# How Do Black Men Succeed in IT Careers? The Effects of Capital

K.D. Joshi
Washington State University
joshi@wsu.edu

Lynette Kvasny
Pennsylvania State University
lkavsny@ist.psu.edu

P. Unnikrishnan
Washington State University
p.unnikrishnan@wsu.edu

Eileen Trauth
Pennsylvania State University
etrauth@ist.psu.edu

## Abstract

*While most of the literature on Black men prescribe to a deficit model that focuses on academic failures and poverty, this work focuses on the positive by profiling Black men who have successfully entered information technology (IT) majors. Here we reveal various capitals, their accumulation, and their effects using Bourdieu's framework to inductively uncover that Black men succeed in IT careers by accumulating five forms of capital—Cultural, Social, Symbolic, Technical, and Economic—that mold their habitus. The accumulated capital affects IT Career Choices, General Skills, IT Skills, Institutional Benefits, Symbolic Benefits, Financial Benefits, Self-efficacy, Ambition, Expectations, Extra Burden, The Black Experience, and Sense of Service. These effects are well aligned with the rules of playing in the IT field.*

## 1. Introduction

Science, technology, engineering, and mathematics (STEM) workers are instrumental in driving a nation's innovation and competitiveness. The career prospects of STEM occupations, which are projected to grow by 17% from 2008 to 2018, are brighter compared to non-STEM occupations, which have a projected growth of 9.8% [33]. Moreover, STEM workers command higher wages, earning 26% more than their non-STEM counterparts. Minority college students who major in STEM fields earn at least 25% more (and earn at least 50% more if they take STEM jobs) than their peers who study humanities or education [38]. A similar, positive economic outlook is expected for the STEM field of information technology (IT), which has a projected growth of 17.7% from 2012 to 2022 and a median salary of over $76,000 [52].

While the job opportunities in these fields are increasing in the U.S., there has been a decrease in the proportion of students graduating with STEM degrees, resulting in a lack of qualified personnel to fill such positions [5, 33, 20]. Specifically in IT, by 2020, there will be 1.4 million new computer science jobs, but only 400,000 computer science students [8]. The number of computer science jobs, according to Code.org, is growing at a pace two times the national average [8]. Scholars have studied women to address this capacity problem; however, few have studied underrepresented men in IT [24, 31, 53]. There are many reasons to study boys' and men's career pathways. The recent editorial [21] and essay [19] in the Economist on "Manhood" illustrate the economic marginalization of men and argue that poorly-educated men in rich countries are worse off than women, as they are more likely to be jailed and earn fewer university degrees than women [21]. The career prognosis for Black men in the US is even bleaker [1, 18, 21, 28, 19, 49]. These trends for a significant portion of the U.S. population not only raise serious societal issues [21, 19], but they also impede the attainment of credentials needed for our nation to be globally competitive in the future.

Even with modest gains in recent years, the percentage of Black males in IT remains low. Black males comprise around 9% of the total workforce but only represent 2.2% of those working in IT occupations, which offer lucrative job opportunities (U.S. Department of Labor, 2011). Expanding the range of Black males' career options within an increasingly technology-oriented work world will not only help increase the much needed skill supply, but also help alleviate the high unemployment and poverty often experienced by Black men. A typical tech worker's salary is more than double the median household income for Blacks [2]. CompTIA put the median yearly salary for an IT worker at $78,288 and the median salary for Blacks' households at $34,598 in 2013 [2].To expand Black men's IT career options, it is necessary to first understand Black males' career development and choices which, we premise, unfold differently than for Black women or other ethnic male cohorts [24, 39]. While most of the literature on Black men prescribes to a deficit model that focuses on academic failures and poverty and provides theories to address those deficits, there are very few studies that examine Black men's career successes [e.g., 54, 24, 31].

This work focuses on the positive by profiling Black males who have successfully entered IT majors. Specifically, using Bourdieu's Capital Theory, we contribute to the understanding of various capitals that

shape Black men's IT career choices. More specifically, this study addresses the following two research questions: 1) *What forms of capital do Black men believe that they possess and value, and why? 2) What effects do these capitals have on Black men's IT career choices?* We use a qualitative approach, along with Bourdieu's Capital theory, to understand career choice as a practical logic in which subjective interests and actions (e.g., variations in IT career pathways within this group, and educational and career expectations) are linked to objective social structures (e.g., economic, social, and cultural capitals).

## 2. Literature Review

Research examining the career choices of Blacks has grown in recent decades [e.g., 14, 25, 16, 39, 36, 4, 17, 6, 15, 29, 41, 45, 48]. However, most career choice studies in the literature treat Black males as a homogenous group where the within group variances, due to the realities of "Black male experience," are often neutralized. While there are many studies that examine the academic performances of Black males as a single group, few prior studies have explored variations in educational trajectories and pathways *within* this broad group of students [1].

We know a lot about the young men with the worst outcomes, but very little about how others succeed [1]. Of those Black males that do succeed we only know that they managed to avoid failure. The AA Male Donor Collaborative [1] report observed that, "*the absence of a more nuanced analysis of the evolution of achievement of Black males and the prevalence of an analytical perspective that reifies existing stereotypes of academic failure among Black males contributes to the notion that Black males have monolithic experiences and outcomes.*" [1, p. 5].

To design effective interventions, policy makers need to know how, when, and where to intervene. Such guidance is lacking in the current literature. We attempt to address this gap by understanding the complexities and variations in the IT career pathways of Black males. This is accomplished by uncovering how their attitudes, beliefs, norms, and interest in IT careers are constructed within their social realities, and what and how these realities constrain or facilitate their choice of IT careers.

Several theories [3, 22, 34, 27, 46, 51] are used in the literature to explain and predict general IT career choices. These theories, which are predominantly used to posit and test variance models, have enhanced our understanding of IT career choices among the general population. However, the posited variance models, which were primarily tested using survey methods, are not designed to uncover deep and rich insights into how career interests are formed or how individuals arrive at career decisions [36]. Knowledge of how career interest develops and is modified over time is important.

Moreover, the process of selecting and pursuing a career is extremely complex and nonlinear. It cannot be understood solely through the lens of rational variance models. Instead, person-centered analysis through qualitative approaches is also necessary. In a review on Black underrepresentation, Lewis [35] points out that current body of research is highly uniform in both its theoretical and methodological approach, which limits our understanding of these issues. In his review, he critiques that the research on Black underrepresentation tends to assume deficiencies in the life history of Black students; use survey samples of college students to identify the deficiencies that correlate with race and/or choice of major; and interpret those deficiencies as causal factors affecting career choice.

More importantly, the applications of these variance theories within the context of Black males' career choices have generated mixed results that are open to multiple interpretations [31]. Some have justified these mixed and contrary findings by asserting that Black youths are socialized somewhat differently than young people from other American ethnic groups [e.g., 4]. Recently, some scholars have argued that interest in IT careers may not translate into IT career choices for Black males because connecting to the deep concept of values is much more important than the surface notion of interests [17]. They found that some Black males who had worked hard all year to learn introductory computer science (CS) content and were well prepared, but then opted not to take the test that would allow them to pursue CS careers. The reasons for such behavior are not clear to the authors, but it underscores the complexity surrounding Black males' career decision-making process.

We draw on Bourdieu's Capital theory [10] to inductively understand Black men's IT career decision-making process. This theoretical lens is well suited to examine the posited research questions. Bourdieu's Capital theory is concerned with inequalities and injustices and how various capitals, in subtle ways, perpetuate and reproduce to gain, maintain, and transfer social status within societies. This theory gives particular attention to the roles that disparities (often experiences by Black men) play. These disparities may be found in educational opportunity, economic power, access to material resources and labor markets, and other social structures (characterized as capital). This can be an effective lens to explain the differences in Black males' career choices. In addition, the inductive, person-centered approach of this paper complements previous research, which is primarily deductive and variable-centered, in this space.

## 3. Theoretical Framework

For Bourdieu, a central concern is *practice,* the dialectic relationship between how social actors (here, Black men) construct social reality (about IT careers) and how social structure both constrains and enables human agency. The work of Pierre Bourdieu [9, 11] focuses on the visible social world and develops a model of social practice. He terms his theoretical approach as *"socioanalysis,"* in which the role of the researcher is to uncover the practical logic that guides choices (here, the career choices of Black men). The practical logic consists of those unacknowledged interests that Black men follow as they participate in a hierarchical social order in which their access to and success in the US education system is often limited.

For Bourdieu, the practices of Black males and hierarchical institutions often operate in ways that perpetuate self-generating and self-perpetuating social hierarchies. In other words, Black males' practices such as career choice and college enrollment are motivated and shaped largely by their subordinate position within the class structure. Our goal is to contextualize and uncover how and why social hierarchies both objectively and subjectively structure the career choices of Black men. According to Bourdieu, inequities in the educational system are a historically-embedded and necessary condition for the exercise of power by one group upon another. The public exposure of embedded inequities can help undermine their apparent legitimacy and open up the possibility of altering existing social arrangements.

Bourdieu's focus on the constraining and enabling features of social structure on human action posits that structures not only exist in the mind, but in the social world, as well. These mental structures take place in an arena that is both animated and constrained by social structures [47]. Bourdieu posits that while mental structures can change over time and space as actors pursue cultural distinctions such as a college education, the more common tendency is for social positions in the hierarchy to remain largely unchanged. In fact, the social, economic, and cultural practices of both the powerful and subordinate often serve to reify social structure [50].

Bourdieu [9,10,12,13,11] offers theoretical concepts that can help explain how the under-representation of Black males in IT disciplines is related to historical systems of stratification that are perpetuated by racial inequality. The notion of a *field,* together with *habitus* and *capital*, form the central organizing concepts of Bourdieu's work. The habitus represents human agency, which is characterized as a set of dispositions that are learned (in our case by Black men pursuing IT at HBCUs) over one's life history; such dispositions generate perceptions and guide practices [10]. These dispositions generate practices, perceptions, values, and attitudes that are regular, yet not rule based. These

dispositions are said to be inculcated (learned), structured (reflect social conditions in which they were acquired), durable (endure through the life history of the individual), generative (generate multiple practices), and transposable (applied in fields other than those in which they were originally acquired).

This accounts for the similarity in the habitus of actors that occupy similar social positions. The habitus guides practice and behavior in daily life. It is a cognitive construct that arises or "is generative" from personal experience and history. Elements of the habitus are acquired from the social class and status into which one is born [30, 32]. Therefore, it is both an individual and a shared concept. That is, one has one's own habitus reflecting one's place in a social structure. But the habitus is not fixed. Rather, while it is durable, it is also malleable and in constant negotiation with the world. So it may be seen as a kind of shield in the field of social battle. For instance, if one's habitus has been one of relative social privilege, it serves as a template and provides strategies for continued success. But if one's habitus has been one of relative powerlessness, it provides coping strategies. On the negative side, the habitus may limit social progress by defining expectations of the possible and, worse yet, may limit one's aspirations.

All practices are seen as the product of the relation between the habitus and specific social contexts known as *fields*. Fields represent the objective social relations and structures that govern the actions and reactions of actors in concrete social situations (in our case, field is the IT disciplines at HBCUs). Actors within the field compete for control of interests and resources that are specific to the field in question. For example, actors in the academic field engage in competitions for publications and research grants. The interests and resources at stake within a field are both material (i.e., salaries) and symbolic (i.e., prestige). The competitions amongst the actors are not always strategically calculated. However all actors agree, by the mere fact of engaging in the field, in their belief in the field and investment in the game and its stakes. This collusion forms the very basis of competition.

The competition in fields creates a dynamic social structure of positions. Each actor's position is determined by the distribution of different kinds of capital. Bourdieu [12] introduces the concept of capital to describe the material and symbolic resources that are both stakes and weapons in the competition. Capital is a force inscribed in subjective and objective structures, and gives regularity to the social world: *"It is what makes the games of society—not least, the economic game— something other than simple games of chance, offering at every moment the possibility of a miracle"* [11, p. 241].

There are four basic forms of capital: symbolic, cultural, social, and economic [11]. *Symbolic capital*

refers to accumulated honor and prestige, *Cultural capital* concerns forms of knowledge embodied in culture, individual competencies, and institutional credentials. *Social capital* refers to the social networks that one employs to improve social standing. *Economic capital* refers to monetary resources, such as property, stocks, and money. In his later work, Bourdieu [13] recognized the need for *technical capital* to capture the specific skills that a person develops through engagement with modern computing equipment. This capital is particularly germane to our context of IT career choices, as many studies have found a positive association between exposure to this capital and interest in IT careers. Each form of capital is unequally distributed amongst social groups. However, the different forms of capital can be converted under certain circumstances. In fact, one of the most important properties of fields is how they allow one form of capital to be converted into another. For example, one can convert economic capital (e.g., tuition payments to a university) into cultural capital (e.g., a bachelor's degree). While conversion between the forms of capital can occur, the forms of capital are not reducible to each other. For instance, possession of cultural capital does not necessarily imply possession of economic capital (e.g., a college-educated woman working in a low-paying service job).

| Table 1: Bourdieu's Key Theoretical Concepts | |
|---|---|
| **Concept** | **Application to Information Technology** |
| Field | IT disciplines at U.S. Higher Education Institutions |
| Habitus | The personality structures of Black men pursuing IT careers acquired through life's activities and experiences –aspirations and attitudes towards IT majors and careers; values that shape their attitudes toward IT; disposition towards and engagement with IT informs practice like career choice |
| Cultural Capital | A broad array of linguistic competencies, manners, preferences, and orientations that exist in three forms: in the embodied state incorporated in mind and body; in the institutionalized forms such as educational qualifications; in the objectified state existing as cultural goods such as IT books and artifacts |
| Symbolic Capital | Prestige associated with a college education and possession of exemplary IT skills |
| Social Capital | Access to relationships with others knowledgeable about IT |
| Economic Capital | Ability to allocate financial resources to the procurement of IT artifacts and a college education |
| Technical Capital | Exposure, previous experience with and familiarity with IT; IT credentials |

Table 1 gives a high level summary of the most salient elements of Bourdieu's theory used in this study to analyze the data. In this study, Bourdieu's theoretical constructs of habitus, field, and capital are applied to the study of IT career choice and Black males. IT career choice is conceptualized as practice. As such, it can be understood as the product of the relation between Black men's habitus and the field of IT programs offered by institutions of higher education. Dispositions found in the habitus govern the practices of Black males and the anticipated value that the practices will receive in fields, such as the labor and academic markets.

Within the field of IT education at the collegiate level, some capitals are valued more highly than others. Part of the practical competency of Black men pursuing IT majors is the knowledge and ability to produce practices that are highly valued. The greater the

quantities of socially-valuable and desirable capitals that Black men possess in the field of IT higher education, potentially the more power resources are available to them as they envision, consider, and pursue career choices. In this study, we primarily focus on uncovering various forms of capital that Black men pursing IT fields accumulate, and how it allows them to consider, enter, and persist in IT disciplines.

# 4. Methods

The research conducted for this paper is part of a larger National Science Foundation (NSF)-funded study involving a multi-year project undertaken to profile IT career pathways of Black males. This project consists of a series of studies that are investigating the question of Black men's success in IT. This paper explores the question through Bourdieu's Capital theory lens. Black males from four HBCUs and two predominantly-white institutions were interviewed for this project. Here we only describe the methodology used to collect and analyze the data presented in this paper.

## 4.1 Sample

For this study, undergraduate black men enrolled in IT disciplines in four Historically Black Colleges and Universities (HBCUs) were interviewed to study their perceptions about IT and the IT profession. Participation was voluntary. Participants received a $25 incentive to take part in this study. Although the HBCUs make up a small percentage of all higher education institutions in the US, they account for a disproportionate share of the bachelor's degrees in STEM earned by Black students [34]. HBCUs provide an environment (such as social support and role models) that is conducive to fostering academic progress and the career aspirations of Blacks in STEM disciplines [34]. Since we are studying men who have successfully entered IT disciplines, we argue that HBCUs, which have a record of producing high numbers of STEM graduates, provide access to this population, which is severely underrepresented at most other universities. A sample size of 25 individuals was analyzed for this study. This is consistent with the methodology literature, which suggests a minimum sample size of 15 [26] and a theoretical saturation point after about 20 interviews [37].

## 4.2 Data Collection

This was a qualitative research study in which Bourdieu's concept of capital was employed as a sensitizing framework for understanding the practical logic of Black males preparing for IT careers at HBCUs. The objective was to inductively theorize about this historically-underserved group's engagement with IT by focusing on group-level experiences that influence and impact their decision to pursue an IT career. The

data was collected through interviews and biographical questionnaires. The interview guide focused on student's perceptions about individual and structural factors that help explain their academic success and IT career choice. The interview guide was developed using our theoretical framework to capture critical incidents that might influence Black males' decisions to pursue IT as an academic major and career choice [40].

More specifically, we collect data on the constructs included in Bourdieu's theory using the critical incident method [23]. The critical incident method is an effective means to uncover individuals' deeply-held values, experiences, and attitudes in the context of their career choices. The interview guide was reviewed and critiqued by five researchers at HBCUs. The feedback from the pilot was used to revise the guide. Biographical questionnaires were administered online before the interviews to gather demographic information.

To focus data collection and analysis, we used the list of capitals as a lens based on Bourdieu's theory (see Table 1). Broadly, interviews focused on a story-telling approach in which participants start with their earliest experiences working with IT and narrate their life histories, proceeding chronologically to tell a story about their pathway to IT and to college.

In answering the interview questions, participants were asked to reflect upon their life histories to identify critical events that motivated them to achieve academically and attend college, and inspired them to pursue IT careers. While discussing their life histories, participants were reminded to reflect upon how their race and gender shaped their educational experiences and career choice. During the interviews, probes were used to elicit further details, to clarify points of confusion, and to confirm understanding.

The intent was to both describe and understand what it is like to be this particular person by structuring a set of research questions to evoke responses that can be mapped to Bourdieu's theoretical constructs. For instance, what people came to his aid or hindered his progress (social capital)? What cultural knowledge did he employ to overcome obstacles, and how did the lack of cultural knowledge prove to be problematic (cultural capital)? How did being a Black man help or hinder this entrance into and progression within an IT major (symbolic capital)?

The interviews were conducted face-to-face or via phone/Skype. Three of the four authors completed multiple interviews. Each participant was interviewed for 45–60 minutes and asked to fill out a biographical survey. Interviews were recorded and transcribed. For this study, 25 interviews were coded and analyzed. The length of the interview transcripts ranged from 17 to 33 pages, with an average length of 19 pages. The frequency distribution of the demographic information

is summarized in Table 2. In addition, the ages of the participants ranged from 19 to 34 years.

| Table 2: Sample Characteristics | |
|---|---|
| **Item** | **Frequencies** |
| Majors | Information Science and Technology (IST) 26%; Management Information Systems (MIS) 21%; Computer Science (CS) 37%; Other 16%. |
| Academic Standing | Freshman 10%; Sophomore 10%; Juniors 24%; Seniors 56%. |
| IT Work Experience | No Experience 42%; Summer Internship 27%; 1 year 5%; 2 years 10%; 3 years 5%; Information NA 11%. |
| Family's Income Level | Lower Class 16%; Lower Middle Class 26%; Middle Class 48%; NA 10%. |

### 4.3 Data Coding and Analysis

We used the revealed causal map (RCM) method [43] to uncover the capitals and its effects. RCM is a sub-category of cognitive mapping that entails an inductive process of evoking constructs and linkages from the respondents' statements. Our analysis focused on extracting causal relationships from a respondent's explicit statements that indicated the presence of some form of capital and its effect. We used a three-step process to identify perception patterns of capital and its effects in the context of IT career choices: (1) identification of causal statements, (2) construction of revealed causal maps, and (3) interpretation of the maps (see [44] for more details).

In the first step, causal linkages were identified from the causal statements in the transcribed interviews. Causal statements are statements that imply an explicit cause-effect relationship [44]. We identified causal statements from the interviews by looking for key words such as "because," "therefore," "so," "while," and "if–then." We then identified a total of over 450 relevant statements in which a capital was referenced. Within these statements, 322 linkages with both cause and effect were revealed. The causal statements are then broken down into causes and effects to construct the raw causal maps.

The second step in constructing RCMs is the identification of relevant concepts from raw causal statements [42]. The concept-level maps across all participants were aggregated to obtain a causal map at the construct level. The constructs for the causes were the five capitals identified by Bourdieu [12]: Social Capital, Cultural Capital, Symbolic Capital, Economic Capital, and Technical Capital. Relevant concepts for the effects were drawn from the causal statements. This was achieved by grouping frequently-mentioned words in the raw revealed causal maps. These concepts were then aggregated into high level construct effects. The association or the linkage between a cause-level

construct and an effect-level construct was then analyzed.

We constructed a matrix incorporating the frequency linkage between each pair of constructs. A linkage could be positive or negative. The frequency of linkages between two constructs is calculated as a percentage of total linkages. The linkage frequencies are depicted in Table 3. Linkages that were not mentioned more than once were removed. Figure 1 presents these results in a visual map. The last step of interpreting the maps is discussed in the results section.

### Table 3: Frequency Linkage Matrix

| Effect Category | Forms of Capital - Cause Category (N=322 Linkages) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Social | | Cultural | | Symbolic | | Economic | | Technical | |
| | P | N | P | N | P | N | P | N | P | N |
| IT Career Choices | 0.115 | 0.003 | 0.174 | 0.006 | 0.040 | 0.006 | 0.003 | 0.003 | 0.012 | 0.006 |
| General Skills | 0.037 | 0.006 | 0.047 | 0.003 | 0.012 | 0.003 | 0.006 | | | 0.003 |
| IT Skills | 0.016 | 0.003 | 0.065 | | 0.009 | | | | 0.012 | 0.006 |
| Institutional Benefits | 0.043 | 0.003 | 0.025 | | | 0.003 | 0.016 | | 0.006 | |
| Symbolic Benefits | 0.068 | | 0.009 | 0.003 | 0.003 | | 0.006 | | | |
| Financial Benefits | 0.022 | | 0.022 | 0.003 | 0.019 | | 0.003 | | | |
| Self-efficacy | 0.019 | 0.006 | 0.022 | 0.003 | | 0.003 | 0.003 | | 0.003 | 0.003 |
| Ambition | 0.003 | | 0.009 | | 0.003 | | 0.003 | | 0.003 | |
| Expectations | 0.012 | | | | | | 0.006 | | | |
| Extra Burden | | | | | 0.012 | 0.003 | | | | |
| The Black Experience | | | 0.006 | 0.003 | 0.003 | | | | | |
| Sense of Service | 0.003 | | | | 0.006 | | | | 0.003 | |

P: Positve link; N: Negative Link

## 5. Interpreting the Results

The analysis of our data revealed seventeen constructs that represent a causal map of capitals that enabled Black men in our sample to enter and pursue IT disciplines at HBCUs. More specifically, the analysis affirmed the presence of five forms of capital—*Cultural, Social, Symbolic, Technical, and Economic*—which are valuable in producing practices needed to pursue IT careers. In addition, we found the following twelve effect constructs that were attained and accumulated through the aforementioned capital: *IT Career Choices, General Skills, IT Skills, Institutional Benefits, Symbolic Benefits, Financial Benefits, Self-efficacy, Ambition, Expectations, Extra Burden, The Black Experience, and Sense of Service*. Although many of these effects are a form of capital (e.g., symbolic benefit is a form of symbolic capital), for clarity in the presentation of our analysis, we use different labels for the cause and the effect.

The cultural, social, and symbolic capitals strongly impact and shape the generation and accumulation of the effects in the form of behaviors, competencies, experiences, and choices. Interestingly, the effects of economic capital in building IT practices were the smallest of all the capital effects. The construction of IT career choices was the most frequently-revealed effect, which was expected, because it was the main focus of this study. The second most significant effect was the learning of general and IT-specific skills that are important in succeeding in IT careers. Accumulation of institutional, symbolic, and economic benefits and

formation of confidence (self-efficacy) in pursuing IT careers were the next five most frequently-mentioned effects. Although the notion of extra burden and the black experience appeared less frequently, its descriptions in the interviews were very powerful. Career ambition, expectations, and sense of service were also uncovered as important to building practices that are favorable to succeeding in IT.
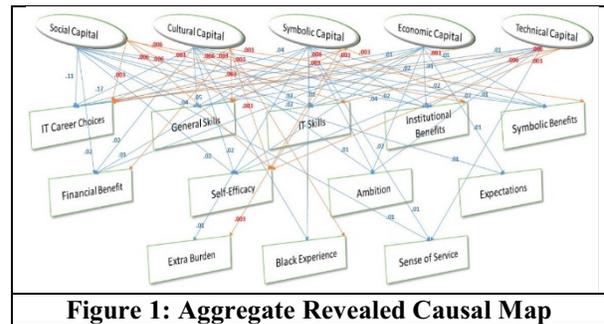


**Figure 1: Aggregate Revealed Causal Map**

**The Effect of Capital on IT Career Choice:** Black men's IT career choice is conceptualized as an individual's awareness of, interest in, and intentions to pursue an IT career. Career choices are shaped by all forms of capitals. The dual effects of *cultural capital*, as embodied in the cultural norms and prevalent in institutional structures, was evident in one participant's description of how growing up in a manufacturing town both enabled and impeded his interest in IT careers. On one hand, he said, "*... coming from [name of the manufacturing town]… most of the schools didn't [teach technology] … it wasn't a school, it wasn't a city that even cared about technology. We cared about manufacturing. They taught us to be a welder repairman. They didn't want to teach us computer technology. That [IT] was something that quote unquote we didn't do.*" But simultaneously (albeit subconsciously), he also credited this very environment with evoking interest in technology by saying, "*I've never had an interest in the actual manufacturing, but I had an interest in the technology behind the manufacturing. That's what kind of gravitated towards … the engineering type behind the machines, seeing how things came together. I think that's kind of my beginning stages of gravitating towards the understanding of technology. … I wasn't really around computers, per se, as much but just being in that environment … being in that city with a manufacturing hands-on environment gave me a different perspective of how things came together and how things should work.*"

One Black man credited his entrance into this major to the navigational capital (a form of cultural capital) facilitated by two faculty members who directed him into this career simply by exposing him to the opportunities that exist for Black men, who are underrepresented in this discipline: *"I… was looking into International Business … I got introduced to Dr. [] and Dr. [], who … let me know … how African-American males are much*

*needed in the field and they would like to see more [Black Men in this field].... I didn't know that at first."*

As illustrated in Table 3, most of the participants focused on the positive aspects of various capitals that allowed them to develop practices that are valuable in IT. However, a few participants described the negative effects of capital. They explained how the absence of certain capital perpetuate the notion that "IT is not a realistic option" for Black men.

One participant explained the negative effects of the absence of Black men (symbolic capital) in IT as follows: "*You don't see that many black men in IT growing up or even [at the school].... I don't want to say taboo, but ... you don't see that [as] a realistic field.... I think that's ingrained in us at a very young [age]."* He further explained how the absence of this symbolic capital negatively affects social capital: *"You know how friends try to make you feel bad for being smart, for being exceptionally smart. It's kind of correlated with being exceptionally smart when you're in IT. People consider you a programmer or a coder, then I think our kids [are] probably one shot away from the ridicule."*

How the presence of such social capital pushes Black men away from IT careers was reflected in following comment, *"in the younger years, it kind of pushes you away from something that would actually benefit you and challenge you. It pushes you into field that everyone knows. This [IT] aren't the field.... No one really knows or has a family or no one to relate to that is in IT."*

Another participant described the construction of "IT is not a realistic option" for Black men as a result of the absence of IT courses (technical capital) in his school's curriculum: *[In] the urban environment, inner city environment in which programming isn't even on the table, technology is not even on the table, it's manufacturing, it's hands-off, it's you're going to work in the automotive industry. That's even hard to leave for something like technology. It's like people where I come from get a job, get a house, get a family....Get something realistic... and in our environment, IT seems unrealistic."*

**The Effect of Capital on Self-efficacy:** Self-efficacy is defined as "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" [7, p. 2]. In this study, it captures a Black male student's belief in his ability to succeed in IT careers. These beliefs determine how he will think, behave, and feel about IT careers.

One participant attributed his belief regarding his ability to persist in an IT major, despite challenges and set-backs he experienced, to the presence of technical capital (i.e., computer competence he possessed) and cultural capital (i.e., leadership skills he embodied) he had accumulated: "*I feel like it's because I know so much about computers* [presence of technical capital*] just before even going to college. That's probably what made me say I want to stay in this right here because I know I can do it"* He elaborated as follows, *"I'm a leader. I'm a really good leader [*presence of embodied cultural knowledge*], played*

*football as a captain for 3 years. I won many awards for being that leader ...There's no way I can't do it. I know I can do it because I've done so many things before. Right now, it's just a little bit of adversity. You have to get over it.*"

**The Effect of Capital on Skill Development:** These effects capture the influence of capital in the formation and development of general and IT-specific skills that are necessary to succeed in IT. How social capital shaped the acquisition of these skills was very instructive. One participant credited his problem-solving skill (an IT specific skill) development that helped him succeed in IT careers to his mom: "*She always bought me like a toolbox and she always said, 'If things break down, you fix them.' That was a very early age, like five years old. I had a real hammer, a real saw and different things. I guess technology feature was just the understanding of how things came together, because she always made sure...I can't go to anyone. I had to figure it out myself."*

Another participant explained his resilience (a general skill) that allowed him to bounce back from the adversity of not doing well on exams in IT courses as something he has learned from his parents: "*…Probably from looking at my father and seeing all the stuff he had to go through ...He came [as] an immigrant...He started as a taxi driver. He went to this corporation...He worked there, had a lot of problems ... messed him up. From right there, he could have just stopped ...he said I'm not going to do that. I'm going to keep going. He decided to start his own business. He's doing well right now....[I also learned from] my mother because my mother at first, she was a single mother and she had to go through a whole lot of trials and tribulations, as well. I really just look up to them and think about how they did it. I say if they can do it, I can definitely do it because I'm learning from what they have done and they're teaching me.*"

Yet another participant explained the role his military colleague played in him acquiring IT skills that allowed him to enter the IT field: "*….One of the old sergeants that I worked with, he knew I didn't have any true transferable experience, so he asked me to come to Washington, DC to do some smaller systems, networking type work, so computer networking type stuff...He was a big influence in getting into the initial stages of IT, because I felt like I needed that year and a half of experience where I can get into a field that would reap financial benefit.*"

One very interesting skill, which we refer to as the "manhood training," emerged as a critical learning experience that is instrumental in developing competencies that are important in building a career (not just an IT career). As one participant explained, "*My father wasn't in my life. My grandfather was…When I had my first job, I was then about 12 or 13 years old, he picked me up on Saturday morning and we'd go cut grass and that [it] was his way of teaching me how to make money. I did cut ...five or 10 lawns and he gave me $50 to $100 for a hard day's work ... that had more of influence on me than anything society could have done.*"

Another instance of the manhood training's importance in building a good work ethic is captured in the following comment: "*... this is a true story, I can go home today and my granddaddy will have me on the roof to clean out the [leaves] hanging off the side of the roof or cutting*

*the grass and trimming the hedges and making sure the lot is in order...To him, when I come home, I'm laboring this. I am a labor machine.*"

**The Effect of "Being a Black Man" (a symbolic capital) on Extra Burden:** Extra burden is the notion of the additional weight Black men have to carry on their pathways to successful IT careers. Interestingly, most black men in our study harnessed a likely burdensome social structure to foster a more constructive behavior, i.e., a desire to "prove everyone wrong." For instance, one Black men, who aspired to be in the NFL but turned to IT after being paralyzed by gun shots to his spine, explained his feeling regarding the burden of being viewed as a "token" Black men in IT as follows: "*You just have to be better than everybody, I feel. When I get to [*name of a leading IT company where he got a full time job as a programmer*], I think a lot of people will think, 'He got the job because he's African-American and he's disabled. They're getting points for that, and that's the reason why he got hired.' I will have to show them differently that I'm better than you all, even though I am disabled and Africa-American.*"

Yet another participant expressed his desire to gain credibility and legitimacy in IT by saying, "*...I've got to show everybody that I can do this. It's basically I want to just show everybody, prove everybody wrong, anybody that's doubted me, I want to prove them wrong, the naysayers and everything like that. That's pretty much what I have to say about that.*" However, this behavior could, in the long term, result in stress, burnout, and dissatisfaction with IT careers, which would be counterproductive.

**The Effect of Capital on the Black Experience:** The notion of the Black Experience is related but distinct from the notion of extra burden. They are related in the sense that repeated negative Black experiences could lead to the feeling of extra burden, but these experiences are not always negative. In addition, these negative experiences (such as frequent encounters with police, pressures of belonging to a gang, and dealing with the expectations of hegemonic Black masculinity), as well as positive experiences (such as more opportunities because of their underrepresentation in IT, and being viewed as competent because of low academic expectations) have much broader implications (beyond IT careers).

The men in our study acknowledged the presence of the Black experience as something very powerful and unique, but they simultaneously and much more frequently dismissed or rejected its effects on their lives and careers. These young Black men's ability to cope with this effect by embracing these experiences to generate a more positive growth outlook was remarkable.

A productive and constructive approach to dealing with the Black experience is reflected in the following two comments. One Black man explained the powerful influence of symbolic capital frequently experienced by young black men and suggested ways (e.g., by showing them there is good money to be made in IT fields) to leverage these to engage Black men in IT: "*They see drug dealers who drive a Porsche down the street. Everybody wants to drive that Porsche. I feel like, if I can drive this Porsche, I will show you that you can do it without having to sell drugs, then you would want to be like me [i.e., an IT professional]. I don't have to worry about getting killed every day because I'm not into that life style, but you would still want to be like me, because of the things that I have. I think that materialistic things drive African-American young boys a long way. The only people that they see with materialistic things are ... rappers, ball players, or drug dealers.*"

Another explained the dualities of these experiences as follows: "*It's basically the expectation that everyone has for you because of your skin. They expect you to be athletic. They expect that you listen to rap. They expect you to be like the black people they see on TV is kind of more what they expect. When you do something that challenges what they feel black people should be, it's like, 'Hey. You are being a little white right now'....It [the black experience of low expectations] only benefits me when I get lots of minority scholarships. Those are awesome. Those are nice but it's annoying because people have [low] expectations for you*"

**The Generative Nature of Capital:** The effects of capital are cumulative. Different capitals can be converted to other forms of capitals (Bourdieu 2002). This is evident in one Black man's road to IT. He was doing minimum wage jobs with no interest in college. However, he ended up enrolling because of his brother (i.e., social capital helped build institutional capital) - "*My older brother...He's a mechanical engineer now. He started coming here [to the university] first. I didn't even know you could do that [i.e., go to college]. He received his GED in a parish prison. He didn't even finish high school. He gained his high school GED inside of a prison. To see him come out and try to do the things he has accomplished, was very inspiring.*"

Once this Black man entered college, he received an opportunity to attend a summer school at a prestigious university (institutional capital helped build technical capital), which he believes was transformative: "*I was accepted to [a very prestigious Big 10 school]. ... [It was a] summer research opportunity. That was a life changing experience for me. It was, without a doubt, the best summer of my life ...My research was composed of evaluating failure modes of Jboss cache. That's a software cache that's used throughout the manufacturing industry within enterprise application servers.*" This experience made him confident (i.e., technical capital helped develop self-efficacy) that if he worked hard, he could one day attend his dream school, (i.e., Harvard): "*That is how I know it was a supernatural blessing from God. The only thing that made me believe I can go to a prestigious university [like Harvard]. ... The only thing that gave me that kind of confidence [before] was prayer. I prayed because ... I didn't even see it was possible. How in the world could I attend Harvard University? I had a ... rough life and a rough childhood. I really didn't go to high school that much. That comes from my past environment. That was just the culture; no education, no*

*school. That would've made me the guy who needs to get beat up every day or something.*"

## 6. Discussion and Contributions

Circling back to addressing the question we ask in the title, Black men succeed in IT careers by accumulating *capitals* that shape their dispositions (*habitus*) to be favorable and well aligned with the rules of playing in the *field*, i.e., IT disciplines at HBCUs. These dispositions (*habitus*) are: inculcated, structured, durable, generative, and transposable. Inculcated means that they can be learned, e.g., resilience learned through parents' struggle. Structured indicates that they reflect the social conditions in which they were acquired, e.g., skills learned while being raised in a manufacturing town. By durable, we mean that they endure through the life history of the individual, e.g., manhood training acquired by a grandparent. Generative means that they generate multiple practices, e.g., as illustrated above in the generative nature of capitals section. Lastly, transposable indicates that they can be applied in fields other than those in which they were originally acquired, e.g., problem-solving skills learned at a young age through fixing things.

This study contributes to research and practice in significant ways. First, it enhances and enriches the career choice literature by applying qualitative approaches that supplement the limited research that has used these methodologies (e.g., [51] work on individual differences). In addition, it complements the extensive variable-centered analysis that currently exists in the extant literature.

Second, the rich and deep social analysis of Black men's career pursuits in IT in terms of various societal capitals reveals how and which social structures collectively interact and conspire to shape, drive, and/or constrain Black males' IT career choices. This study's findings about various capitals show how IT career pathways of Black males are constructed and begin to reveal how an IT educational trajectory for Black males can be created and sustained.

Third, the present research contributes to the limited literature on Black males' academic success by revealing why and how Black males choose and persist in IT-careers. The literature is populated with topics associated with Black males' academic failures. By focusing on the positive, we are able to understand how they negotiate, maneuver, and leverage the embedded social structures. These structures enable (rather than disable) them to successfully pursue IT majors.

Fourth, some scholars have observed that Black males' career development and choices are constructed differently than for Black women or other ethnic male cohorts [38], because they are socialized differently than any other group [4]. Therefore, while examining Black

males' career considerations, one should not treat them as one homogenous group with monolithic experiences. Both of these aforementioned issues contribute to the mixed and contradictory findings about Black career choices that exist in the current literature. Our work, which provides contextualized and nuanced understanding, could help clarify the mixed and contradictory findings in the extant literature.

## 7. References

[1] AA Male Donor Collaborative. (2010). Understanding the Education Trajectories of Young AA Men in New York City, July, http://www.schottfoundation.org/drupal/docs/bmdc-trajectory-report-full.pdf.

[2] Abbey-Lambertz 2015, The Typical Black Household's Income Is Less Than Half Of One Tech Worker's Salary, http://www.huffingtonpost.com/2015/06/03/tech-diversity-income_n_7452790.html.

[3] Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

[4] Alliman-Brissett, A. E., & Turner, S. L. (2009). Racism, parent support, and math-based career interests, efficacy, and outcome expectations among African American adolescents. *Journal of Black Psychology*.

[5] Ashcraft, C., & Blithe, S. (2009). Women in IT: The facts. *National Center for Women & Information Technology*.

[6] Austin, C. Y. (2010). Perceived Factors that Influence Career Decision Self-efficacy and Engineering Related Goal Intentions of African American High School Students. *Career and Technical Education Research, 35*(3), 119-135.

[7] Bandura, Albert. Self-efficacy in changing societies. Cambridge university press, 1995.

[8] Bidwell 2013, Tech Companies Work to Combat Computer Science Education Gap, http://www.usnews.com/news/articles/2013/12/27/tech-companies-work-to-combat-computer-science-education-gap

[9] Bourdieu, P. (1984). *Distinction: A social critique of the judgement of taste*: Harvard University Press.

[10] Bourdieu, P. (1990). *The logic of practice*: Stanford University Press.

[11] Bourdieu, P. (1986). 'The Forms of Capital', In J. Richardson (Ed.) Handbook of Theory and Research for the Sociology of Education, pp. 241-258, New York: Greenwood.

[12] Bourdieu, P. (2011). The forms of capital.(1986). *Cultural theory: An anthology*, 81-93.

[13] Bourdieu, P. (2002). The Social Structure of the Economy, NY: Polity.

[14] Brown, M. T. (1995). The career development of African Americans: Theoretical and empirical issues. *Career development and vocational behavior of racial and ethnic minorities*, 7-36.

[15] Byars-Winston, A., Estrada, Y., Howard, C., Davis, D., & Zalapa, J. (2010). Influence of social cognitive and ethnic variables on academic goals of underrepresented students in science and engineering: a multiple-groups analysis. *Journal of Counseling Psychology, 57*(2), 205.

[16] Clark, K. (2003). Impact of technology on the academic self-efficacy and career selection of African American

students. *Information Technology in Childhood Education Annual, 2003*(1), 79-89.

[17] DiSalvo, B., & Bruckman, A. (2011). From interests to values. *Communications of the ACM, 54*(8), 27-29.

[18] Eckholm. E. (2006). Plight Deepens for Black Men, Studies Warn, The New York Times, March 20, 2006.

[19] Economist (2015). Men Adrift, May 30th 2015, p. 21.

[20] Economist (2011). The Future of Jobs, Special Report, September 10th 2011, p. 8.

[21] Economist (2015).The Weaker Sex, May 30th 2015, p. 11.

[22] Feather, N. T., & Newton, J. W. (1982). Values, expectations, and the prediction of social action: An expectancy-valence analysis. *Motivation and Emotion, 6*(3), 217-244.

[23] Flanagan, J. C. (1954). The critical incident technique. *Psychological bulletin, 51*(4), 327.

[24] Fuller, K., Kvasny, L., Trauth, E. M., & Joshi, K. (2015). *Understanding Career Choice of African American Men Majoring in Information Technology.* Paper presented at the Proceedings of the 2015 ACM SIGMIS Conference on Computers and People Research.

[25] Gainor, K. A., & Lent, R. W. (1998). Social cognitive expectations and racial identity attitudes in predicting the math choice intentions of Black college students. *Journal of Counseling Psychology, 45*(4), 403.

[26] Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field methods, 18*(1), 59-82.

[27] Helms, J. E. (1990). *Black and White racial identity: Theory, research, and practice*: Greenwood Press.

[28] Holzman, M. (2010). Yes We can, The Schott 50 State Report on Public Education and Black Males, Schott Foundation for Public Education, www.blackboysreport.org.

[29] Jackson, J., & Moore III, J. (2006). African American males in education: Endangered or ignored? *The Teachers College Record, 108*(2), 201-205.

[30] Kvasny, L. (2005). The role of the habitus in shaping discourses about the digital divide. *Journal of Computer‐Mediated Communication, 10*(2), 00-00.

[31] Kvasny, L., Joshi, K., & Trauth, E. (2015). Understanding Black Males' IT Career Choices. *iConference 2015 Proceedings*.

[32] Kvasny, L., & Truex III, D. (2000). Information technology and the cultural reproduction of social order: A research paradigm *Organizational and social perspectives on information technology* (pp. 277-293): Springer.

[33] Langdon, D., McKittrick, G., Beede, D., Khan, B., & Doms, M. (2011). STEM: Good Jobs Now and for the Future. ESA Issue Brief# 03-11. *US Department of Commerce*.

[34] Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), 79-122.

[35] Lewis, B. F. (2003). A critique of literature on the underrepresentation of African Americans in science: Directions for future research. *Journal of Women and Minorities in Science and Engineering, 9*(3&4).

[36] Lewis, B. F., & Connell, S. (2005). African American students' career considerations and reasons for enrolling in advanced science courses. *Negro Educational Review, 56*(2/3), 221.

[37] Mason, M. (2010). Sample Size and Saturation in PhD Studies Using Qualitative Interviews, Forum: Qualitative Social Research, Vol. 11, No. 3, Article 8

[38] Melguizo, T., & Wolniak, G. C. (2012). The earnings benefits of majoring in STEM fields among high achieving minority students. *Research in Higher Education, 53*(4), 383-405.

[39] Moore III, J. (2006). A qualitative investigation of African American males' career trajectory in engineering: Implications for teachers, school counselors, and parents. *The Teachers College Record, 108*(2), 246-266.

[40] Morrow, R. A., & Brown, D. D. (1994). *Critical theory and methodology* (Vol. 3): Sage Publications.

[41] Moses-Snipes, P. R., & Snipes, V. T. (2005). The call: The importance of research on African American issues in mathematics and science education. *Negro Educational Review, 56*(2/3), 103.

[42] Narayanan, V.K., & Armstrong, D. J. (2005). Causal Mapping for Research in Information Technology. Hershey, PA: Idea Group Publishing.

[43] Narayanan, V. K., & Fahey, L. (1990). Evolution of revealed causal maps during decline: A case study of Admiral. *Mapping strategic thought*, 109-134.

[44] Nelson, K. M., Nadkarni, S., Narayanan, V., & Ghods, M. (2000). Understanding software operations support expertise: a revealed causal mapping approach. *MIS Quarterly*, 475-507.

[45] Quimby, J. L., Wolfson, J. L., & Seyala, N. D. (2007). Social cognitive predictors of African American adolescents' career interests. *Journal of Career Development, 33*(4), 376-394.

[46] Riegle-Crumb, C., Moore, C., & Ramos-Wada, A. (2011). Who wants to have a career in science or math? Exploring adolescents' future aspirations by gender and race/ethnicity. *Science Education, 95*(3), 458-476.

[47] Ritzer, G. (1996). Modern Sociological Theory/George Ritzer: The McGraw-Hill Companies, Inc.

[48] Rollins, V. B., & Valdez, J. N. (2006). Perceived racism and career self-efficacy in African American adolescents. *Journal of Black Psychology, 32*(2), 176-198.

[49] Shaun, R. (2012). Black male student success in higher education: A report from the National Black Male College Achievement Study.

[50] Swartz, D. (2012). *Culture and power: The sociology of Pierre Bourdieu*: University of Chicago Press.

[51] Trauth, E. M. (2006). Theorizing gender and information technology research. *Encyclopedia of gender and information technology, 2*, 1154-1159.

[52] U.S. Bureau of Labor Statistics 2013, http://www.bls.gov/opub/mlr/2013/article/pdf/occupational-employment-projections-to-2022.pdf.

[53] Windeler, J. B., & Riemenschneider, C. K. (2014). The influence of ethnicity on organizational commitment and merit pay of IT workers: the role of leader support. *Information Systems Journal*.

[54] Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race ethnicity and education, 8*(1), 69-91.