problem-solving.

Implications for Practitioners

This framework has also implications for managers. First, by analyzing the combinations of antecedents that lead to flow and individual skills, managers may engage in developing organizational initiatives and policies that promote using specific video games as learning tools in the workplace. Our framework assumes that video games features should be considered alongside manager traits to explore segments of managers who may benefit from new organizational policies. Second, patterns of technology usage have implications for workplaces around the world given the availability of video game consoles, Internet access, and online multiplayer games. Some tech firms and universities have engaged in such initiatives with an intuition on the benefits, but more research is needed to understand the evidence-based managerial interventions. Third, our research proposals assume that managers more prone to play video games may engage more frequently in flow, focus, and immersive behaviors. While this may suggest higher performance, we are also aware that mature managers may not be inclined to playing video games; hence they would lose such performance effect. Hybrid policies would be needed at workplaces, since firms include generations, digital natives, and immigrants. Finally, maladaptive behaviors may appear because of playing video games. Firms need to detect early signals from these behaviors and address them accordingly.

Conclusion

Video games have evolved toward pervasive, hedonic, entertaining systems. This paper has proposed a number of research questions to analyze managerial behavior in the context of alternative training tools. Our proposal links manager traits, video game features with focus, flow, and immersion, as core constructs. The outcome is learning and developing skills by trial and error, self-control, enhanced cognitive capabilities, alongside possible maladaptive behaviors as loss of control, aggressiveness, and isolation. We hope that these research questions may help advance understanding transferal of managerial skills from video games to the workplace. We also hope other researchers engage in this exciting topic.

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