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**Will the Internet of People, Things and Services (IoPTS)  
be too much of a good thing for sustainable career management?**

**Abstract**

This study will explore how the Internet of People, Things and Services (IoPTS) provides both opportunities for advancing employees' careers, as well as potential concerns that employees will need attend to as the IoPTS inevitably becomes a common part of the career and technology landscape. A sustainable careers framework will be offered to help explain how IoPTS plays a role within the individual career management ecosystem. The *Too Much of a Good Thing* (TMGT) effect will also be introduced and applied to investigate what may happen when high usage levels of the otherwise benign IoPTS occur. Propositions will be offered broadly focusing on the following research question: will the IoPTS be *too much of a good thing* for individual career management leading to unexpected and undesired career outcomes? Future research opportunities are offered, along with practitioner realities that should also be considered.

## **Introduction**

This study will explore how the Internet of People, Things and Services (IoPTS) provides both opportunities for advancing employees' careers, as well as potential concerns that employees will need attend to as the IoPTS inevitably becomes a common part of the career and technology landscape. The Internet has increased our ability to interact with other people, and for sharing career-related information and services globally. We are enabled to work collaboratively over long distances, and increase our scope of learning. But what will the IoPTS enable as it regards possible effects on individuals' career management? Will the IoPTS allow individuals to pursue sustainable careers, in that they will maintain work patterns over time, and across multiple social spaces or contexts (work, home, and leisure)? These patterns may create individual agency and provide meaning to each career actor.<sup>1</sup> A sustainable career theoretical framework allows us to more broadly view the effects of IoPTS on individual career management. Since sustainable careers consider varied social contexts, career longevity, and employability, it honors the concept of boundarylessness, in that self-directed career actions and agency supersede the organization's structural boundaries. Sustainable careers also build on boundaryless career theory in that it considers independence from, rather than dependence on organizational structures for career building.<sup>2</sup> Additionally, sustainable career theory expounds on protean career theory in that the central decision maker is the individual, recognizing his/her ownership and meaning attached to a career.<sup>3</sup> Since sustainable careers incorporate this multi-dimensional approach to careers, with its unique foci on work continuity and allowing for amorphous social space, it is applicable to helping us to understand the context within which IoPTS will affect individuals' careers management.

Sustainable career theory recognizes today's highly individualistic socio-economic climate and simultaneously notes the broader life context, organizational and societal context<sup>4</sup>, and therefore considers the impact of technology like IoPTS as part of a career ecosystem. This blends the best interests of employer, employees and society in a balanced fashion. Sustainable careers create flexibility and promote well-being.<sup>5</sup> Career sustainability is not just being employed, but "...maintaining employability by accessing opportunities for career and personal development."<sup>6</sup> IoPTS is a technological innovation that supports career sustainability.

A sustainable careers framework will be offered to help explain how IoPTS plays a role within the individual career management ecosystem. The *Too Much of a Good Thing* (TMGT) effect will also be introduced and applied to investigate what may happen when high usage levels of the otherwise benign IoPTS occur. Propositions will be offered broadly focusing on the following research question: will the IoPTS be *too much of a good thing* for individual career management leading to unexpected and undesired career outcomes? Future research opportunities are offered, along with practitioner realities that should also be considered.

### **IoPTS model**

The IoPTS is defined as an internet of people (IoP), things (IoT), and services (IoS) where people, things or physical objects, and services are seamlessly integrated into a network of networks, otherwise known as the "internet of everything." This environment enables actors to exchange digital data about themselves and their surrounding environment over a web-based infrastructure.<sup>7</sup> Conceptually, the IoPTS can be viewed as overlapping constructs each to another, allowing both individuals and employers to access and share various types of

information and make data-based decisions. The IoPTS is positioned on the framework of sustainable careers because as that theory suggest, we need to consider the ubiquitous social space career actors are working within towards continued employability. Today's employers and employees use IoPTS at every turn to enable this environment. Figure 1 represents those relationships.

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Insert Figure 1 about here.  
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The IoPTS model sets the stage for how individuals' careers can be impacted today. The model posits that each segment of the IoPTS, the IoT, IoP, and IoS, overlap each other such that the "internet of everything" is more unstructured than binary. At the model's intersection, there is a need for high levels of security, trust and privacy. When personal or organizational information is shared via IoT devices or within IoS, these systems require a high level of security, as these data are usually needed to be maintained with high levels of privacy and trust. Regarding career management, an example of needed trust includes employees who trust HR professionals to treat yearly evaluative information with respect and to disclose only to necessary management. Another example of privacy would be employee's health or salary information which would be accessible by HR professionals, but is not necessarily needed by others in the firm. It would be expected that in the IoPTS career ecosystem, high data security is ever present, and high levels of trust and privacy would be indicative of how 21<sup>st</sup> century organizations maintain and share digital information. The following sections will discuss each segment of the IoPTS, and the

opportunities (and possible problems) that the IoPTS will create for individuals' career management.

### *Internet of Things*

The Internet of Things (IoT) is a web-based architecture connecting technologies together to perform actions as a way of stitching together various data to do something new with that information.<sup>8</sup> The IoT represents the connecting of physical products on a multipoint basis and exposing them to digital applications. This enables the IoT to collect and share data directly with other things, people, as well as third-party systems.<sup>9</sup> Examples of IoTs include the 45 million wearable devices and fitness trackers bought in 2015 by consumers. Demand for these devices is expected to grow by more than 45 percent annually through 2019, becoming one of the fastest-growing technology markets. While most of us are familiar with the Fitbit and Garman wearable devices, analysts suggest that IoT wearable technology will not only demonstrate value in personal fitness but may also play a huge role in business applications, potentially as much as 60 percent of the market.<sup>10</sup> Some career management examples include:

- The National Basketball Association (NBA) has been using IoT technologies to track and screen player performance and gather statistics.<sup>11</sup>
- The IoT can provide performance data to employers and HR managers simplifying the entire performance evaluation and appraisal process by making it streamlined and more accurate.<sup>12</sup>
- Sensors in lanyards act as identification badges allowing employees entrance to various buildings and rooms within the workplace.<sup>13</sup> Employees working shifts can clock in and out at exact times and can be automatically tracked leading to error free calculations of

work hours resulting in accurate payroll processing. Similarly, shift workers can be notified via a text on a smart phone when it is time to clock out.

### *Internet of People*

The Internet of People (IoP) was originally conceptualized as “...people equipped with human-implantable RFID tags will become part of the ubiquitous network.”<sup>14</sup> However, the IoP is increasingly overlapping with IoT such that data is gathered from a variety of sensors, and organizations may capture data which is in both the employees’ as well as management’s best interests. This data is allowing companies to gather people analytics.<sup>15</sup> This data may be descriptive, predictive or prescriptive in nature.<sup>16</sup> The idea of gathering data about employee performance is over 100 years old, stemming back to industrial psychologists and Frederick Taylor in the late 19<sup>th</sup> century. However, the idea of gathering data from devices employees may wear or attach to themselves is new, and allows for gathering data on employee engagement, workplace health and wellness, performance, and other work-related activities. HR professionals are finding ways to use people analytics to understand data that was previously unavailable to managers and employees, allowing companies to use a greater range of information which may help improve the business’ performance.<sup>17</sup> HR managers note that 77 percent of all organizations are moving towards greater use of people analytics.<sup>18</sup> Specific use cases include the following focused on improving productivity, hiring, and retention:

- The profiles of top insurance salespeople have been analyzed, and it is now passé to screen candidates for grade point average or academic pedigree since that data is no longer a strong indicator of future sales performance.

- Data from the characteristics of top salespeople in software companies, retail banks, and manufacturers was analyzed to reveal that personal networks, internal interactions with other employees, and the time salespeople spend with their customers predicted positive results much more accurately than the amount of sales training received or experience.
- A technology company has developed a recruiting analytics model that accurately predicts candidates who are likely to become “toxic employees,” defined as those who are more likely to lie, cheat, or commit crimes, and has dramatically reduced this population from its hires by scrutinizing data from the interview process.
- Several companies are collecting data from LinkedIn and other social networks, and are creating predictive models, to forecast high potential employees who may also be highly likely to leave the organization.
- Companies are gathering data regarding office environments which have larger shared workplaces, more natural light, and more inter-office collaboration, as these workplaces result in higher levels of retention and productivity.<sup>19</sup>
- Humanyze is a company gathering employee behavioral data from its customers via a smart badge built to look like a smart phone with a microphone, accelerometer, bluetooth connection and other tools typically found in a smart phone. This device measures how employees moved throughout the day, with whom they interacted, what their tone of voice was, how they listened (or if they did not listen but spoke over others), and other types of customer interactions that happen every day. Humanyze also asked their customers to provide key performance metrics, such as sales or customer service completion times to compare against the behavioral data.<sup>20</sup>

For these processes to work, companies need to take privacy into account. Employees must know in advance exactly what's being tracked and analyzed. Managers should make employee participation optional. In that way, IoP analytics will include data from employees who do not feel they have been pressured into contributing.<sup>21</sup> With so much data potentially available from employees' wearables, HR professionals could aim to create more pleasant and efficient work environments by looking at productivity data, patterns of communication, how teams work effectively together, and employee need trends. From a career management standpoint, the IoP can assist in quantifying employee successes in the workplace, communicating that data in career portfolios, in addition to interacting with colleagues around the globe. IoPs may support a sustainable career and employability. But certainly, there are costs to giving management access to levels of personnel data may compromise trust and privacy.

### *Internet of Services*

The Internet of Services (IoS) is defined as “...next-generation services provided over the Internet.”<sup>22</sup> An overlap between the IoT and the IoS allows employers to gather data from IoT sensors to create actionable intelligence which managers may use in the future. IoS may allow organizations to create service ecosystems whereby resources (tangible things, or intangible knowledge, skills and abilities of employees) can be combined and integrated to enhance a business's viability. Examples of the overlap between IoT and IoS include software companies using technology which will enable people to make more informed decisions by analyzing and creating heuristics with the help of big data.

- A company named Parsable has developed mobile applications for front-line and field workers in the oil- and gas-services industry. This technology provides immediate

feedback on needed training, safety, and logistic support via applications on mobile smart phones to improve worker performance and drive productivity.<sup>23</sup>

- VirginPulse and Limeade encourage employee wellness engagement holistically. Embedded technology, along with expertise in motivation, competition and team building, is offered as these companies help to deliver service solutions which drive improved individual health and wellness outcomes, as well as company productivity and results. Organizations which integrate VirginPulse and Limeade solutions into their workforce report improvements in retention, absence rates and overall employee engagement, which research suggests positively impact organizational performance.<sup>24</sup> These applications certainly support a sustainable career and work-life balance.
- Another example is a future IoS offering of holoportation that Microsoft Research is developing. Holoportation is a virtual or augmented reality which will allow people to communicate in 3D, making Skype and other forms of videoconferencing look ancient.<sup>25</sup> Holoportation may allow HR professionals to interview candidates at a distance, and see and hear both verbal and non-verbal cues. It may also allow groups of individuals around the world to work together, by communicating and networking, as if in the same space.

These IoS examples create intriguing possibilities, but also share the concern of trust and privacy of the employee's data. Employees don't want something as simple as their need for training (knowledge deficiencies) or as complicated as their health status to be in the hands of individuals who might exploit that information. Additionally, the use of holoportation for interviewing candidates may cause some communication issues or possible virtual discrimination (based on

age, gender, ethnicity, ability to use technology, etc.). In these cases, IoS may cause concern for employees and their career management actions.

### **Will IoPTS be TMGT? Future Research Propositions**

While there are many opportunities that IoPTS allows for individuals to manage careers, the technology associated with IoPTS allows for constant 24/7 accessibility, invasive employer access to employee data and behavioral scans, and real time analysis and action. So will IoPTS become too much of a good thing in the future? As we see from the stress literature, excessive amounts of a variable may result in conditions in which stressors result in lower levels of accrued benefits or enhanced concerns, and therefore may have detrimental effects to one's career. The *Too Much of a Good Thing* effect will be discussed so that we can understand under what conditions IoPTS results in positive outcomes, and when increasing amounts of IoPTS becomes too much to handle.

To achieve happiness and success, individuals are advised to nurture values at the mean between deficiencies and excesses.<sup>26</sup> Accordingly, much of the psychological research has focused on demonstrating well-being and performance as a result of positive traits and experiences. Yet, other researchers have noted positive relationships may reach context-specific inflection points after which the relationship often turns negative, resulting in an overall pattern of inverted curvilinearity. This phenomenon has been called the *Too Much of a Good Thing* (TMGT) effect.<sup>27</sup> Several studies have brought credence to this inverted U-shaped phenomenon, and results have consistently found job performance and work satisfaction was highest when employees reported moderate levels of stress.<sup>28</sup>

Given this phenomenon and its resultant outcomes, it is contended that IoPTS can have both positive and negative effects on career management. Stress researchers have demonstrated each person has an optimal tipping point, above and below which the person does not perform as well as he or she does at the inflection point.<sup>29</sup> When increasing levels of stress are experienced from moderate IoPTS usage, the individual may experience positive outcomes. For example, when individuals use IoTs for communicating, networking and advancing one's career (smart phones using social network media applications) in moderate amounts, IoTs can result in eustress and create many positive career experiences (job opportunities, learning about corporate cultures, connecting with colleagues, friends and family, etc.). As the individual experiences excessive levels of stress associated with IoPTS usage, which may become intolerable and create distress, he/she moves across the tipping point of the inverted U-shaped curve, resulting in less desirable career outcomes. For examples when employers require employees to work, answer calls or emails, using smart phones on personal time, this IoT usage may become extreme (i.e., employees feeling they are working 24/7) causing employees to experience work-related stress and other emotional and physical concerns which may negatively affect one's career.<sup>30</sup> Individuals might experience bias in future promotional opportunities because management may construe lack of interest in working 24/7 as lack of interest in furthering one's career. In fact, legally, employers may have to pay employees for work activity on personal time, otherwise known as suffer or permit to work.<sup>31</sup>

The question becomes under which conditions individuals experience eustress from IoPTS use, compared to others which may be experiencing distress. Certainly, one's individual differences

associated with career aspirations, age, gender, race, or career stage may impact IoPTS usage enabling eustress, or creating distress. Studies, particularly those from the work-life integration and the job demands-resources literatures,<sup>32</sup> suggest work demands may be handled if met with sufficient resources, thereby also impacting these relationships. Given the paucity of studies on IoPTS and its outcomes, the following propositions with posit relationships with IoTs, therefore:

Proposition 1: IoT usage will increase employees' career management opportunities to (a) access job opportunities, (b) gather information about potential employers, and (c) network with friends, family and colleagues regarding job opportunities.

Proposition 2: When employees using IoTs report moderate levels of stress, employees will experience high levels of (a) well-being, (b) job performance, and (c) work satisfaction.

Proposition 3: When employees using IoTs report excessive levels of stress, employees will experience low levels of (a) well-being, (b) job performance, and (c) work satisfaction.

Proposition 4: Employee variations in career aspirations, age, gender, race, or career stage will differentially affect IoT usage and job stress.

Proposition 5: Employee variations in work-life support resources will differentially affect job stress.

In sum, future research may lead to practical conclusions for employees embracing IoPTS usage, and therefore should investigate the relationship between IoPTS use, individual career management outcomes, and the stress that may lead to positive, as well as negative, outcomes.

## **IoPTS & Career Management Practitioner Research Opportunities**

The Internet of People, Things and Services will create innumerable opportunities for individuals' ability to manage their careers. It is also clear that IoPTS usage will become more rampant not less. Career management is changing and practitioners need to manage their sustainable careers within the new IoPTS ecosystem. While the IoS systems available are providing digital services that are increasingly part of our lives at home (i.e., systems that change lighting or music in your home, or buy products from Amazon), these systems will soon define career management in the future too.<sup>33</sup> Some specific areas practitioners need to pay attention to, and researchers should measure, include the:

- Effect of IoSs on the recruiting and selection process.
- Use of IoTs, such as videoconferencing or holoportation, during the interviewing process.
- Use of IoTs to gather data that will impact performance management.
- Use of performance management IoSs that will be closely tied to compensation and benefit management systems.
- Effect of IoTs, such as videoconferencing or holoportation, on training and development experiences of employees.
- Effect of IoPs which may impact networking and other career development opportunities, such as e-mentoring.
- Effect of excessive use of computers (IoT) which may create physical and emotional strains.<sup>34</sup>

These issues suggest that information offered to the employee within the IoPTS ecosystem can only aid in informed career management decision making.<sup>35</sup> As more workplaces become knowledge-based environments, companies will experience the tension of allowing employees to

work together effectively, while allowing them to do their jobs from almost anywhere. These may all be benefits of managing one's career within the IoPTS.

The IoPTS also may have detrimental effects on individuals. Researchers might investigate whether discrimination has become more common (or at least more measurable) or not, as HR professionals actively use IoSs to weed out job seekers. Additionally, much has been written in the work-life balance literature about negative effects of working from home and lower advancement potential.<sup>36</sup> Researchers might consider the effects of IoTs on flexible work schedules and locations, and possible detrimental effects on career progression. Finally, much has been written about the physical strains associated with constant computer usage, and researchers may continue to investigate those who work from home and possible health outcomes.<sup>37</sup> Researchers will need to investigate at what point IoPTS usage becomes too much of a good thing as it regards employee health, wellness, performance, and career development and advancement potential. Both employees and employers will gain much from this shared knowledge and thus a sustainable career workforce will be enabled.

## **Conclusion**

This study has reviewed the IoPTS ecosystem and its effects on employees' career management. An IoPTS model, based on sustainable career theory, is offered. The importance of sustainable career theory, while considering the work continuity and social space important for employability, calls for the inclusion of IoPTS usage and its relevance to career management. The TMGT phenomenon was introduced as a possible guideline within which both opportunities and disconcerting concerns of IoPTS usage should be considered. The TMGT phenomenon tells

us that employees might experience extreme levels of stress, and hence fewer benefits, if they experience IoPTS in uncomfortable amounts. This phenomenon can be managed properly when various individual and organizational supports come together. But, there are many questions associated with IoPTS usage and its career outcomes for which we do not yet have answers. Propositions are offered, and future research needs to investigate the effects of IoPTS on employees and their career management. HR practitioners also need to deal with IoPTS and effects on both the organization and employees. Therefore, this area is ripe for researchers to investigate IoPTS and its effects on sustainable career management. While we know that the IoPTS is relatively new and growing, and will create an inordinate amount of opportunities, it also will create an environment within which the employee might experience significant career change. This study aims to structure a research agenda to investigate the effects of IoPTS on individuals' careers.

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