How IT Changes Careers: The Role of Career Anchors and Career identity

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed _____ Date_____

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Abstract

Information technology (IT) has impacted almost every aspect of business and industry including employees and their career paths. Although it is evident that information technology has had a profound impact on the individual worker—from automation in the workplace and the changing nature of job tasks and roles—a concerted effort to understand how IT changes careers for the individual worker has not uniformly been addressed in the literature. In an effort to fill this gap and to better understand how information has impacted outcomes for the individual worker and his or her career, the current investigation utilized a meta-narrative approach to systematically review and analyse the literature. The results of this process revealed a total of 48 articles of relevance to the topics of career anchors and career identity. Pertinent themes identified suggest that career outcomes as they relate to information technology are directly impacted by personal characteristics of the worker as well as job satisfaction. Subsequently job satisfaction and satisfaction for information technology are shaped by variables such as IT training provided to workers and participation of workers in technology implementation. These results have implications for ensuring that organizations are able to meet the needs of workers to ensure that career development is successful in the wake of the introduction of IT.

Chapter 1: Introduction

Diverging views on how information technology (IT) impacts work and career development have been reported in the literature. While some authors conceptualize the introduction of IT as a boon for workers (Overby, 2008) others argue that technology serves as the foundation for eroding worker capabilities and roles within the organization through automation (Burris, 1998). What is evident from the literature is that information technology has some implications for the development of careers. What is not as well-illuminated is the direct impact that IT has on the development of workers and their career trajectories.

Arguably, the proliferation of information technology in the last several decades has dramatically impacted almost every industry. Information technology may be the foundation for a business' operations, or it may be used in an ad hoc manner, such as in the form of a personal computer or smartphone to keep appointments and interact with customers. Although the specific impact of information technology on a particular industry or profession may be different, the reality is that IT has had some influence on the way that individuals perform their jobs. For this reason, it is reasonable to assume that IT has also had implications for the development of careers.

Technology in the workplace appears to represent a trade-off for employers in some cases. Specifically, analysts examining technology in the workplace have argued that while advances in technological supports can improve communication, reduce ancillary tasks, and accommodate a diverse range of employees, technology may also disenfranchise employees leaving them disengaged from the tasks which made their jobs interesting and engaging in the first place (Long, 2016). These issues have notable

ramifications for businesses and workers. In order to keep employees engaged businesses may need to re-examine how technology impacts work processes and workflow (Long, 2016). Employees, on the other hand, may need to consider how technology has changed their work environment to evaluate whether or not they will remain in the current jobs or seek other career opportunities.

Efforts to understand the impact of technology and information technology on careers had yielded some insight into this topic with scholars demonstrating both positive and negative outcomes for professionals. Black, Carlile, and Repenning (2004) observed that new technology has the potential to disrupt professional and functional groups, altering the way in which these groups interact. Technology can aid in the development of a particular profession or it can serve as a detriment to the way in which individuals and groups within the organization interact (Black et al., 2004). Further, researchers have identified particular variables which encompass career development for the individual including career anchors and career identities (Schien, 2007; Feldman & Bolino, 1996).

Even though some progress has been made toward understanding how information technology has impacted careers, direct research examining career identities and career anchors is scant. Both of these variables provide a foundation for understanding the scope and impact of IT on careers; however the available literature does not comprehensively consider the ways in which information technology shapes outcomes for the individual's career trajectory. Given this current gap in the literature it is evident that a more in-depth analysis of the literature on this topic is needed to

identify themes which may shape or mitigate outcomes when it comes to the impact that information technology has on careers.

Further support for examining the impact of information technology on careers stems from the need to conceptualize how career development occurs for the individual worker. With the realization that information technology has such a powerful influence on outcomes for the workplace and for career development, there is an impetus to understand this process from the viewpoint of the worker. Although this viewpoint is one that is salient, there is currently a paucity of research specifically outlining the way in which information technology impacts the development of careers for individuals. What this indicates is that efforts are needed to identify pertinent issues of concern that have relevance to understanding career development such that relevant literature can be evaluated to provide some insight into the topic.

Using this as a foundation for investigation, the current research uses a systematic review of the literature. In particular, a meta-narrative review (Greenhalgh, 2015) is employed utilizing the key themes identified as impacting career development: career anchors and career identity. Using these key concepts the literature is reviewed to identify articles with related themes which can be used to explore and better understand the ways in which information technology impacts the development of careers for individuals. The research is designed to provide insight into a complex subject that has not been directly evaluated in the empirical literature. The data provides important understanding of the topic while initiating a starting point for structuring further investigation into the topic. The research questions posed for this investigation focus on

the impact of information technology (IT) on career anchors and career identity and include the following:

- **Q1**: How does information technology change careers through an impact on career anchors?

- **Q2**: How does information technology change careers through an impact on career identity?

Given the prevalence of career anchors and career identity to direct literature explaining the development of careers and further the relevance of these terms for understanding the impact of information technology on career outcomes the research questions proposed provide a useful foundation for initiating a literature search and identifying related themes that can be utilized as the basis for examining the impact of information technology on careers. Through a consideration of these issues, it will be possible to facilitate greater insight into the topic and to determine future areas of study to better understand the true impact of IT on outcomes for careers.

Chapter 2: Literature Review

Using the research questions as a foundation for the literature review, the current chapter first considers broader implications of information technology (IT) and its implications for workers and career development including automation and virtualization. This literature is followed by an analysis of the concepts of career anchors and career identity, with an effort made to evaluate these concepts in the context of information technology. Finally, the literature review synthesizes the information to provide a theoretical foundation for understanding how information technology impacts workers and careers.

2.1 Information Technology and Its Evolution

Early definitions of information technology provided a simplistic view of this term. For instance, Rafenstein (2000) argues that "information technology is the use of computers to convey, create and/or process information" (p. 6). While this definition provides a rudimentary understanding of information technology Aral and Weill (2007) provided a more comprehensive review of the term, explicating the way in which information technology systemically impacts the organization. In particular, Aral and Weill defined information technology, separating the process into four classifications each with a strategic purpose and expected benefits. These include the following:

- IT Infrastructure: This includes a foundation for shared IT services which facilitate the ability to build future business. Over time infrastructure should result in greater market value and lower costs.

- Transactional assets: These elements automate processes, increase volume of business and reduce costs. The primary benefit is a reduction in costs.

- Informational assets: This element of IT focuses on providing information such as key elements of operations can be effectively managed: accounting, planning, decision support, data mining, etc. Information assets lower costs and increase profitability.

- Strategic assets: This element of IT supports entry into a new market or the ability to deliver a new product or service. The primary benefit of strategic assets is an increase in product innovation.

Based on this description, it becomes evident that information technology has implications for almost every aspect of the organization's operations. Additionally, descriptions and definitions of information technology are invariably intertwined with work. Barley (1996) notes that while "technology, organization, and work co-evolve" (p. 404), untangling the relationships between these variables remains somewhat difficult. Broad-stroke evaluations of the evolution of technology and its implications for work and organizations indicate that technology is often uniquely optimized for each organization to ensure efficiency in operations (Barley, 1996). These processes have been occurring since the Industrial Revolution and continue today; as technology evolves, so too does the organization and the nature of work and labour.

While the history of information technology indicates its integral relationship with work, a review of this history also demonstrates the accelerated pace at which technology has developed and proliferated (Barley, 1998). To illustrate this point, Barley (1998) compares the rate at which personal computers were adopted with the rate at which radios were adopted when they were first introduced. The results clearly indicate that technology is being developed and accepted at a much faster pace (Barley, 1998).

These issues have specific implications for the individual but also have ramifications for organizations and workers. As a result of this situation new avenues for organizational and labour development have occurred. In an effort to illustrate this point, Barley notes the specific practice of internationalization, demonstrating the full scope of how information technology has expanded.

At the heart of technology development and adoption within organizations appears to be the central goal of improving the effectiveness of work (Black et al., 2004). However, as noted by Black and his co-authors (2004), organizations often fail to create the support needed to make technology implementation successful. As a result, many companies with the most advanced technologies continue to struggle to optimize the use of these tools in the context of the human systems that are responsible for their use. In defining and describing information technology it becomes obvious that despite the interconnected nature of technology, organizations, and labour, IT is often defined independently creating some notable challenges for integration in practice. These issues have systemic implications for understanding the role of information technology on careers and helps to demonstrate why making this connection remains so difficult.

2.2 Scope and Definition of Organization

Perhaps the most compelling definition of the organization is provided by Morgan (2006) who defines the organization in terms of different metaphors to explicate specific elements and features of these institutions. At the core of the metaphors provided by Morgan is a common thread in which organizations represent collections of individuals all focused on a similar goal established by leaders. The mechanisms for achieving outcomes are different based on the metaphor applied; however the basic foundation is

the same. What differs in organizations are structures, processes, and strategies. Morgan is able to demonstrate that the specific type assigned to the organization will have direct implications for how it is structured and the type of processes and internal strategies used to achieve success.

2.2.1 How Technology has Changed Organizations

Although Morgan's (2006) assessment of the organization is apt, it excludes an understanding of information technology which is not surprising given the discourse on this topic. However, what becomes evident from a review of the literature is that regardless of the structure, processes, or strategies used in the organization, technology can have a profound impact on each and all of these areas. For instance, Burris (1998) argues that the computerization of organizations has led to their fundamental restructuring to accommodate the use of technology in operations. Further, Forman, King, and Lyytinen (2014) assert that technology has introduced organizations to a wealth of information: "Information has always been intimately related to work processes" emerging as a "major rather than peripheral factors in society" (p. 789).

Sawyer, Crowston, and Wigand (2014) consider some of these issues in the practical context of the real-estate industry which has frequently been a knowledge intensive discipline. According to Sawyer and co-workers the proliferation of technology in the industry has changed the way that buyers and sellers acquire information and the way in which real estate agents broker knowledge. Formal structures which were once used as the foundation for the development and dissemination of information have also changed, giving rise to the development of new agencies in which structures,

processes, strategies, and tasks have shifted to accommodate the realities of technology and its impact on operations.

Looking more specifically at the impact of information technology on organizational structure, Gunel and KaraoGlu (2015) contend that IT has created an environment in which organizational structure has become more complex, dynamic, and flexible all at the same time. These authors contend that IT enables organizations to grow and diversify in new ways, facilitating the evolution of new structures that were once not possible without technology. Further, Gunel and KaraoGlu assert that information technology has introduced the role of personal interaction to facilitate two-way communication. The process not only increases the amount of information collected by the organization but also the process allows for more efficiency in communication leading to new structures that can accommodate these changes (Gunel & KaraoGlu, 2015).

Despite becoming more complex and dynamic, information technology has also engendered a higher level of flexibility in organizational structure. Im, Grover, and Teng (2013) consider these issues noting that information technology has served as the basis for changing the dynamics of coordination in the organization leading to a reduction in coordination costs and overall size of the firm. Perhaps the most pertinent example is the process of automation which can impact administrative operations within the organization (Im et al., 2013). With information technology in place, leaders can emphasize different aspects of operations, leading to increased agility as well as cost savings over the long-term (Im et al., 2013). As a result, organizations can transform to meet the needs of their external environments more efficiently (Im et al., 2013).

Processes within the organization have also changed as a result of the development and implementation of information technology. Vander Elst and De Rynck (2014) consider this transformation arguing that information technology has provided leaders and managers with access to data which facilitates the alignment of internal processes with the specific needs of the organization. In this context, Vander Elst and De Rynck contend that organizations are able to be more responsive to change. This also has implications for flexibility but, as noted by Vander Elst and De Rynck information technology enables organizations to better operate in context reducing some of the uncertainty and risk associated with decision making. Through this process organizations can become more responsive and purposeful in their actions leading to their ability to more successfully achieve their vision, mission and goals (Vander Elst & De Rynck, 2014).

While the current literature does indicate that information technology has had a significant effect on both organizational structure and processes, IT has also had a profound impact on organizational strategy. A review of the literature regarding this topic clearly indicates that IT has impacted strategy in several different ways. For instance, Ullah, Lai, and Marjoribanks (2013) argues that information technology has been used to complement the development of organizational strategy including the evolution of sustainable operations. The process is one that is supported by information technology to help organizations build strategic foundations that can be maintained over the long-term. Chen, Mocker, Preston, and Teubner (2010), on the other hand, note that information technology has introduced the need for IT strategy within the organization. Chen and co-workers argue that while IT strategy is often combined with general

strategy to improve areas such as quality or costs, IT strategy is also often viewed as an ad hoc process which is utilized to complement various elements of operations.

2.3 Influences of Information Technology on Work

After reviewing the literature on the relationship between information technology and career development, it became evident that while information technology may play some role in influencing employee career evolution directly, information technology has more precise implications for how labour and organizations operate. These implications have been most widely noted with regard to the influence of information technology on automation and virtualization. As such, these variables are considered as the foundation for understanding how information technology alters the environment in which employees work. Alterations in the work environment caused by automation and virtualization can then be examined in terms of the direct impact of these changes on the employee and his or her career trajectory.

2.3.1 Information Technology and Automation

Information technology has also been integrally tied to the process of automation. Autor (2015) considers the general role of automation in the development of work noting that over the course of the last two centuries, scholars have given dire warnings about the negative impact that technology will have on the development of labour. In particular, experts have argued that automation would prevent the economy from creating new jobs required to support and sustain healthy social development (Autor, 2015). Even though these warnings continue to pervade popular culture regarding the impact of automation, Autor (2015) contends that history has consistently demonstrated that technology has not made human labour obsolete. Despite a lack of evidence

demonstrating that automation will lead to obsolescence in labour, Autor (2015) argues that this concern remains for the future:

> …Those concerned about automation and employment are quick to point out that past interactions between automation and employment cannot settle arguments about how these elements might interact in the future: in particular the emergence of greatly improved computing power, artificial intelligence and robotics raises the possibility of replacing labour on a scale not previously observed (p. 4).

Indeed a comprehensive overview of the literature regarding the impact of information technology and automation on workers demonstrates a wide range of arguments for and against automation and its implications for worker development. For instance, Bailey, Leonardi, and Chong (2010) argue that the computerization of labour processes has been a boon to modern organizations and workers, serving as the basis for advancing knowledge, capabilities, and development in general. According to Bailey at al. technology is dependent upon human workers to provide input and information. Given this reality, Bailey and colleagues contend that technology cannot exist without workers, thus negating the argument that technology makes workers obsolete. Similar arguments are made by Vardi (2015) who asserts that "Journalists and expert commentators overstate the extent of machine substitution for human labour. The challenges to substituting machines for workers in tasks requiring adaptability, common sense, and creativity remains immense" (p. 5). In this context, information technology promotes automation but does not eliminate the individual worker and can, in many instances, advance the development of labour (Vardi, 2015).

The arguments made in favour of information technology and automation do have some salience. However, these arguments fail to take into account the changes for labour and individual employees that occur as a result of IT and automation. Kristal (2013) illustrates this point by noting that the rise of automation in all industries has served as the basis for eroding the positional power of labour. Computerization, according to Kristal, has favoured technology over workers creating a situation in which labour in general is not as valued by organizations. Because of these changes Kristal asserts that organizations are investing less in worker development and more in technology. These changes not only have implications for the development of labour in general, but also these changes impact the evolution of the worker and efforts by the individual to pursue a specific career paths and/or acquire the supports needed to advance in a particular career (Kristal, 2013).

Appelbaum and Santiago (1997) further review the implications of technology and automation on outcomes for workers noting the general changes that have resulted in organizations as a result of the proliferation of IT. In particular these authors argue that increased reliance on automation and technology within the organization has given rise to a reduction in the size of the organization and a flattening of organizational hierarchy. In terms of the impact of this situation on employees, Appelbaum and Santiago maintain that these fundamental alterations in the organization's structure and function have had direct implications for the individual worker: "As individual career paths and promotional possibilities are largely determined by organization structures and behaviour, one has to wake up to assess the extent of the personal impact of…environmental factors that change organizational structures" (p. 12). For many

employees, the flattening of the organizational hierarchy and shrinking of the organization have led to career plateaus in which employees find themselves unable to advance in their organizations or to acquire the skills needed to move to higher paying positions in competing companies (Appelbaum & Santiago, 1997).

Synthesis of this data clearly indicates that automation as a result of information technology has been both a boon and a bane for individual employees and career development. While it is evident that automation has given rise to increased access to knowledge and increased demand for highly skilled labour (Bailey et al., 2010) the process has also altered labour's power and the structure of the modern organization (Appelbaum & Santiago, 1997). Determining the net impact of all of these issues proves difficult as each scholar measures a different aspect of labour and employment as it relates to the impact of automation on outcomes for labour. What is evident is that automation brought about by information technology has resulted in significant change in career development which does warrant further investigation.

2.3.2 Information Technology and Virtualization

Virtualization as a result of information technology has also been noted to be a key element impacting the career development of the individual employee (Overby, 2008). Overby (2008) provides a general review of virtualization noting that the process can be defined as a shift in societal processes such as education, shopping, and banking. More specifically, this author defines virtualization "as a process in which physical interaction between people and/or objects has been removed" (p. 279). In an effort to demonstrate this point, Overby provides the specific example of the evolution of the banking industry as a result of technology. According to this author, virtualization

has occurred as basic banking procedures, such as obtaining cash, have shifted from customers interacting with bank tellers, to automated teller machines and, most recently, to online banking. Virtualization thus has a unique impact on labour. In some instances, virtualization eliminates jobs altogether while in others is alters or simplifies job related tasks.

The impact of virtualization has been systemic and as noted by Strunk (2009) has increased the unpredictability of labour markets, arrangements for work, and the development of individual careers. From a management perspective, Stunk asserts that virtualization has made it more difficult for organizations to control employees. While this has prompted increased flexibility for workers in terms of work arrangements it has also led to the development of the irregular development of human capital, preventing organizations from facilitating the development of individual career trajectories (Strunk, 2009). Organizations that virtualize their operations often do not have a clear understanding of individual employee needs (Strunk, 2009). This issue can have systemic implications for the way in which employees work together within the organization. Ahuja (2010) considers this issue noting that virtualization has increased the scope and scale of operations in many organizations leaving employees without the education and training needed to be effective in this environment. A lack of critical communication, management, and teamwork skills can hinder the ability of the organization to achieve desired results (Ahuja, 2010). Thus, while virtualization was initially believed to be a boon for engaging and retaining workers through increased flexibility there is now concern that virtualization makes it more difficult for the organization to predict the development of the employee over time (Strunk, 2009).

Traditionally, career development has been conceptualized outside of the context of information technology. Sampson et al., (2014) demonstrate this point by examining the current literature on theories of career development that have been postulated and reviewed in the literature. In particular, these authors are able to identify specific theories of career development that have been consistently employed and utilized to inform career counselling practice. For example, Sampson and colleagues note the use of life-span career development, examining career evolution as a component of individual psychosocial development. Additionally, Sampson and co-workers note the use of career assessment, person-environment fit, and work adjustment to understand how careers evolve. None of these theories incorporates the role of information technology and how it may impact outcomes for the individual worker.

As the scope, use, and penetration of technology within the organization intensifies, Johns and Gratton (2013) maintain that career development continues to evolve as a result of virtualization. More precisely, Johns and Gratton argue that virtualization created by technology has created three distinct changes in work models which have occurred over the last three decades. These waves are described below in Table 1.

Table 1: Three Waves of Work Models Created by Virtualization

Name	Timeframe	Impact
Wave One: Virtual Freelancers	1985 to 2002	Technology allowed employees who were once tethered to the organization to work outside for the first time. Employees enjoyed the flexibility and organizations were able to contract on demand, reducing labour costs (Johns & Gratton, 2013).
Wave Two: Virtual Corporate	2002 to Present	Organizations began expanding their operations globally in an environment impacted by terrorism and global health issues (SARS). In this environment full-

Colleagues		time employees, rather than freelancers, became able to work outside of the organization, eroding office-based infrastructure and placing an emphasis on work-life balance (Johns & Gratton, 2013).
Wave Three: Virtual Co-workers	2010 to Present	The disconnection of employees from the organization in Wave Two prompted concern about the ability of the organization to maintain values and a team environment. Virtualization through shared technology as well as hybrid work situations in which employees are required to report to an office one or two days per week are being utilized as methods to connect employees and to improve the ability of the organization to utilize teams for operations (Johns & Gratton, 2013).

In each of these waves the function of the employee within the organization has changed, requiring shifts in professional and career development (Johns & Gratton, 2013). In particular, virtualization has been noted to have created an erratic career development path that involves forward and backward progression rather than linear growth across the career. Erratic career paths continue to change as the evolution of technology and its use in the organization shifts (Johns & Gratton, 2013).

Iellatchitch, Mayrhofer, and Meyer (2003) provide some synthesis in understanding the role of virtualization on career development. In particular these authors argue that virtualization as a result of the proliferation of technology has served as the foundation for altering the context in which employment occurs as well as for altering the way that individual employees view work and career development. More precisely, Iellatchitch and co-workers argue that change drivers including virtualization "have led to new forms of organizations, new forms of organizing and new forms of individual concepts of private and professional life" (p. 729). These authors go on to argue that virtualization has resulted in definitive shifts in career development including:

1. <u>Career Development Outside of the Organization</u>: Iellatchitch et al. argue that

   traditionally career development has occurred inside the organization with human

   resource departments providing guidance, training, and support. Virtualization has

   not only increased worker access to knowledge for career development but also the

   process places the worker outside the organization creating an environment in which

   professional development does not occur within the context of the organization.

2. <u>Instability in Career Paths</u>: Iellatchitch and colleagues further note that traditionally,

   career development has followed a linear path with development occurring over the

   course of the professional's employment. Not only has technology created a

   foundation for diversity in career development, virtualization has also given rise to

   the need for new careers and professions that were often not initially conceptualized

   by workers or organizations. Because of this, career paths are nonlinear and shift

   over time based on the needs of the organization and the larger economy.

3. <u>Changes in Social Structure</u>: Virtualization has also resulted in a change in social

   structure. Iellatchitch and co-workers examine this shift arguing that social values

   and attitudes continue to change as technology proliferates. Changes in social

   attitudes and values may include the way in which individuals identify with work, the

   social status associated with work, and elements of social worth. This also has

   implications for career development: "As careers represent actors' movements

   through social structures over time, they form the link between person, organization,

   and society" (p. 730). This foundation will continue to shift as technology evolves.

   Arguably, virtualization has had notable implications for changing the way that

organizations manage career development and for altering perceptions of careers and

work for employees: i.e., work-life balance. Work-life balance refers to the ability of workers to achieve satisfaction by meeting the demands of work and life simultaneously (Sayah, 2013). In many instances, information technology has been viewed as being disruptive to this process. Information technology has created an environment in which individuals are continually connected to work, making it difficult for them to separate work from their personal lives (Sayah, 2013). Even though these challenges exist, information technology has also been noted to be a double-edged sword, providing employees with the freedom and flexibility to live work outside of the office meeting personal needs more efficiently (Sayah, 2013). These shifts all have implications for understanding how career development for the individual employee evolves. Although it is evident that virtualization has created numerous benefits for employees and organizations, the implications of virtualization have not been extensively reviewed in terms of the career development of the employee. The research provided here does indicate that virtualization is indeed a relevant topic for framing career development.

Automation and virtualization appear to provide a foundation for understanding how technology alters the process of career development both for the individual and in the context of the organization and traditional structures utilized for facilitating career advancement. Although automation and virtualization have different implications for employees and work, they have a simultaneous impact. Automation can change the types of jobs available to employees and the tasks required to be effective in a particular position. Virtualization, on the other hand, changes the way in which employees interact with the organization and engage directly in the process of work.

Both elements are important when it comes to understanding how information technology impacts career development for the individual worker.

2.4 Changes to Career Trajectories

As noted previously in this investigation career development, and therefore career trajectories, have been extensively reviewed through the application of theory (Sampson et al., 2014). Based on the theories provided, career development can be personal—related to the lifespan of the individual—based on formal structures which facilitate career development, arranged around how the individual fits with the larger organization, or focused on less formal structures such as adjustment to the work environment (Sampson et al., 2014). For the purposes of this investigation, personal changes in career development and trajectories is considered as the focal point for understanding the role of information technology on career changes.

The argument built through this literature review is that information technology impacts the environment in which employees work as measured through automation and virtualization. While this foundation for the argument facilitates a more comprehensive picture of the role of IT on career development, research regarding the evolution of careers does indicate that there are specific elements of career progression which must be investigated to understand how changes in careers occur at a personal level. These elements of personal career development and change include career anchors and career identity and were selected because they have direct implications for how careers develop and can be altered by the external environment, providing insight into how automation and virtualization may shape personal choices as well as the environment in which career decisions are made.

2.4.1 Career Anchors

The concept of career anchors was first introduced by Schein (1968, 1975) who argued that an individual's career is typically anchored in specific needs and values that are important to the individual employee. These needs and values are satisfied by each individual through engagement in specific actions to ensure that the primary career anchor is preserved (Schein, 1975). Schein (2007) identified eight career anchors that are commonly used by most workers. These include: autonomy, security, technical-functional competency, managerial competency, entrepreneurial creativity, service, challenge, or lifestyle. A more comprehensive overview of these career anchors is provided below in Table 2. Employees commonly make an effort to preserve career anchors and if the anchor is in some way threatened or challenged the employee will respond accordingly (Schein, 2007). For example if an employee views job security as the most important anchor for his or her career, threats to job security will result a specific pathway for career development that preserves this particular anchor (Schein, 2007).

Table 2: Overview of Career Anchors

Anchor	Core Desire from Workplace	Core Values
Technical/Functional Anchor	Employees with this anchor desire challenging work that allows them to apply talents, abilities, and skills.	Employees value learning and professional development, especially in their areas of expertise.
Managerial Anchor	Employees desire a workplace in which they are given a high level of responsibility, opportunities for leadership, and the ability to contribute to the success of the organization.	Core values that are important to this competence include power, influence, and advancement.
Entrepreneurial Creativity	Employees with this career	Core values include

Anchor	anchor desire challenges and opportunities to be innovative and to create.	freedom to achieve and a desire to have accomplishments recognized by the organization.
Autonomy/Independence Anchor	Employees desire delineated, time-work which allows them to achieve at their own pace in their own way.	Core values include freedom in achievement and the ability to demonstrate competency to the organization.
Security Anchor	Desirable traits include: job security, tenure, benefits, and predictability.	Rewards for service as well as predictability are core values of this career anchor.
Lifestyle Anchor	Employees with this anchor desire respect for personal and family issues and openness for change when lifestyle circumstances change.	Core values include the ability to balance work and family life as well as flexibility.
Service Anchor	Employees desire the ability to express personal values and to have an influence over value development within the organization.	Core values include: freedom of expression, the ability to pursue personal goals, and the ability to achieve a higher purpose in life.
Challenge Anchor	Employees desire the ability to engage in self-testing and new opportunities.	Core values include competition, the ability to succeed, and the ability to influence.

Modified from Coetzee & Schreuder (2008).

Career anchors represent an important framework for understanding career development as these anchors typically serve as a foundation for supporting the employee's self-concept with regard to work (Schein, 2007). Anchors include specific elements such as self-perceived talents, basic values, and motivation as they relate to career decision making (Schein, 2007). Once a career anchor is formulated by the individual it often serves as the basis for directing the actions taken with regard to occupational and personal development (Schein, 2007). Although career anchors can be stable over periods of time they do evolve across the individual's lifespan (Feldman

& Bolino, 1996). Thus, personal changes affecting the employee as well as changes in the external environment may have implications for the career anchor that is selected.

Although research regarding the impact of information technology on career anchors is limited, there is evidence which suggests that disruptions in any aspect of the individual's employment may result in changes to the career anchor. For instance, Oosthuizen, Coetzee, and Mntonintshi (2014) contend that "The challenge of sustaining one's employability in a highly dynamic and turbulent labour market places new demands on individuals' ability to navigate their career development" (p. 1). These authors go on to argue that career anchors are substantiated in the context of the experiences of the individual employee in the workplace. If the workplace is changed or altered in any, way this will impact the experiences of the individual employee and thus either alter the career anchor for the individual or the employee's career trajectory as efforts are made to preserve the anchor (Oosthuizen et al., 2014).

The selected career anchor of the individual employee also appears to have implications for the employee's response to the organization. Coetzee, Schreuder, and Tladinyane (2014) consider these issues evaluating career anchors in the context of employee engagement and commitment within the organization. Career anchors, according to these authors, have implications for how the individual employee views elements of the organization including culture, policy, and practice. If changes occur within the organization, the employee's specific career anchor will have a significant impact on how the employee views these changes and the outcomes that result in terms of employee motivation, commitment, and engagement (Coetzee et al., 2014). Based on this assessment issues such as virtualization and automation which result

from the development and inclusion of information technology in the organization appear to have notable salience for career anchors. Depending on the type of career anchor of the employee and the scope of the change created by technology it is possible that the career trajectory of the employee could change significantly.

Even though the impact of information technology on career anchors has not been extensively reviewed in the literature, Gubler, Arnold, and Coombs (2014) do consider career anchors in the context of the protean career concept. The protean career is defined by a career path that is developed by the individual rather than dictated by the organization (Gubler et al., 2014). This concept, according to Gubler and co-workers has evolved over the course of the last two decades and focuses on the fact that employees have become more mobile and independent as a result of changes in the structure organizations as well as technology. Careers, according to Gubler et al. have assumed a boundaryless context for many employees, changing the fundamental way in which employees may view careers and career anchors in general. This appears to be related to what Iellatchitch and colleagues (2003) note regarding the social changes associated with technology. Because workers are encompassed by technology in all domains of their lives and before they enter the world of work their basic values and perceptions of careers may have shifted influencing the development of anchors as career progression occurs over time.

2.4.2 Career Identity

Career identity is also integrally linked to the career trajectory of the individual employee. Mack, Rankins, and Woodson (2013) provide some important insight into the role and prominence of career identity noting that theories focusing on this process

have commonalities which illustrate a "process of transforming from a pre-existing identity to one that is crystallized and all-encompassing" (p. 28). Meijers and Lengelle (2012) further examine the development of career identity noting that this process involves three elements which are internally organized by the individual to make sense out of career development. These elements are: vocational personality, career adaptability, and life themes important to the individual (Meijers & Lengelle, 2012). These three elements, according to Meijers and Lengelle are arranged in a narrative which provides the individual with the ability to make decisions about his or her career and to determine what, if any, action should be taken to facilitate career development or advancement.

Although it is evident that career identity is internally constructed, the reality is that this concept is externally driven by various elements of the environment that encompass the individual employee. Freudenberg, Brimble, and Cameron (2009) illustrate this point by noting that when individuals enter a specific field, they are socialized to through formal educational channels to understand the professional obligations and expectations of their chosen field. If the individual accepts these professional norms and standards, they will be integrated as part of career identity (Freudenberg et al., 2009). If problems arise however, the individual may choose a different specialization or may experience considerable conflict reconciling personal values and needs in the context of the profession selected (Freudenberg et al., 2009). In both situations the career identity of the individual will be impacted indicating that the external environment will have notable implications for shaping career identity.

Efforts made to understand the influence of the external environment on career identity have been made by Millward and Haslam (2013). They argue that career identity is shaped by the culture of the organization and the expectations of leaders and supervisors in this environment. What this suggests is that the organizational milieu presented to the employee will have some influence on how the employee views his or her career identity and whether or not personal expectations for career development can be achieved (Millward & Haslam, 2013). While this insight does not directly relate career identity to information technology it does indicate that organizations impacted by variables such as automation and virtualization may have specific cultures or environments which do in fact impact the career identity of the individual employee.

The relationship between career identity and information technology is further supported in the framework of research provided by Fouad and Bynner (2008). In particular these authors note the ability of individual workers to manage transitions at work. Meijers & Lengelle (2012) considered this issue in the context of career adaptability as a component part of career identity. According to Fouad and Bynner (2008) changes at work can have a significant impact on the overall well-being and psychological health of employees. Technological changes that result in outcomes such as automation or virtualization represent substantial alterations in the workplace which may require career adaptability, impacting career identity. This issue is one of notable concern especially in light of the rapid pace at which technology is being integrated into the workplace (Boudreau, Serrano, & Larson, 2014). Clearly career identity can be shaped by the incorporation of technology in the workplace.

2.4.3 IT Ubiquity and Careers

Information technology is also shifting the fundamental nature of work, resulting in what Fey and Osborne (2013) refer to the disappearance of routine jobs. MacCrory, Westerman, Alhammadi, and Brynjolfsson (2014) make similar observations noting that as a result of the proliferation of technology "Many middle and low skill jobs have disappeared…" (p. 2). While Fey and Osborne note the implications of this situation for the development of the individual worker and the rise in unemployment, MacCrory and colleagues take this assertion one step further, arguing that the situation continues to result in the decline of labour force participation as well as growing inequality.

2.5 Summary

Synthesis of the literature provided in this review does indicate that information technology is having a profound impact on the organization, the labour force, and the individual worker. Even though the impact of information technology on careers has been loosely examined in the literature, there is a dearth of information regarding this specific issue. In fact, various scholars have made mention of this reality. Dey, Fan, and Pang (2011) contend that the impact of technology use on individual workers is virtually un-researched in the current literature. Further, the history of information technology and work provided at the outset of this investigation clearly demonstrates that there is a paucity of empirical investigation into the topic linking various concepts together.

Despite this gap in the literature, concepts such as automation and virtualization as well as career anchors and career identity provide a solid foundation for conceptualizing and understanding the phenomenon. Moving forward, these concepts will be instrumental in building the framework needed to understand how information

technology impacts careers. Utilizing these foundations it should be possible to ground

the current investigation such that the topic of how information technology changes

careers can be analysed utilizing current literature on the topic.

Chapter 3: Methodology

The impact of information technology (IT) on career development is a topic that has rarely been addressed in the information systems literature. Hence, very few studies on the impact of IT on career development are available for review. The impact of IT on careers has instead been examined through specific theoretical frameworks to understand specific dimensions of the trend. Thus, understanding the scope and impact of IT on careers requires an integration and synthesis of this literature to acquire a more comprehensive picture of what has occurred in this area. The current chapter considers the use of a meta-narrative review to acquire deeper insight into the topic.

3.1 Systematic Reviews and Meta-Narrative Reviews

In general, literature reviews are an important foundation for providing a critical synthesis of existing knowledge on a topic (Boell & Cecez-Kecmanovic, 2014). Although basic literature reviews can be useful for understanding data and information, the complexity of structuring these reviews becomes more apparent in the context of a "large, unbounded and continuously growing body of literature" (Boell & Cecez-Kecmanovic, 2014, p. 1). In response to this, the systematic literature review or SLR has been proposed as a validated, structured method to help guide the literature review process and to ensure that the data collected provides the insight required to understand a particular topic (Kahn, Kunz, Kleijnen, & Antes, 2003). Systematic literature reviews are part of the evidence-based practice movement, whose goal is to "advance policy and practice by providing the best evidence from available research" (Boell & Cecez-Kecmanovic, 2014, p. 1-2). Systematic literature reviews of the literature are unique because they provide a distinct protocol for identifying, selecting, assessing,

and synthesizing evidence from the literature (Boell & Cecez-Kecmanovic, 2014, p. 2).

Systematic literature reviews differ from basic literature reviews in that they follow

structured methods for retrieval and analysis of data as well as utilizing an iterative

process which requires continual review of the research question (Greenhalgh et al.,

2005).

A general overview of the specific steps involved in a systematic review are

provided by Kahn et al. (2003) who argue that there are five steps in this process:

framing the questions for review, identifying relevant work, assessing the quality of

studies, summarizing the evidence, and interpreting the findings. While this basic

foundation for a systematic literature review could be used to understand the topic

under investigation in this research—how information technology (IT) changes

careers—the complexity of the research question warrants additional efforts to use a

methodological framework which takes into consideration the broad scope of the topic.

With this in mind, the meta-narrative review is proposed as a means to guide the current

research.

A meta-narrative is a type of systematic review which is specifically, designed for

"reviews of topics which have been differently conceptualized and studied by different

groups of researchers" (Cleland & Durning, 2015, p. 30). Many of the key steps involved

in writing a systematic literature review are similar to the process for conducting a meta-

narrative review. Greenhalgh et al. (2005) argue that a meta-narrative involves six

phases:

i)   Planning, in which the research question is posed;

ii)   Searching, led by institution, snowballing, and conceptual understanding;

iii) Mapping, which involves addressing the conceptual, theoretical, methodological, and instrumental elements of how researchers have explored the topic;

iv) appraisal of the evidence;

v) synthesis; and

vi) recommendations.

These steps mirror those used in the systematic literature review process but require the incorporation of different efforts to examine the key elements of the research paradigm. These differences are well illustrated in steps 2, 3 and 5. In step 2, the search stage, the process is guided by a search led by intuition and formal browsing (Greenhalgh et al., 2005). This is followed by a search to evaluate seminal work based on generic criteria for scholarship and comprehensiveness (Greenhalgh et al., 2005). Finally, searching involves a more concentrated effort which involves precise keywords, databases and snowballing (Greenhalgh et al., 2005). Through the process, the iterative foundation of the meta-narrative is illuminated, demonstrating the need to re-examine the research questions and search terms.

Similar observations can be made with regard to steps 3 and 5. Step three, mapping, requires a consideration of the key elements of the research paradigms underlying each study, including conceptual, theoretical, methodological, and instrumental components (Greenhalgh et al, 2005). Key actors and events in the development of the topic are identified and prevailing language used to understand the story of the work must be identified (Greenhalgh et al, 2005). This process again highlights the iterative nature of meta-narratives and demonstrates the consistent need

to re-evaluate the language and nomenclature used to understand the topic. Synthesis, or step 5, also involves an iterative approach in which key dimensions of the topic are provided as a narrative account in order to understand and explain differences in the way that the topic is understood and conceptualized (Greenhalgh et al, 2005).

When examined in this manner, it is possible to understand the differences between a systematic review of the literature and a meta-narrative approach. Overall, the meta-narrative approach requires more stringent supports for reviewing and identifying the underlying foundations which serve as the basis for understanding a topic. Rather than having simple rules or protocols for guiding the development of the literature search, such as in the case of the systematic review, the meta-narrative requires the researcher to develop a working history of the topic based on the information provided in the literature. This process deepens understanding of the topic by providing a higher level of synthesis of the research across multiple disciplines and domains of inquiry. These issues have notable implications for the development of the methodology and results. In an effort to comprehensively and succinctly review these issues, Table 3 below provide a comparison of the differences that result from the use of a systematic review of the literature compared with a meta-narrative.

Table 3:

Comparison of Systematic Literature Review (SLR) and Meta-Narrative

Issue	SLR	Meta-Narrative
Research Question	Specific and guided by the protocol established for research.	Broad to allow for an iterative review of the topic based on different perspectives.
Sources	Comprehensive in nature, explicit, identified through	Non-specific and difficult to identify by other

	an outline of the protocols used for gathering data.	researchers. Biased based on the parameters and language identified for searching.
Selection of Data	Specific based on criteria that is strictly outlined as part of the methodology.	Based on identified terms associated with iterative review of the topic.
Evaluation	Based on alignment with protocols established in the methodology.	Can be variable based on the literature that is located and deemed relevant to building the narrative.
Synthesis	Evidence-based and specifically developed to meet the criteria established.	Can be quantitative but is often qualitative to provide a narrative overview of the results.
Inferences from the Research	Inferences are evidence-based and have significant credibility.	Inferences are not evidence-based and provide more cohesion in understanding the topic.

(Source: Cook, Mulrow, & Haynes, 1997, p. 378)

3.2 Application of the Meta-Narrative Review Methodology

Based on the six steps identified by Greenhalgh et al. (2005) for the development

of the meta-narrative review, the first step involved outlining the initial research question

in a "broad, open-ended format" (p. 420). As stated at the outset of this investigation,

the focus of the research is to understand the impact of information technology on

career trajectories though an understanding of career anchors and career identity. As

such, the broad research question posed for the investigation was as follows: How have

changes in IT affected careers? Based on this broad research question, it was possible

to initiate an extensive search to identify articles that could potentially be utilized in the

research.

The initial search strategy began with a general search of terms central to the research including information technology and career development. These search terms were intuitive in nature and intended to provide a general understanding of the topic. The intuitive nature of the search refers to the researcher's natural instinct to guide searching based on a cursory overview of the literature. In order to locate articles, a comprehensive full-text search of databases from EBSCOHost, Google Scholar, and ProQuest was employed. The databases included: Academic Search Complete, Academic Search Premier, Business Source Complete, Business Source Premier, CINAHL Plus with Full Text, Communication & Mass Media Complete, Computers & Applied Sciences Complete, EBSCOhost, eBook Collection (EBSCOhost), Education Source, E-Journals, Environment Complete, Health Source: Nursing/Academic Edition, LGBT Life with Full Text, Library, MasterFILE Premier, MEDLINE with Full Text, Military & Government Collection, MLA Directory of Periodicals, MLA International Bibliography, PILOTS (Published International Literature On Traumatic Stress), Political Science Complete, Professional Development Collection, PsycARTICLES, PsycBOOKS, PsycINFO, SocINDEX with Full Text, SPORTDiscus with Full Text, Teacher Reference Center, TOPICsearch, and WorldCat.

General information on the topic was acquired through an intuitive search of the literature utilizing general search terms such as "career" and "information technology." This intuitive approach is noted by Greenhalgh et al. (2005) in the early stages of searching for information included in a meta-narrative. After general information on the topic was identified, more specific search terms relevant to the topic that were consistently noted in the literature were utilized for retrieving data. In particular, search

terms including "career anchor" and "career identity" were utilized. Snowballing was achieved by reviewing references in relevant articles to identify additional articles that may be relevant to the topic. This process is known as backward searching using the Web of Science (Paradis & Zimmerman, 2002). Concepts were the focus of the search to ensure that a broad range of literature was accessed. No limits on the publication timeframe or type of publication were set. This was done to ensure that all relevant articles were identified regardless of discipline and to ensure that a complete understanding of the evolution of the topic could be acquired. The following list includes an exhaustive list of the search terms that were used:

- career anchor, Schien's model, anchor theory, Schien's theory, career management, internal career, anchor structure, career anchor and job, career development, career identity, career trajectory, work identity, career well-being, career counselling, identity and career counselling, identity at work, career and identity, career definition, job satisfaction, career change, personal career identity, and dominant career anchor.

Two independent searches of the databases were completed for "career anchor" and "career identity." A search for the former phrase with the term "information technology" from EBSCOHost databases resulted in 97 full-text articles with duplicates removed, while a search for the latter phrase with the term "information technology" from EBSCOHost databases resulted in 235 full-text articles with duplicates removed. A Google Scholar search for "career anchor" or "career identity" and "information technology" led to a total of 2,080 articles. However, these results include hundreds of references whose full-text versions are not available.

The results from the two searches were combined through Carrot^2, an open source results clustering engine for organizing small collections of documents based on thematic categories (Stefanowski & Weiss, 2003). Carrot^2 was employed to ensure accuracy in clustering the data, and ensure that all articles were appropriately classified through the use of clustering algorithms based on singular value decomposition and suffix tree clustering (Stefanowski & Weiss, 2003). Through this process, Carrot^2 was able to identify terms that are most commonly linked in documents (Stefanowski & Weiss, 2003). An example of its usage is Yin (2012), where Carrot^2 was used to evaluate emergency situation preparedness to identify themes associated with who is affected during a disaster, how individuals are affected, where help is needed, and what is aid is required.

The results were utilized for mapping for the identification of themes. First articles identified through the database searches were parsed using Carrot^2 software. Once the software programme had been run, a list of results were returned with the most common themes identified in the articles. The results included only articles which had common themes. The results were organized into folders and the following themes were surfaced: career development (122), personal career identity (66), dominant career anchor (45), Schein's theory (2), career orientation (10), job satisfaction (19), and career change (55).

These themes were used to conduct additional searches of the databases listed above in conjunction with the search term "information technology". Table 4 on the following page provides an overview of the search terms utilized and the number of results returned for each of the searches. Iterative review of the term "information

technology" revealed two synonyms which were also used for searching: "information systems," and "technology." Tables 5 and 6 provide an overview of the results from these searches.

Tables 4, 5 and 6 provided below include a review of the total number of full-text articles that were identified for each of the iterative searches. In each of the Tables, the iterative search terms identified for "career anchor" and "career identity" through Carrot[2] were matched with the term "information technology" (Table 4), and iterative terms for IT: "information systems" (Table 5) and "technology" (Table 6). This iterative search process produced a broader range of articles that could be utilized for the final meta-narrative in this investigation. This process was essential to building the total number of articles that were included in the results.

Table 4

Literature Search for Meta-Narrative Themes Involving Information Technology

Search Term	Number of Results
career development	5,463 Results
personal career identity	7 Results
dominant career anchor	8 Results
Schein's theory	3 Results
career orientation	57 Results
job satisfaction	432 Results
career change	91 Results

Table 5

Literature Search for Meta-Narrative Themes Involving Information Systems

Search Term	Number of Results

career development	1,122 Results
personal career identity	4 Results
dominant career anchor	3 Results
Schein's theory	1 Results
career orientation	23 Results
job satisfaction	567 Results
career change	22 Results

Table 6

Literature Search for Meta-Narrative Themes Involving Technology

Search Term	Number of Results
career development	10,231 Results
personal career identity	133 Results
dominant career anchor	67 Results
Schein's theory	6 Results
career orientation	455 Results
job satisfaction	789 Results
career change	332 Results

All of the searches were sorted by relevance with up to the first 100 abstracts reviewed for each of the searches. The abstracts were listed based on relevance of the search terms utilized. The decision to utilize only the first 100 abstracts from each search is a common practice of several systematic literature reviews in which thousands of articles were identified, making it necessary to limit the search process. For instance, Haroon, Jordan, O'Beirne-Elliman and Adab (2015) limited their search to the first 100 articles per database when attempting to identify strategies for treating COPD in primary care. A similar approach was used by Lang and Ang (2012) when evaluating best

practice for the use of external defibrillator and by Navas, Ferraz, and Borges (2014) when seeking a universal model for understanding dyslexia.

In this study, the first 100 articles found each search resulted in a large number of articles for review. For instance in Table 4, a total of 366 articles were reviewed: 100 articles for career development, 7 articles for personal career identity, 8 articles for dominant career anchor, 3 articles for Schein's theory, 57 articles for career orientation, 100 articles for job satisfaction, and 91 articles for career change. For Table 5, a total of 253 articles were reviewed: 100 articles for career development, 4 articles for personal career identity, 3 articles for dominant career anchor, 1 article for Schein's theory, 23 articles for career orientation, 100 articles for job satisfaction, and 22 articles for career change. For Table 4 a total of 6, articles were reviewed: 100 articles for career development, 100 articles for personal career identity, 67 articles for dominant career anchor, 6 articles for Schein's theory, 100 articles for career orientation, 100 articles for job satisfaction, and 100 articles for career change.

In total, 1,192 articles (366, 253, and 573) were reviewed. The search included the initial 97 and 235 articles if they were found to be linked through common themes identified by Carrot[2]. This review process served to identify articles that examined the relationship between information technology and some aspect of career anchors and/or career identity. Articles were deemed relevant based on their content. If the article contained information regarding the impact of information technology or technology on the development of the employee it was determined to be relevant for inclusion. The impact on the employee was the critical factor for making this decision.

In total, 48 articles were found to have relevance to the current study based specifically on the relationship between the search and the specific topic of information technology and will be used as the basis for completing the meta-narrative of the literature. These articles will be examined utilizing four frameworks for the meta-narrative: conceptual, theoretical, methodological, and instrumental (Greenhalgh et al., 2005). These frameworks are important for capturing the iterative nature of the meta-narrative (Greenhalgh et al., 2005). The focus of the analysis is on understanding how career anchors and career identity have impacted the development of careers as a result of the introduction of information technology by examination through multiple viewpoints. In particular, themes related to career development, career identity, and career anchors—those found to be the most consistently noted in the relevant literature—will be used for analysis.

3.3 Review of the Methodology

The discussion for this investigation is guided by the framework for evaluating literature reviews provided by Templier and Pare (2015). As argued by these authors there are few frameworks available of evaluating the rigor of standalone reviews. Given this reality, Templier and Pare provide a six step procedure for conducting literature reviews which includes the following: formulating the problem, searching the literature, screening for inclusion, assessing quality, extracting data and analysing and synthesizing data. The first three steps are considered first followed by a more in-depth consideration of steps four, five, and six.

3.3.1 The First Three Steps

The first step noted by Templier and Pare (2015) involves a definition of the objectives of the study and the key concepts needed to justify the literature review. These issues were discussed at the outset of the investigation with the establishment of the research question—examining how technology has impacted careers—and the identification of the concepts to be used as the foundation for the literature search: career anchor and career identity. These foundations for the literature search were supported through a review of the literature and the identification of gaps in the current research, demonstrating and justifying the need for the current study. This made it possible to meet step one in Templier and Pare's framework for conducting a literature review.

The second step in Templier and Pare's (2015) framework is searching the literature. Specifically these authors note that this process represents the beginning of the data collection phase with the author identifying a wide range of information sources that will be pertinent to the review. This process was detailed through the methods used for searching various databases to identify research articles that were relevant to the investigation. Full-text articles located in Google Scholar and EBSCOHost databases were identified for further inclusion in the study based on their relevance to the topics of career anchors or career identity.

Once potential articles for inclusion for the study were identified it was then possible to conduct step three in Templier and Pare's (2015) framework: screening for inclusion. As argued by Templier and Pare, screening for includes evaluating the applicability of the studies to determine if they are relevant for the investigation. Carrot[2] software was employed in an effort to organize the research and to identify articles with

common themes. This software is an open source program which allows for clustering

of articles based on a review of pertinent themes identified through text searching.

Through the use of this software, a total of 48 relevant studies were identified along with

10 themes relevant to the topics of career anchors and career identity. These studies

were utilized for the remainder of the analysis and provide the focus for the previous

chapter.

3.3.2 Step Four

Step four in the analysis process developed by Templier and Pare (2015)

involves an assessment of the methodological quality of the primary studies used for

inclusion. Table 3, included in Chapter 4, provides a review of the specific

methodologies used to study the topic under investigation. The results provided in this

study demonstrate that correlational survey research was used most frequently for

investigating the topic. Researchers were primarily concerned with providing a

descriptive or exploratory understanding of the subject utilizing surveys without the use

of an experimental design.

Non-experimental research utilizing correlational surveys does provide important

information regarding the topic. However, this research design does not provide

causality regarding the impact of technology on careers. Further, the samples used

were not randomly selected, limiting the generalizability of the finding. These issues are

of notable concern as Table 3 indicates that only three randomized controlled studies

were utilized providing some insight regarding casualty and the impact of technology on

outcomes for employees. The use of randomized controlled trials appears to be limited

because the topic appears to be difficult to study utilizing an experiment. Rather

naturalistic assessments and observations including the use of qualitative interviews and focus groups as well as mixed methods studies appears to be justified.

The challenge in this situation is determining what serves to create high quality in the methodologies utilized. Given the challenges that exist with regard to the use of experimental designs for evaluating the topic, the use of surveys and correlational design is clearly justified. Mixed methods and qualitative studies provide additional insight into the topic, deepening the scope of understanding for the reader. Each study identified for inclusion therefore serves an important role for understanding the topic even though controlled experimental designs are not consistently utilized as the primary research methodology.

3.3.3 Step Five

Step five in the process developed by Templier and Pare (2015) involves extracting the data. According to Templier and Pare this requires "gathering applicable information from each primary study included in the review and deciding what is relevant to the problem of interest" (p. 116). Various efforts were made to extract data from the studies identified for inclusion. Specifically, data extraction included an identification of primary themes related to the topic (Figure 1), a review of articles focused on the most prominent theme—job satisfaction—(Table 1), chronological analysis (Figure 2), assessment of the research traditions (Table 2), assessment of the methodologies (Table 3), and an evaluation of nomological networks (Figures 3 and 4). Each of these assessments provides important insight into the topic.

The identification of primary themes related to the topic facilitates an understanding of variables which play a direct role in shaping or mediating the

relationship between technology and career anchors or career identity. These variables are important as they demonstrate that technology often does not have a direct influence on career outcomes for workers. For instance, personal characteristics of the worker may influence how the worker respond to technology. In addition to identifying these themes, the use of nomological networks facilitated a broader understanding of how the themes fit together. Job satisfaction, for instance, can be shaped by factors such as training and support provided to employees or the employees' participation in technology implementation. What this suggests is that the themes identified have relationships to one another in some cases, further expanding understanding of the topic.

Chronological assessment as well as assessment of the research traditions further provides insight into the topic. Chronological assessment indicates that the bulk of the research on the topic has only recently been undertaken (since 2009). Changes in the role of technology in the workplace may have occurred since the topic was first investigated in the early 1960s: i.e., digital natives and immigrants. No effort was made to assess generational differences in the literature. However this topic is one that is worth reviewing for future research. Assessment of the research traditions demonstrates that the topic has relevance to a number of different disciplines suggesting that collaboration across these domains may be a useful undertaking for building additional comprehension of the topic.

3.3.4 Step Six

Step six in the literature review process requires analysing and synthesizing the data to aggregate the information and construct new knowledge (Templier & Pare,

2015). The data acquired from this investigation indicates that that there are important issues of concern for organizations to consider when introducing new technology to ensure that career identity and anchors are preserved. The most salient finding from the research indicates that job satisfaction is a significant issue of concern impacting outcomes for employees. Satisfaction is influenced by a number of secondary variables including how the organization approaches training and support of employees when new technology is included and whether or not employees are included as part of technology implementation.

3.4 Summary and Diagram

A summary of the process used for identifying articles used in the meta-narrative is provided below. Three specific steps were utilized in total. First, two independent searches of the databases were conducted. Second, Carrot^2 was utilized to identify iterative search terms that were relevant to the main themes involved in the research: "career anchor" and "career identity." Third, based on the iterative terms identified, additional searches of the databases for full-text articles were performed matching each of the iterative terms with "information technology," "information systems," or "technology." Finally to the first 100 abstracts for each of the individual searches were reviewed. From Table 4, 366 articles were reviewed with 15 having relevance to the topic. From Table 5, 253 articles were reviewed with 11 having relevance to the topic. From Table 6, 573 articles were reviewed with 22 having relevance to the topic.

Figure 1: Summary Diagram

Two independent searches of the databases were completed for "career anchor" and "career identity."
A search for the former phrase with the term "information technology" from EBSCOHost databases resulted in 97 full-text articles with duplicates removed, while a search for the latter phrase with the term "information technology" from EBSCOHost databases resulted in 235 full-text articles with duplicates removed.

Carrot[2] used for iterative search using the terms "career anchor" and "career identity."
Search terms identified from Carrot[2] included: "career development," "personal career identity," "dominant career anchor," "Schein's theory," "career orientation," "job satisfaction," and "career change."

Iterative terms identified were searched for full-text through selected databases along with "information technology."
Iterative terms for "information technology" identified included "information systems" and "technology." These terms were paired with Carrot[2] terms identified above to expand range of available articles.

Abstracts for up to the first 100 articles for each of the paired searches was employed to identify final articles for inclusion in the meta-narrative.
Results: "Information technology" 366 articles reviewed manually; 15 included – "Information systems" 253 articles reviewed manually; 11 included – "Technology" 573 articles reviewed manually; 22 included. Total of 48 Articles

Chapter 4: Results

The focus of the meta-narrative review was to identify pertinent themes to facilitate a broader understanding of how information technology has impacted careers. The concepts of career anchors and career identity were initially used as the basis for locating articles related to the introduction and use of technology in the labour force and for understanding the effect that information technology has had on individual employees. The current chapter reviews the results of this meta-narrative review, examining the specific themes identified through the search of the literature and the systemic issues associated with the themes identified.

4.1 Key Themes Identified

The results of the search process was the identification of 48 articles that studied the relationship between information technology and career anchors and career identity. Next, Carrot[2,] an open source results clustering engine (Stefanowski & Weiss, 2003), was used to identify themes across the articles. The previous chapter described how

Carrot[2] works. From these 48 articles, a total of ten themes were identified: job

satisfaction (21 articles), gender (6 articles), career development (5 articles), work-life

balance (4 articles), career readiness (4 articles), role strain (2 articles),

empowerment/control (2 articles), group membership (2 articles), job characteristics (1

article), and career orientation (1 article). Figure 2 on the following page provides a

review of the themes along with the total number of articles identified under each topic.

The data indicates that articles focused on job satisfaction were among the most widely

available in the current literature.

Figure 2

Overview of Article Themes
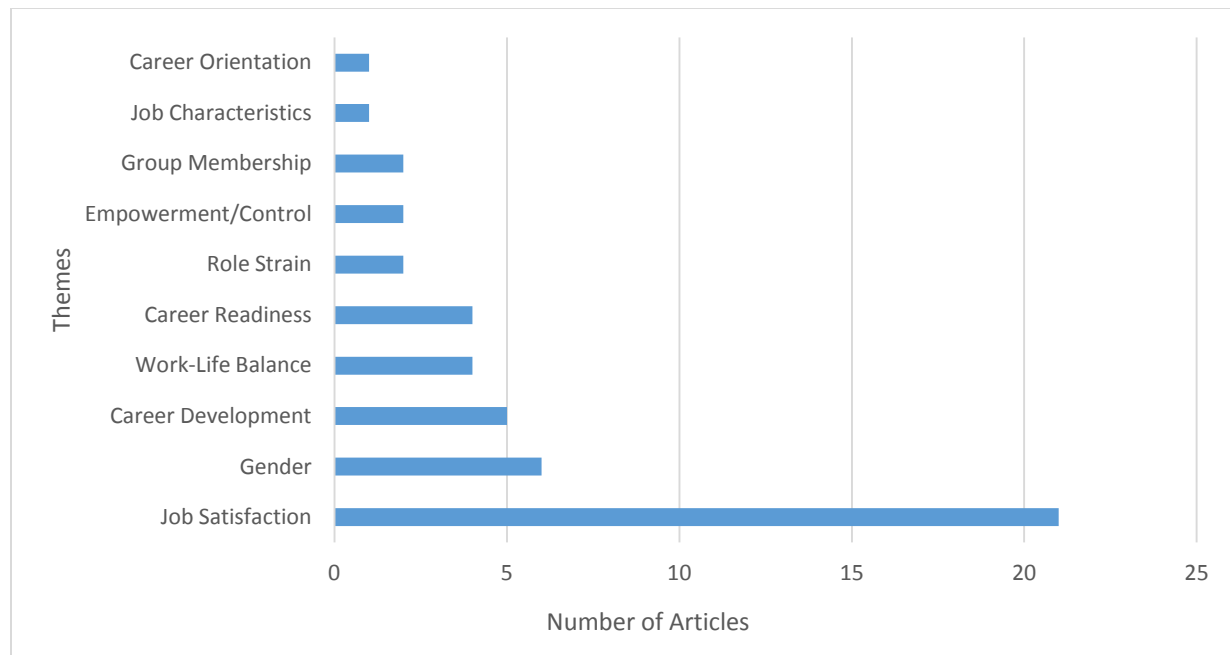
4.1.1 Job Satisfaction

The data indicate that job satisfaction clearly had the most significant implications

for shaping the role of information technology on careers. Even though job satisfaction

was noted to have the most significant implications for careers as a result information

technology, it is important to note that the research does include a wide range of nuances which indicate that job satisfaction is, in some instances, integrally, tied to other issues related to the individual's employment. With these issues in mind an effort was made to provide a closer examination of the literature focused on job satisfaction in an effort to identify the process by which job satisfaction is addressed. Table 7 below provides an overview of each of the 21 articles that identified job satisfaction as a significant theme impacting work as a result of information technology.

Table 7

Review of Articles Focused on Job Satisfaction

Author, Year	Aim	Results	Implications for Job Satisfaction
Hardin (1960)	This research employed a study to compare responses of automated and non-automated departments in an organization. Specifically perceived impact of automation, change in job, feelings about change, and satisfaction were evaluated.	There were few differences in the departments with regard to responses and satisfaction levels. Dissatisfaction was higher in automated groups with these effects easing after the initial introduction of technology. The results suggest that technology does not cause significant disruptions in job function or the attitudes of employees.	This study is unique because it argues that even though technology is revolutionary technology "causes changes in work environment and job satisfaction very similar to those which normally occur and without computer automation" (p. 567). This suggests that technology has no impact on careers.
Critchlow (1977)	The aim of this research is to examine the impact of technology on the automobile industry.	The research indicates that for employees that have the skills for specialization, technology can led to increased satisfaction with employment. For employees with low skill levels the inability to adapt to technology	The data from this investigation demonstrates that the capabilities of the individual worker play a significant role in shaping satisfaction levels. These issues are pertinent to consider as skill

		results in a decline in satisfaction.	levels and match or fit with technology are clearly issues of concern.
Abdel-Halim (1981)	The aim of this investigation was to examine role stress—including ambiguity, conflict, and overload—as they relate to the use of information technology in the workplace.	The results indicate that for employees in both low and high skilled jobs, technology resulted in lower job satisfaction as measured by these variables.	Technology impacts specific areas include role conflict, ambiguity, and overload leading to a reduction in job satisfaction. Thus technology impacts the role of the employee causing disruptions which lead to dissatisfaction.
Buchannan & Boddy (1983)	This article considers the development of technology for biscuit makers, noting the forces driving the use of technology for employees in this industry.	The results indicate that workers in the organization were responsible for advocating for technology change with the belief that this change would have a positive impact on productivity and operations. The research indicates that job satisfaction of employees can be positively impacted if employees are willing to embrace new technology.	Employee readiness of new technology as well as the ability and willingness of management to consider the needs of employees clearly had implications for shaping job satisfaction with regard to the introduction of technology in this research.
Huber & Hyer (1984)	This study examined the impact of technology and automation on batch manufacturing employees.	The results suggest that when technology was implemented job redesign was also undertaken leading to the maintenance of job satisfaction even in the wake of introducing new technology.	Data obtained in this research also emphasizes the role of the organization in shaping outcomes for developing automation in the organization. Careers and satisfaction can be preserved with support from the

			organization.
Rosow (1984)	This theoretical review of the literature provides insight to both the benefits and drawbacks of technology with regard to the impact on jobs.	The results indicate that technology: improves safety, requires upgrading skills, eliminates low-skill work, and displaces some workers. The actual impact on jobs and careers is thus dependent on the technology adopted, the skills of the individual worker, and the manner in which technology is addressed by the organization.	Satisfaction for employees as a result of automation suggests that the issue is multifactorial and dependent upon a wide range of factors including personal attributes and skills of the individual worker as well as actions taken by the organization in the implementation of technology.
Millman & Hartwick (1987)	The central focus of this investigation was an examination of the impact of automation on middle managers.	The research indicates that most managers felt that technology had enriched their lives and increased satisfaction. Additionally, managers with previous exposure to technology reported higher levels of satisfaction with automation.	This research indicates that when technology represents a good fit with the needs of managers it can have a positive impact on satisfaction through job enrichment. Personal factors including technology use at work or home also impacted satisfaction levels.
Wall, Clegg, Davies, Kemp, & Mueller (1987)	This research considers the advancement of technology on outcomes for shop floor employees.	The results indicate that the greater the difference between jobs before and after technology implementation the higher the level of dissatisfaction with the job and technology.	The results have implications for understanding the factors which shape employee response to technology. When technology causes a radical shift or change in a job it can be more disruptive and damaging to the employee in terms of overall job satisfaction.
Baxter (1990)	The goal of this	The results indicate that	Job fit and rewards

	research was to examine the effects of technology on job satisfaction for employees working in the US Postal Service. Factors including job rewards and individual attributes were examined in the context of job satisfaction.	the manner in which technology was implemented in the workplace had significant bearing on job rewards and whether or not employees were able to experience these rewards. Fit between the individual and the job also had bearing on outcomes.	associated with the implementation of technology impact satisfaction for the individual employee. By considering these issues for future employees, the author believes that it should be possible to increase satisfaction even in the wake of increased mechanization.
Korunka, & Vitouch (1999)	This research examined the effects of implementing new information technology in ten companies operating in Vienna.	Data captured through this investigation demonstrated that strain increased and satisfaction decreased if organizations did not provide support needed to help employees utilize technology or to participate in the implementation of technology.	The role of the organization in shaping outcomes for employees and their jobs is well-illustrated in this point. Job satisfaction and strain are impacted if employees are not provided with the opportunity to engage in IT implementation and training.
Jiang & Klein (2000)	This study examined career satisfaction for IS employees in the wake of changing technology.	The results indicate that satisfaction can be preserved for IS employees with support from the organization in terms of training and career advancement opportunities.	This research also emphasizes the role of the organization in mitigating the impact of technology on the career of the professional. Support provided by the organization can increase satisfaction and enable employees to adapt to changing technology.
McMurtrey, Grover, Teng, & Lightner (2002)	This research considers the introduction of technology for IT	The results suggest that when technology is implemented based on employee needs and	Personal attributes of the individual with relationship to career orientation were

	professionals, considering the implications for satisfaction.	desires, high levels of satisfaction are achieved. Personal career orientation was noted to play a significant role in determining if new technology impacted satisfaction.	noted to have a direct impact on outcomes for satisfaction with the introduction of new technology.
Speier & Venkatesh (2002)	The focus of this investigation is the impact of customer service automation on employees working in sales.	The results indicate that although initial responses to technology were positive, after six months of use many employees experienced high levels of dissatisfaction. Absenteeism and turnover also increased.	The research indicates the challenges of introducing new technology in non-automated processes. Organizations have some obligation to ensure that there is a fit between technology and employee needs.
Beam, Kim, & Voakes (2003)	The focus of this investigation was to examine the impact of technology on the profession of journalism with a specific effort made to evaluate implications for educators working in the field.	The results indicate that most of the professionals surveyed reported the presence of job stress in efforts to keep up with the proliferation of technology. Many reported feeling overwhelmed by the extent of technology leading to a decline in overall satisfaction with their jobs.	This research highlights a different aspect of technology and its implications for careers of journalists. Stress and strain associated with keeping pace with changes in technology are the direct cause of dissatisfaction among this group.
McHugh (2004)	This article provides a case study of employee reactions to the implementation of technology in a healthcare setting.	The results indicate that employees wanted the new technology and embraced it because they were able to see the benefit of the technology for their work environment and job duties.	This research demonstrates the importance of employee acceptance of technology and benefits for the technology in practice as they relate to satisfaction.

			Organizational support for technology adoption and implementation are also critical factors of concern.
Hameed, Mohd, & Oudah (2005)	In this article an effort is made to evaluate specific elements of information technology—utilization and ease of use—as they relate to job satisfaction and work effectiveness.	The authors found that increased use of IT as well as ease of use increased job satisfaction and made it easier for employees to meet job responsibilities. However, mediating variables were also noted including knowledge sharing orientation among workers.	The results obtained from this investigation suggest that adaptation to technology to achieve job satisfaction is impacted by variables related to the technology as well as variables related to the organization.
Wagner, Dainty, Hague, Tuck, & Ong (2008)	The research considers the impact of rapid automation on the work of employees who make prosthetics.	Data collected indicates that satisfaction with automation proved challenging for older workers with many dissatisfied to craft prosthetics by hand.	This process of automation led to profound changes in the way that employees worked. These changes appear to have a substantial impact on employee attitudes and overall satisfaction levels.
Leung (2011)	This research considers the proliferation of technology into the lives of employees who experience work contact outside of the office.	The results indicate that spillover from work to home as a result of technology resulted in lower satisfaction for employees. Individuals who were able to create clear boundaries between home and work had higher levels of satisfaction overall.	This research considers career changes and satisfaction as these issues relate to the home-work interface. Clearly, the ability of the individual to manage technology in these domains has a significant impact on outcomes.
Sardeshmukh, Sharma, & Golden (2012)	This article considers the impact of	Satisfaction for employees is dramatically impacted	Satisfaction in this investigation is related to job

	technology as it relates to telework and the implication of these outcomes for workers.	by telework with the infusion of technology into home life impacting exhaustion and burnout. Job demands can increase if the individual is unable to separate out work and home life issues.	demands created by telework. Individual capabilities in managing this issue will play a significant role in shaping the outcomes experienced by the individual.
Diedericks & Rothman (2014)	This research examines the ability of employee to flourish in high tech environments with an emphasis on both individual and organizational outcomes.	The results suggest that when employees were satisfied with their work roles, commitment and citizenship behaviour increased with counterproductive behaviour decreasing. Satisfaction also had implications for reducing turnover.	The individual employee's ability to adapt to technology or to achieve fit typically lead to satisfaction which had systemic outcomes for both the individual and the organization. Employees who were able to adapt to technology and their environment experienced the best outcomes overall.
Shan, Li., Yao, Shi, & Ren (2014)	This research considers satisfaction with technology use among workers in IT enterprises.	The research indicates that satisfaction with technology is mediated through the way in which new technology is managed within the organization. Opportunities for learning and knowledge sharing are noted as critical issues of concern for increasing satisfaction.	The results again support the role of the organization is positively shaping satisfaction and outcomes for career development in professionals working with information technology.

The results provided in this table with regard to the specific issue of job satisfaction have notable implications for understanding the impact of information technology on careers. While the general theme of job satisfaction provided a means for identifying articles, it is evident that satisfaction is shaped by a wide range of issues

which need to be considered when understanding the impact information technology on careers. One of the most pertinent themes noted throughout a review of this literature is the role that the organization plays in outcomes for the employee. Training and support are clearly issues of concern when it comes to employee responses to technology (Huber & Hyer, 1984; Jiang & Klein, 2000; Speier & Venkatesh, 2002; McHugh, 2004). Additional issues identified through this research include: the need for organizations to fit technology with the needs of the employee (Buchannan & Boddy, 1983; Jiang & Klein, 2000), the role importance of enabling employees to participate in implementation (Rosow, 1984; Korunka, & Vitouch, 1999), and the way in which technology implementation and use is managed overall (Hameed et a., 2005; Shan et al., 2014).

Additional issues of concern noted with regard to information technology and job satisfaction stem from the degree to which the technology implemented impacted the job of the employee. If the job of the employee was significantly changed or altered as a result of the introduction of technology this had a significant impact on dissatisfaction of the employee (Wall et al., 1987; Baxter, 1990; Wagner et al., 2008; Diedericks & Rothman, 2014). The issue of technology and its fit with the needs and activities of employees was consistently noted as impacting outcomes for satisfaction and overall response to technology (Speier & Venkatesh, 2002; McHugh, 2004; Diedericks & Rothman, 2014). If the new technology did not fit with the specific needs of the employee, higher levels of job dissatisfaction resulted with disruptions for some individuals (turnover and absenteeism) as well as disruptions for organizations (Speier & Venkatesh, 2002).

Personal attributes of employees, including past exposure to technology (Millman & Hartwick, 1987) and the desire for technology in the workplace (Buchannan & Boddy, 1983; McMurtrey et al., 2002; McHugh, 2004), also had significant implications for shaping job satisfaction. These issues must also be considered when examining the impact of information technology on careers. Although outside of the scope of the articles identified for this investigation, bring-your-own-device (BYOD) policies have also been implicated in how workers view technology in the workplace. BYOD policies provide employees with access to their devices enabling them to easily access and utilize technology in the workplace (Scardilli, 2014). Although this issue may be relevant today, it is one that would not have been considered in the literature prior to the 2000s and mobile and portable technology was not widely accessible before this time period.

Bring-your-own-device policies have noted implications for the development of worker satisfaction. As noted by Comisky and Diamond (2014) BYOD programs offer employees the ability to utilize devices with which they are familiar. As a result, barriers that may arise because of technology use (e.g., lack of familiarity, inability to use the technology, etc.) are eliminated (Comisky & Diamond, 2014). This can increase employee satisfaction impacting levels of productivity and performance (Comisky & Diamond, 2013). Given these outcomes it is evident that BYOD may have important implications for shaping career development as job satisfaction has been identified as a pertinent variable impacting careers in the wake of information technology.

Clearly, while job satisfaction provides some insight into the particular implications of IT on career development and job orientation, the topic is one that is notably complex. It is possible however to find some common ground for evaluating job

satisfaction with a review of the systemic implications of technology on this variable. A review of this research thus provides the needed insight to acquire a comprehensive understanding of the impact of information technology on careers as it relates to the specific issue of job satisfaction in the workplace.

4.1.2 Additional Themes

Although job satisfaction was by far the most pertinent theme identified in conjunction with career anchors and career identity, Figure 1 does indicate that there were a myriad of other themes that were consistently identified through the research as well. These include: gender (Ryan & Harden, 2014; Birgitta, 2013; Quesenberry & Trauth, 2012; Bigliardi & Dormio, 2009; Klapwijk & Rommes, 2009; Shapiro, Ingols, & Blake-Beard, 2008), career development (Zientek, Skidmore, Saxon, & Edmonson, 2015; Alyahya, 2011; Khapova, Arthur, Wilderom, & Svensson, 2007; Hall & Mirvis, 1995; Creapeau, Crook, Goslar, & McMurtrey, 1992), work-life balance (Cooke, Chowhan, & Cooper, 2014; Lee & Yen, 2013; Leslie, Manchester, Park, & Mehng, 2012; Gattiker & Howg, 1992; Wall et al., 1987), career readiness (Xie & Reider, 2014; Vuorinen, Sampson, & Kettunun, 2011; Yoruk, Morgil, & Secken, 2009; Mau, 1999), role strain (Duxbury & Halinski, 2014; Golden, 2013), empowerment/control (Jian, 2008; Quigley & Tymon, 2006), group membership (Allan & Lewis, 2006; Harrison, 2006), job characteristics (Jarvenpaa, 1997; Huber & Hyer, 1984), and career orientation (Igbaria, Greenhaus, & Parasuraman, 1991). These themes provide additional insight into how technology has shaped the development of individual careers creating a broad foundation for evaluating the scope of the topic in research and practice. Table 8

provided below includes a summary of the articles by theme to facilitate a better

understanding of the topics that are addressed in this research.

Table 8

Review of Additional Themes

Author, Year	Theme	Aim	Results	Implications Research
Shapiro, Ingols, & Blake-Beard, 2008	Gender	This research examines career choices made by women utilizing traditional models including the "opting out" and "mommy track."	The authors are able to demonstrate that these models are ineffective in the changing landscape of the business environment.	Women are more likely to be actively involved in career development and to have career self-agency seeking to build skills, including those in technology to achieve job security.
Klapwijk & Rommes, 2009	Gender	This research examines career anchors as they are being established in educational environments.	The results indicate that gender influences how technology is viewed in the context of career anchors with females less likely to associate technology with creativity and service.	These views will shape career choices for females and males and should be considered by schools when building career aspirations for all students.
Bigliardi & Dormio, 2009	Gender	To evaluate the process of career development for R&D staff in relation to career anchors and gender.	The results indicate that gender influences career orientation and views of career anchors.	Gender is a variable that cannot be controlled by the organization but must be recognized in order to

				understand its implications in developing policy as it relates to information technology.
Quesenberry & Trauth, 2012	Gender	An investigation of career anchors for women working in the IT workforce.	The authors argue that organizations must be aware of the implications of gender and how this variable will shape career anchors for women when it comes to technology development and use.	Gender is elucidated as a variable that must be considered in the context of information technology as women will have different views on career anchors when it comes to IT as compared with men.
Birgitta, 2013	Gender	The influence of role models on women's entrance into technology fields is reviewed.	The author notes that women with strong role models and encouragement were likely to enter these fields.	Gender will impact the supports needed by the employee to engage with and utilize technology.
Ryan & Harden, 2014	Gender	Research examines the role of gender in IT employees with regard to embeddedness and fit with the organization.	Gender differences were noted with women reporting lower levels of fit and embeddedness.	Gender should be considered when evaluating the role of technology on career development.
Creapeau, Crook, Goslar, & McMurtrey, 1992	Career Development	This research involves an assessment of career orientations for workers who utilize technology as	The authors identify career development as an important issue for how employees view their careers in the wake of	Career development is an important issue of concern for understanding how technology influences

		integral components of their jobs.	technology.	worker views on their careers.
Hall & Mirvis, 1995	Career Development	This research considers shifts in careers as a result of technology.	The authors argue that technology requires new career development capabilities that are currently being overlooked.	Efforts to build career development on technology changes should be considered.
Khapova, Arthur, Wilderom, & Svensson, 2007	Career Development	This research examines career change intention in the IT sector.	The results indicate that career development was the most significant influence on outcomes.	Those interested in using IT in the workplace are continually looking for opportunities for career development which include technology use and expansion.
Alyahya, 2011	Career Development	This research considers career development in the wake of new technologies being introduced in developing nations.	The results indicate that technology must be integrated with career development to ensure positive outcomes for career growth in these regions.	This research demonstrates the importance of integrating technology as a part of career development in order to foster positive outcomes in this domain.
Zientek, Skidmore, Saxon, & Edmonson, 2015	Career Development	This research was conducted to understand how mathematics teachers can use technology to advance their capabilities in the classroom.	The authors found that many instructors made technology a priority choosing to view it as an opportunity to improve their capabilities and outcomes for	This study demonstrates the positive role that technology can have when integrated as part of career development with benefits for others involved

			students.	in the career development process.
Wall et al., 1987	Work-Life Balance	This work compares high and low-technology jobs for workers to assess outcomes.	The results indicate that regardless of the level of technology, work-life balance was identified as a significant issue impacting outcomes for all workers.	Work-life balance must be taken into consideration when technology is integrated into work as it will change how employees view their careers.
Gattiker & Howg, 1992	Work-Life Balance	This research is focused on the effects of IT on office workers and their attitudes.	The results indicate that officer workers believed that technology would increase the complexity of their jobs leading to the need for improved work-life balance.	The impact of technology on workers can be addressed positively through policies which reduce stress and promote a work-life balance.
Leslie, Manchester, Park, & Mehng, 2012	Work-Life Balance	This research considers the role of technology in work-life balance.	Some employees believe that technology can negatively impact career development making jobs too flexible.	The pervasiveness of technology in work and home lives is an important issue to consider when evaluating career views of employees.
Lee & Yen, 2013	Work-Life Balance	This research examines work-life values in relation to career orientation for workers engaged in technology use.	The results indicate that organizations may need to invest in efforts to create work-life balance programs to effectively meet	This issue is one that must be addressed by the organization to ensure that positive career development occurs for

			the needs of workers.	workers utilizing technology as part of their jobs.
Cooke, Chowhan, & Cooper, 2014	Work-Life Balance	This research considered employer use of technology and its impact on work-life balance for employees.	Employers focused on innovation were more likely to employ technology negatively impacting employee work-life balance. This was found to have a negative impact on strategy for the organization.	Work-life balance is a critical issue for the development of worker capabilities and careers making it a prominent issue for organizations to consider.
Mau, 1999	Career Readiness	This research considers career interventions to assess the ability of individuals to meet the changing technological demands of the workplace.	The results indicate that career readiness plays an important role in shaping how individuals respond to technology in the workplace.	Career readiness is an important issue that must be addressed by the individual and organization when new technology is introduced.
Yoruk, Morgil, & Secken, 2009	Career Readiness	This research assesses career readiness in high school students in comparison with skills needed to be effective in the current work environment.	High levels of career readiness served to prepare students for the work environment including the use of technology.	Career readiness is an important factor to cultivate in order to ensure that workers are able to adapt to technology in the workplace.
Vuorinen, Sampson, & Kettunun, 2011	Career Readiness	In this article, the authors consider the needs of individuals	Career readiness is identified as a factor shaping outcomes for the acceptance of	Workers must be prepared to accept technology in order to

		seeking career advice.	technology.	successfully integrate technology as part of their careers.
Xie & Reider, 2014	Career Readiness	This research examined student readiness of their careers in the wake of changing technology.	Higher levels of career readiness were correlated with the ability of students to integrate and use technology as part of their careers.	Career readiness should be assessed in order to evaluate the impact of technology on career development.
Golden, 2013	Role Strain	This research sough to examine the impact of technology on conflict and strain with efforts to understand how this impacted career development.	The author found that technology can increase role strain unless effort is made to address this issue by the organization. This can impact career development and views on career.	The impact of technology on the worker must be assessed to ensure that it does not result in conflict or strain which changes career perspective for the employee.
Duxbury & Halinski, 2014	Role Strain	This research examined the relationship between technology and role strain.	The authors demonstrate that technology creates a certain level of control which increases role strain having a negative impact on worker satisfaction and career views.	The invasiveness of technology into the workers' home life must be addressed to reduce role strain and negative views on satisfaction and overall career development.
Jian, 2008	Empowerment	This research examines the role of identity and how it is changed by information	The author is able to demonstrate that when technology empowers it enhances identity	Efforts are needed to understand how technology influences the identity of the

		technology in the workplace.	and strengthens career development.	individual and whether or not it empowers workers.
Quigley & Tymon, 2006	Empowerment	This research considers the issue of career self-management in the wake of changes in the workplace including the introduction of technology.	The results suggest that career self-management can serve to motivate and empower the individual making it possible to overcome obstacles in career development.	The research supports the need to build empowerment as a foundation for enhancing intrinsic motivation toward career development.
Allan & Lewis, 2006	Group Membership	This research seeks to understand how virtual learning communities can improve outcomes for individuals exposed to new technologies.	The research indicates that those involved in group learning environments were more likely to adapt their work practices and careers to meet the needs of new technology.	This indicates that group learning may be a positive support for meeting the needs of employees who are required to adapt to new technologies.
Harrison, 2006	Group Membership	This is a theoretical review of the construct of career in the context of technology.	The author contends that careers developed on new technological advances are shaped by group or social factors with these influences shaping how individuals respond to technology.	Group and social issues can be addressed by the organization to encourage the integration of technology in the workplace and the evolution of individual views on their careers.
Jarvenpaa, 1997	Job Characteristics	Using a longitudinal design the	The author found that job characteristics	Job characteristics may influence

		author of this work sought to understand how the implementation of office automation impacted satisfaction and career orientation of workers in a district court.	had the most influence on outcomes for workers. The specific tasks for the worker and increased levels of change resulted in higher levels of dissatisfaction and negative views on career development.	views on career based on the level of technology required and the scope of technology use in a particular job.
Huber & Hyer, 1984	Job Characteristics	The authors of this study examined differences in perceptions among those with high tech and low tech jobs.	Those with high tech jobs reported increased autonomy, significance, and identity in their jobs.	Technology in a job can shape job characteristics leading to differences in how workers view their jobs.
Igbaria, Greenhaus, & Parasuraman, 1991	Career Orientation	This research examined career orientation and its outcomes for careers in employees working in the MIS field.	The results of the investigation indicate that career orientation was highly compatible with career outcomes suggesting that the orientation of the individual will have a significant impact on adaptation to technology in the workplace.	Organizations may need to consider the orientation of employees to better understand how they will respond in terms of career development in the wake of introducing new technology.

4.2 Additional Methods of Analysis
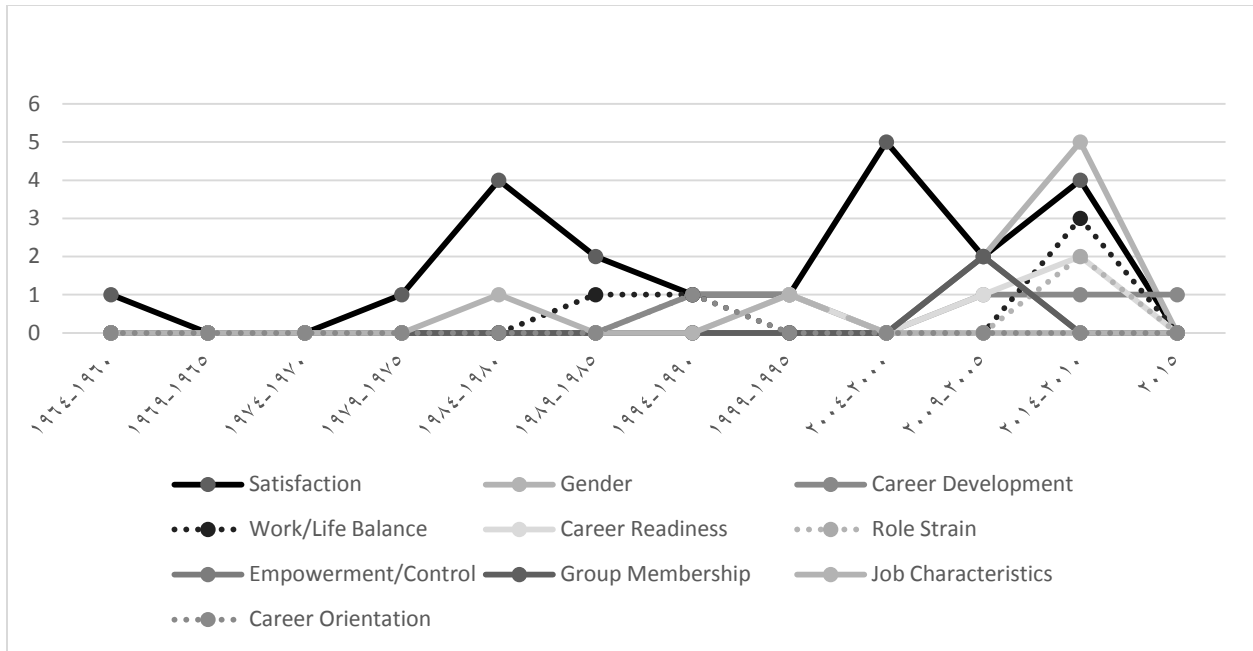
4.2.1 Chronological Analysis

Although thematic analysis provide important insight into the specific issues

related to the impact of technology on careers, additional analyses of the data can

facilitate further assessment of the information collected. Greenhalgh et al. (2005), for example, completed a chronological analysis of data in their meta-narrative. Greenhalgh and co-workers utilized a chronological analysis of the data collected in an effort to map the traditions in the research to determine when these traditions became prominent. By evaluating themes utilizing a chronological assessment this process should provide further understanding of how the topic has evolved over time. Figure 3 on the following page provides an overview of the chronological timeframe for each of the themes.

A review of Figure 3 indicates that between 1970 and 1995 the theme of job satisfaction overlapped with job characteristics, career orientation and work-life balance. Between 1999 and 2005 job satisfaction overlaps with job characteristics, job readiness, and career readiness. It is not until after 2009 that the number of topics explored with regard to career trajectories and career identity becomes notably diverse. Clearly, the Figure demonstrates the prominence of job satisfaction throughout the course of the research with only gender having more results in the 2009-2015 period. This analysis indicates that over the course of reviewing the topic job satisfaction has been utilized as a dominant framework for evaluation suggesting that this concept has notable implications for understanding the impact of information technology on career development.

Figure 3

Chronological Assessment of Data

Legend: Satisfaction, Gender, Career Development, Work/Life Balance, Career Readiness, Role Strain, Empowerment/Control, Group Membership, Job Characteristics, Career Orientation

4.2.2 Assessment of Research Traditions

Greenhalgh and her co-authors (2005) also analysed the research captured for their meta-narrative through an examination of the various research traditions employed in conducting the research. For the current study, a review of each article was undertaken to consider the key topics under investigation as well the journal in which the article was published and the theoretical frameworks used for conducting research, if noted. Table 9 below provides a review of the research traditions, the number of articles focused on each, and the way in which career anchors and career identity were conceptualized in each of the articles.

Table 9

Research Traditions Identified for Articles

Research Tradition	Number of Articles	Conceptualization of Career Anchors and/or Career Identity
Management	18	In the management tradition, efforts are made to

		understand the impact of technology on outcomes for employees in the workplace. Managers must respond to the changing issues facing employees making it necessary for the organization to address this issue from a pragmatic standpoint.
Education	8	Education focuses on two themes: the education of the worker as a means to adapt to technology and the education that must be provided by the organization in order to ensure that employees are able to navigate the changes in the workplace due to technology.
Career/Adult Development	7	Career development is focused on the specific needs of the individual worker and the particular supports that may be needed to help the worker adjust to a work environment in which technology is a predominant or new feature.
Sociology	8	Articles written in the tradition of sociology focus on communication issues and the way in which technology changes how workers interact with each other and the organization. Workers are often required to learn new skills changing the way that interactions occur within the organization.
Psychology	7	Articles focused on psychology consider the impact of technology on the ability of the worker to change and adapt in the workplace. In some instances, adaptation does not occur resulting in significant shifts for the worker that may not have been anticipated. Psychology is shown to impact behaviour and the ability of the individual to cope with and accept changes in technology.

Assessment of the research also included an examination of the type of studies that were conducted: qualitative and quantitative with an assessment of the particular methodology employed. The results indicate that the most commonly used research methodology was a quantitative survey (24 articles). This was followed by qualitative theoretical synthesis in which researchers attempted to utilize existing research to provide a new perspective on the topic (9 articles). Table 10 below provides an overview of this data.

Table 10

Research Methods Used in the Selected Articles

| Research Method	Type of Research	Number of Articles
Quantitative	Survey	24 Articles
Quantitative	Controlled Studies	3 Articles
Qualitative	Theoretical Synthesis	9 Articles
Qualitative	Interviews	4 Articles
Qualitative	Literature Reviews	2 Articles
Qualitative	Focus Group Interviews	1 Article
Mixed Methods	Case Studies	3 Articles
Mixed Methods	Longitudinal Case Study	1 Article
Mixed Methods	Survey/Interview	1 Article

4.3 Nomological Networks

Nomological networks provide a visual representation of the constructs in a study which are related to one another (Lissitz, 2009). These networks can be constructed utilizing the data to provide greater insight into the way in which concepts developed in are linked together. For the purposes of this investigation, articles were identified based on one of the ten central themes identified. The articles were then reviewed to identify their relationships with other themes. If the article contained content discussing the results in terms of an additional theme related to the research is was linked to that theme. Figure 4 below provides an overview of the nomological network which exists for

the central theme of satisfaction as it relates to the impact of technology on careers. As illustrated in this Figure there are a number of different variables which contribute to the development of job satisfaction when it comes to the introduction and use of technology. Clearly, a comprehensive consideration of each of these issues is warranted to acquire a comprehensive understanding of job satisfaction in the context of information technology.

While Figure 4 demonstrates that there are specific variables related to job satisfaction which all contribute to outcomes in this area when technology is introduced in the workplace, the Figure also demonstrates that there are overlaps between key areas which shape job satisfaction. In particular, the analysis demonstrates that the impact of technology on the job can be shaped by the needs of the employee, which can also be altered by personal characteristics. These issues demonstrate that the relationships between variables which shape job satisfaction in the wake of technology are notably complex and dynamic.

Figure 4

Nomological Network for Job Satisfaction
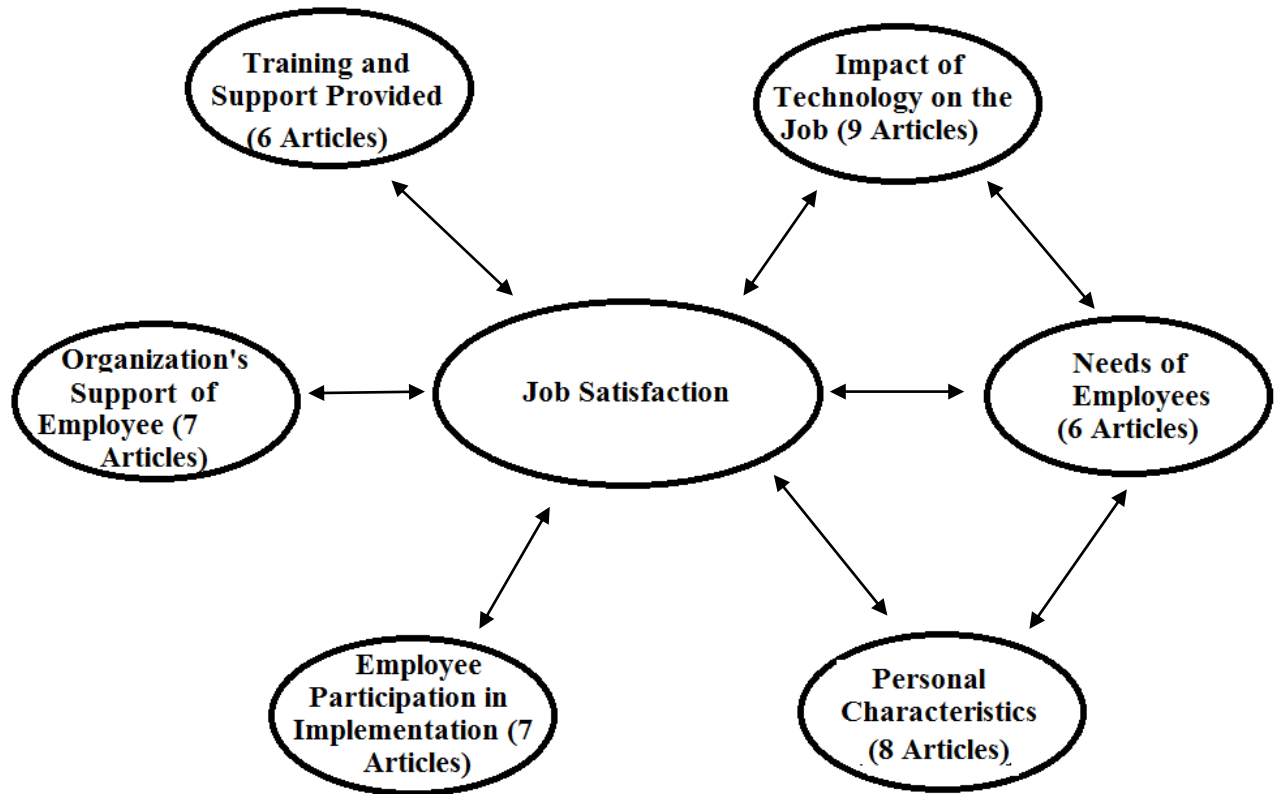
Further analysis of the themes identified were also considered to determine if there were any links between job satisfaction and the other common issues noted in the literature as impacting careers in the wake of the introduction of technology. Figure 5 on the following page includes all of the themes identified through the literature with connections between those that were demonstrated in the literature. What the analysis demonstrates is that while some themes—including career readiness and group membership—were noted in isolation, other themes—including gender, role strain, work/life balance, job satisfaction, and job characteristics—were noted as having some connection to other concepts and ideas within the literature. These relationships are important to note as they provide a systemic understanding of the concepts and how they fit together in the full scope of the literature. The results also emphasize the

underlying role of gender and its implications for how technology impacts careers.

Clearly, this is one area for further study that should be considered.

Figure 5

Nomological Network among Themes
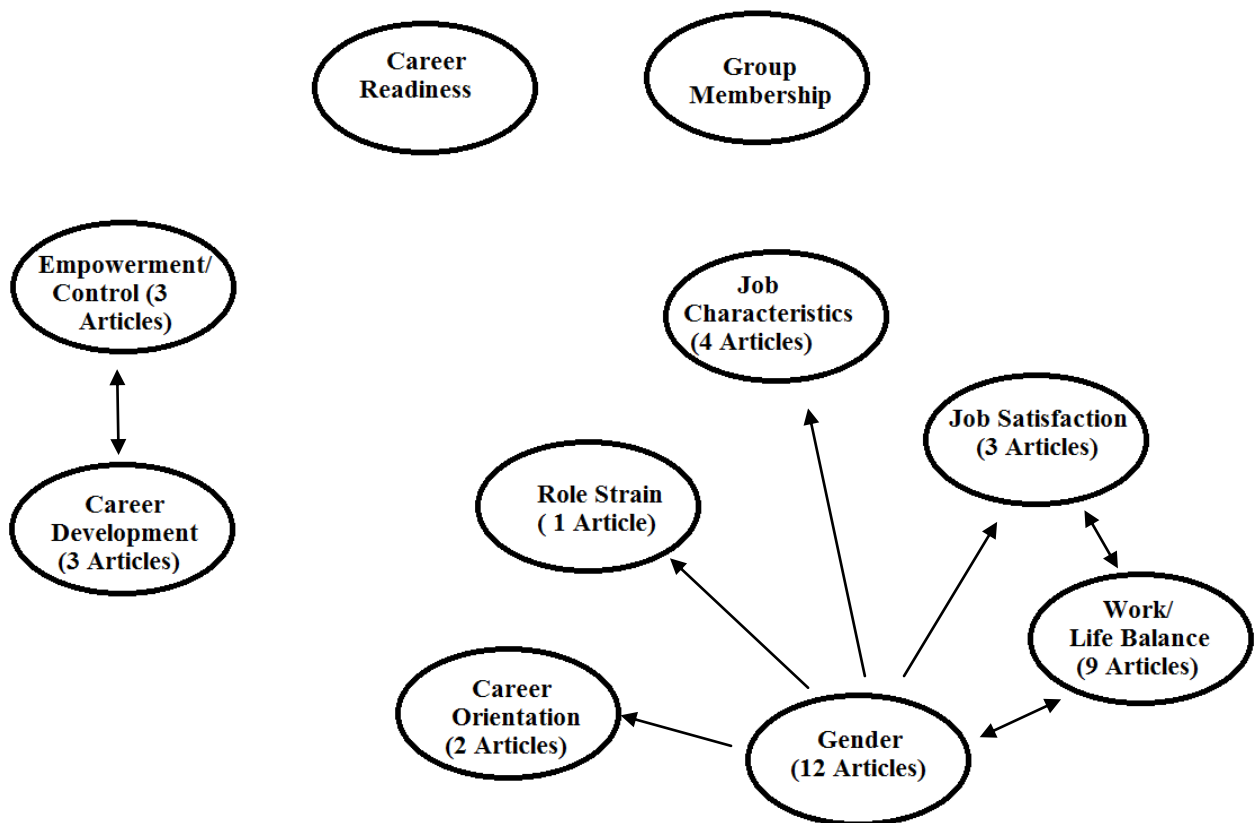
4.4   Summary

This chapter provides a review of the results from this investigation. Various

methods are used to demonstrate themes identified in the literature. The analysis

indicates that job satisfaction is the most prominent theme identified in the literature.

Further, the results suggest that data regarding the impact of information technology on

careers comes from a wide range of disciplines and covers research spanning more

than six decades. Job satisfaction has links to other themes identified as illustrated

though the use of nomological networks. Clearly, understanding the interconnectedness

of ideas and themes is critical for comprehending the impact of information technology

on careers.

Chapter 5: Discussion and Conclusion

The previous chapter presented the results of the analysis of the 48 articles that were gathered. This chapter critiques the methodology of this study, examines the wider implications of the findings, puts forwards avenues for further research, and concludes with a summary of the study. An effort is made to demonstrate the full implications of information technology on careers as currently illuminated in the literature.

5.1 Gaps in the Literature

The gaps that exist in the literature stem from the lack of synthesis and cohesion among different constructs for examining career anchors and career identity. For instance, the current data clearly demonstrates that career anchors and career identity are heavily influenced by satisfaction as a result of the introduction of information technology in the workplace (Wall et al., 1987; Baxter, 1990; McHugh, 2004; Wagner et al., 2008; Diedericks & Rothman, 2014). This suggests that when information technology is introduced, this variable will have a significant impact on job satisfaction which will, in turn, impact career anchors and/or career identity. Although other variables were identified along with job satisfaction, between 2005 and the present, gender became a prominent issue shaping understanding of career anchors and identity as they relate to information technology. The prominence of job satisfaction remained during this time period but no effort was made to integrate gender and job satisfaction in relation to the topic.

Similar observations can be made with regard to the issue of work/life balance, career readiness, role strain, empowerment/control, group membership, and job characteristics. What is revealed through this analysis is that there are a number of

salient variables which can and should be considered when examining the impact of information technology on career development. Even though these themes are present, there is a dearth of research which effectively integrates these issues and attempts to evaluate the topic comprehensively. Clearly the impact of information technology on careers is a detailed and complex subject. However, the identification of variables impacting the topic needs to be taken into consideration when evaluating the current research and identifying where current gaps exist.

Gaps in the literature can also be seen, to some extent, in the context of the research traditions used for the development of research on the topic. As noted in Table 8, the majority of studies conducted on the topic have focused on the impact of information technology on careers from the standpoint of the organization and implications for how managers should provide supports for employees in the wake of this type of change. Although this insight is needed to facilitate the ability of managers to provide support for employees, there is a dearth of research which comprehensively and effectively details the issue from the viewpoint of the employee. Without clarity regarding how information technology impacts the employee—especially in light of recent studies which indicate issues such as gender and work-life balance impact outcomes—organizations could not possibly understand the phenomenon enough to address it through relevant policies and practices to strengthen career anchors or build career identities.

A comparison of the methods used in the research is also helpful to identify current gaps in the literature. A critical review of the methodologies employed suggests that most of the studies conducted on this topic involved descriptive approaches which

primarily sought to demonstrate correlations among the data. The use of descriptive

research can be seen throughout the literature. Buchanan and Boddy (1983) used this

method in an effort to understand the implementation of technology on the quality of life

for biscuit makers while Golden (2013) used this approach when attempting to evaluate

how individuals structure their home and work lives around new technologies.

Descriptive analyses provide a bulk of the methods used to conduct research on this

topic.

The samples used for the development of the research varied. In most instances

data was collected from primary data sources including those directly impacted by

technology. Examples include: biscuit makers (Buchanan & Boddy, 1983), journalism

and communication faculty (Beam et al., 2003), research and development personnel

(Bigliardi & Dormio, 2009); engineers (Birgitta, 2013); information systems personnel

(Igbaria et al., 1991; Creapeau et al., 1992; Diedericks & Rothmann, 2014), and court

workers (Jarvenpaa, 1997). Overall the samples involve diverse employees from a wide

range of organizations indicating that efforts have been made to understand the topic

from a number of different industries and careers.

5.2 Future Research

Arguably, the current gaps in the literature are extensive. However, these gaps

do provide a foundation for conducting future research. In particular, the gaps suggest

that more information regarding information technology and its impact on career

anchors and career identity is needed from the perspective of the individual employee.

Few case studies have been published in the literature and there is a paucity of

qualitative data which outlines the experiences of individuals as they integrate

technology as part of their careers. Based on this realization future research should include a qualitative design utilizing an inductive approach to build theory which incorporates relevant themes such as job satisfaction, gender, and work-life balance to acquire a complete understanding of how these issues shape outcomes for the employee. Research acquired from this type of research would provide organizations with a better understanding of how to address changes caused by information technology in practice, establishing relevant supports for the employee.

The use of qualitative frameworks to examine employee reactions to information technology may also provide insight to additional variables which should be utilized as a foundation for understanding the topic. Career anchors and career identity are important concepts for building management practice and for meeting the needs of employees. Even though efforts have been made to review these topics in practice it is evident that more research would broaden the field and provide access to new information that could be useful for understanding the impact of information technology on careers. Qualitative studies are thus needed to achieve this goal.

The current literature on this topic further indicates that there are a broad range of descriptive correlational studies which have been conducted in different industries with results suggesting similar outcomes. Given the homogeneity of this data, a meta-analysis may also provide a viable suggestion for future research on the topic. Results obtained through correlations could be statistically compared to determine effect sizes and provide a more comprehensive assessment of the strength of relationships between variables this may enable the researcher to rule out certain variables and to

support others as a recognized foundation for shaping careers as a result of the introduction and advance of technology in the workplace.

While these particular areas are worth investigating, it is also important to note that the changing role in technology may have implications for the study of this topic. In particular, the concepts of digital natives and immigrants has some relevance for understanding this proposed area of research. Digital immigrants are individuals who did not grow up with technology but rather have learned to use it as a result of changes in society, education, and the workplace (Kirk, Chiagouris, Lala & Thomas, 2015). Digital natives, on the other hand, are individuals that have grown up with technology and have never known a time before the internet and personal computer (Kirk et al., 2015). The differences in the life experiences of these individuals may have implications for how careers are viewed based on the impact of technology. For digital natives, the introduction of technology in the workplace may not have as significant of an impact on how these individuals view career anchors and career identity.

The changing nature of worker exposure to technology would have notable implications for reviewing the literature on the topic and for developing research questions. Rather than seeking a direct shift in career anchors and career identity, it may be more useful to examine whether or not a shift occurs and if that shift is as dramatic as what has been reported in the literature of other generational cohorts. Overall, it is evident that this would create multiple opportunities for examining the literature and conducting empirical research to understand generational differences and to asses if concepts of career anchors and identity are even relevant to digital natives when it comes to shifts in technology in the workplace.

Future research should also consider the pervasiveness of technology in society and its implications for creating more on-demand and freelance workers. Technology has become a pervasive part of modern society changing the employment relationship and the way in which employees are monitored and controlled by the organization. Further, technology has increased the mobility of employees, creating a situation in which many individuals will not hold the same job until they retire. This may influence the willingness of employees to acquire a broader range of technological skills in order to remain competitive in their industry. These topics also provide an important foundation for understanding how information technology is shaping careers and needs to be addressed in order to provide a full understanding of the topic as it relates to the modern business environment.

5.3 Limitations

The research is limited by the number of studies included and the number of databases employed for the research. As noted when reviewing the methodology a large number of databases were selected for identifying relevant articles. However, there are additional databases and print sources that were not considered due to lack of access. Additionally, it was noted in the methodology that only the first 100 articles for each of the searchs were reviewed. This was done in an effort to make the review process more amenable for analysis. A further examination of all the articles identified may have allowed for the identification of additional themes or additional articles supporting the themes identified.

5.4 Conclusion

These findings have important implications as organizations seek to expand the use of technology within the organization. Clearly, efforts are needed to systemically understand satisfaction as it relates to the supports needed by workers to adopt new technology in the workplace. Leaders and managers must be aware of what specific challenges may exist before the implementation of technology and what specific steps can be taken to mitigate outcomes once the technology is introduced. This finding thus has notable implications for shaping how organizations proactively address technology use within the organization.

The importance of this data must be recognized in the context of information technology and careers and the link between these variables and career anchors and career identity. The research provided in this investigation suggests that career anchors and career identity are influenced by a number of different variables including job satisfaction, gender, career development, work-life balance, career readiness, empowerment, group membership, job characteristics, and career orientation. All of these variables appear to shape the way that the individual views his or her career in the wake of the introduction of technology. These themes therefore have notable relevance to understanding how technology shapes careers technology clearly has a significant impact on the employee leading to changes in views regarding career anchor or identity.

Organizations can control some of these issues (work-life balance group, membership, job characteristics). In other instances organizations can be aware of the issues to assess workers, determining how to mitigate career development in the wake of technology (e.g., gender, career readiness, empowerment, career orientation). What

this indicates is that the themes identified help to operationalize efforts to mitigate the

relationship between information technology and careers. With these issues in mind, a

structured plan for addressing these issues in practice can be developed and

implemented by the organization.

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