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INCENTIVISING THE GENERATION OF IP PROTECTABLE MATERIALS IN THE WORKPLACE: THE CASE OF FINTECH COMPANIES IN ZIMBABWE

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN INTELLECTUAL PROPERTY IN THE COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

2021

ABSTRACT

Employed creators and/or inventors are key contributors to the generation of intellectual property (IP) protectable material in innovations commercialized by organizations that employ them. Rights in the IP for works generated under hire more often are assigned to the organizations which enjoy economic benefits from commercial exploitation of the IP's. That creates a lacuna with regards the incentive effect of the IP system to individual contributors in the generation of IP in the course of employment. The study explores how organizations in the Fintech sector in Zimbabwe are incentivizing the generation by employees of IP protectable material and how that fits in within discourse on the framework of the IP system. Thus, as a primary objective the study investigated if there are companies in the Fintech sector in Zimbabwe that are giving incentives to their employees for generation of IP work. It also evaluated if there is increased generation of IP material in companies that give incentives as compared to those that do not. The study further examines which incentives are given and whether the types of incentives have an impact on the generation of IP protectable material. It then endeavored to suggest strategies for the generation of IP protectable materials from lessons learnt from the case of Fintech companies in Zimbabwe. Anchored on some mix of economic and labor theories which place premium on the incentive function of IP as well as the critical theory that interrogates other disciplines which account for motivation and human behavior, the study explores the debate in literature on the interplay between extrinsic and intrinsic factors to motivation of employees. The research being empirical in nature it adopts a combined quantitative and qualitative approach. Primary data was collected through questionnaires administered to a target population selected by random sampling. Findings confirmed the proposition that people respond to incentives and hence it is important to pay the proverbial piper, albeit that on a more philosophical level the participates evinced that they are driven as well to create/invent by other more intrinsic factors beyond just their felt need for extrinsic incentivizes. Nevertheless, a key conclusion to the study is that it is necessary to incentivize the generation of IP material by employees through financial rewards, mixed with other non-monetary forms of incentives for good effect. It also notes an interplay between extrinsic and intrinsic motivators in incentivizing the generation of IP material and goods.

Key Words: Incentives, employed inventors/creators, generation of IP material, intrinsic, extrinsic.

DECLARATION PAGE

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

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ACKNOWLEDGEMENTS

This work is the result of research and writing that involved some numerous very amazing people who showed immense concern, direction and encouragement.

I must thank God for His strength and mercy.

I am sincerely grateful to Africa University staff, a special mention of my supervisor Professor C Ncube, for assessing my work to the standard required for a Master's Thesis. I also must mention the efforts of Mr G. Mandewo, MIP coordinator and lecturer for his zeal which kept us on our toes. Like it is with any form of discipline we despised him for it but with the benefit of hindsight wisdom we appreciate his determination and extreme patience in pushing us to meet deadlines.

I would like to thank my partners and colleagues at Scanlen & Holderness for their forbearance, support and encouragement towards my academic endeavour. I am thankful to my fellow classmates and study partners for the insightful observations and their peer review. I must mention a few other individuals like Tapiwa Makoni, Craig Chibage, Mc Donald Zihanzu, Lloyd Mashayamombe and Kundai for their help in data collection, and Gerald and his team for their invaluable input in organization and analysis of data.

DEDICATION

To my loving wife whose unfailing support I am grateful for, to my adorable son who cheered me on, and to my ever-supportive mother whose prayers I am much indebted.

LIST OF ACRONYMS AND ABBREVIATIONS

ARIPO	- Africa Regional Intellectual Property Office
ATM	- Automated Teller Machine
Fintech	- Financial technology
IP	- Intellectual Property
IPRs	- Intellectual Property Rights
ILO	- International Labour Organization
SMEs	- Small and Medium Enterprises
TRIPS	- The agreement on Trade Related Aspects of Intellectual Property
USA	- United States of America
UNDP	- United Nations Development Program
WIPO	- World Intellectual Property Organization
ZIPO	- Zimbabwe Intellectual Property Office

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CHAPTER 1 INTRODUCTION

1.1. Introduction

This chapter provides an overall framework for the dissertation which guides this work. It gives a background to the study and defines the problem statement. The chapter will also outline the purpose and objectives of the study as well as set out the research questions. An explanation of the significance of the study follows whereafter a delimitation of the research and what limitations affect the study are also given.

1.2. Background to the study

The generation of intellectual property (IP) which can be protected through various intellectual property rights (IPRs) enriches both the inventor and the public. New drugs, faster computer chips, more productive crops, and safer cars can result from an idea or years of sustained, methodological research brought to the market with the expectation of profit (De Vore, 2015). The generation of such new ideas or inventions is synonymous with innovation, and thus the creation of IP or inventions stands at the beginning of IP protection through the various IP tools available. Put in other words before IPRs are considered, eligible IP goods/products or services which warrant protection through IPRs should have been created or authored.

IP is generally considered as a driver of innovation in the sense that it provides an incentive framework in which innovation is not only protected from invention to

commercialization of a new product or service but also encouraged or incentivized. Innovation takes many forms including and more particularly introducing or creating a new technology or creatively solving a technical problem. Invention which IP is concerned with is the bedrock of innovation. The two terms are in economic studies often treated as synonymous though technically they can be distinguished in that while innovation refers to the entire value chain for commercialization of new ideas, invention *stricto sensu* is confined to the generation of a new idea aimed at solving a technical problem. Not all inventions are commercialized thus not all inventions result in innovation (WIPO, 2005).

The IP system plays a significant role in facilitating the successful introduction of innovative products in the marketplace from the time a novel idea is conceived, followed by research and development ending in the launch of a new product. While the IP strategy may vary, the constant is that the IP system remains a valuable tool. From the moment the innovation is still just an idea it must be kept a secret particularly where patent protection is envisaged and where the chosen form of IP protection requires confidentiality, and hence trade secret protection is relevant especially at the inception stage. For an idea that may result in a patentable invention, the final choice between either the trade secret route or the patent route for protection would be a strategic business decision taken at a later stage when the product is developed. Even then technical drawings and know-how would require protection through trade secrets and in addition through copyright which also is relevant for protection of software. Suffice to say patents are of particular interest to innovations in that they serve to protect new solutions to a technical problem by ensuring that those inventors whose technologies are truly groundbreaking and commercially

successful can control the commercial use of their inventions. IP protections recognize and reward inventors for their commercially-successful inventions, and as such they serve as an incentive for inventors to invent. When marketing the eventual product other IPRs can also be used to protect a new technology, product or service such as design rights and trademark or a combination of patent, industrial design and trademark. Nevertheless, as intimated already patents and perhaps trade secrets are by far the most important IPRs related to innovative activity followed by copyright to the extent that it is used in some jurisdictions Zimbabwe included, to protect software and computer programs. Thus, generally speaking innovation and IPRs may sometimes be loosely considered to be two sides of the same coin. There may of course be some industries that do readily innovate without reliance upon or enforcement of IPRs.

Innovation drives economic development and prosperity. The Reserve Bank of Zimbabwe noted that the world has experienced a proliferation of technology and innovations that have significantly altered the digital landscape and the way in which economic agents offer services and products (The Reserve Bank of Zimbabwe n.d.). It observed that the financial sector is leveraging on these technological innovations to improve efficiency, lower the cost of financing and improve convenience, speed of service delivery and quality of information provided to users of these services. It remarked that Zimbabwe has witnessed a fair share of Financial Technology (Fintech) growth in several areas, especially in insurance, payments and trading, including the revolution in crypto currency. Some of the notable innovative services and products include mobile money, electronic platforms (such as Zimswitch, Payserv, Paynow money), switch and the like. The market for fintech in Zimbabwe could be very large. The lack of liquidity over the last few years

has resulted in a sharp increase in the use of digital payment systems (FSD Africa, 2020). The population is relatively young and literate and yet often excluded from the formal financial system. Innovations in financial services can among other things help expand the scope of financial services to new customer segments, thus acting as a driver of financial inclusion. Technology innovations in financial services can make financial services more efficient and responsive to the needs of the market. It can reduce costs and make products more affordable.

Suffice to say that in most cases such innovations and inventions though generated by employed creators and inventors, are owned by companies which for the most part are the ones that enjoy protection and benefits derived from IPRs in the protected works. This is because the employees would have generated such works in the course of their employment and they would generally not enjoy IPRs in the work due to the operation of what is known as the work for hire principle which operates to preclude them from exercising formal economic rights in it. IP laws having been designed to encourage and reward inventive creativity through exclusive rights in the invention, one cannot overlook the question of how such contributors to the generation of IP can in that context and in the circumstances, perhaps within the framework of the IP system as well, be incentivized to generate IP goods/products and services.

Companies, organizations and corporations tend to put in place employee compensation and/or benefit sharing schemes to incentivize, that is to say to stimulate, recognize and reward those of its scientific and technical professionals who make substantial contributions to product innovation at the company. In some places in the world such

compensation or benefit sharing schemes are recognized by national laws. These scientific and technical employees are what Florida (2002) identified as the 'creative class' - creative and knowledge-based workers who are a leading force in economic development because of their ability to spur growth through innovation. He suggested that the key to economic growth lies not just in the ability to attract the creative class but to translate that underlying advantage into creative economic outcomes in the form of new ideas and technologies which may then be protected through IPR's and commercialized. These compensation or reward schemes make up an important part of the organization's value proposition to its technical staff and serve as factors that incentivize innovation and/or creativity necessary to give the organization a competitive advantage.

The beckoning reality discussed above on the imperative upon Zimbabwe to induce innovation and technology to spur economic growth necessitates an analysis of factors relevant to incentivize and foster individual contribution by employees to innovation, research and development and their correlation to levels of inventive creativity experienced by organizations in particular within companies in the fintech industry, that is to say how relevant and effective are they in spurring innovation and inventive activity.

1.3. Statement of the Problem

Patent statistics show that the great majority of applications for the protection of inventions are filed by companies, organizations and corporations, and only a few by individuals. WIPO (2004) notes that there is a shift in the ownership of inventions from individuals to companies and corporations, and that some studies show that over 80 % of

patent applications in industrialized countries originate with employed inventors, while for patents actually granted the figure is even in excess of 90 %. The question is whether since employed inventors/creators receive a salary, they need to be stimulated to create the inventions that they do create, and if so, how should it be done? Vast differences exist in the ways in which various countries handle employees' inventions/creations ranging from very detailed regulations contained in special laws (as in Germany) to no regulations at all (as in the USA) (WIPO, 2004). To better understand if and how in Zimbabwe employees are being incentivized to generate IP and with what success, research was needed on how Fintech companies for instance by way of case study spur creativity and innovation necessary in IP generation among their employees, and if such efforts if any, generally reflect in some experience by those companies of increased levels of generation of IP material.

1.4. Research Objectives

The objectives of this research were:

1. To identify if there are organizations in the Fintech sector in Zimbabwe that are giving incentives to their employees to generate IP protectable materials.

2. To evaluate whether there is higher generation of IP protectable materials in companies that give incentives as compared to those which do not give incentives.

3. To examine which incentives are given and whether the types of incentive have an impact on the generation of IP protectable materials;

4. To suggest strategies for the generation of IP protectable materials by organizations or companies as gathered from the experience of those in the Fintech industry in Zimbabwe.

1.5. Research Questions

The research focused on prevailing norms and practices and their sufficiency to spur and/or unlock the innovative and creative mind in the workplace. As such the research questions posed by the thesis were as follows; -

1. Are there companies in the Fintech sector in Zimbabwe that offer incentives to their employees to generate IP protectable materials?

2. Is there a higher generation of IP protectable materials in companies that offer incentives for generation of the same as compared to those that do not?

3. What form of incentives are given and what sort of impact do they have on the generation of IP protectable materials?

4. What strategies can be recommended for the generation of IP protectable materials in the Fintech industry in Zimbabwe?

1.6. Assumptions/Hypothesis

The study is premised on certain assumptions which are not examined further in the chapters which follow although they may be elaborated upon in some respects in Chapter 2. The assumptions are:

(i) That whether by contract or national IP laws, ownership of IPR's in works created/invented in the course of employment is assigned to the employer.

(ii) As this study is concerned with the generation of IP protectable material, inventions/innovations/creations under consideration are capable of protection through various IPR's. It is assumed that the requirements for protection by means of IPR's exist and are satisfied with respect to the works under consideration.

(iii) Use of the word employer whether in the singular or plural refers to juristic persons as distinct from the natural persons who make the actual intellectual contribution, and from employers whose contribution can only be indirect, for example through resource contributions.

(iv) Although the IP justificatory theories discussed in chapter 2 are open to criticism particularly when they are generalized as they are in this study, they are valid for the purpose for which they are referred. The research will not engage in the respective homilies on each theory which details are the subject of more specialized literature beyond the scope of this study.

1.7. Significance of Study

The significance of the study

1. To Academia the study will enhance understanding of how reward policies and incentive structures and programs can be used to further innovation and thus encourage the production of intellectual goods. It will provide practical and theoretical literature that helps explain factors affecting research and development which is key to creation or generation of intellectual property. It will lay the foundation for future research on a better understanding of what factors are relevant in the discourse on incentivizing the generation of IP by employed inventors.

2. For the researcher the paper makes a contribution towards a greater appreciation on how IP is created by employed inventors and what factors matter to them in spurring their inventive and innovative interest. The research will also help evaluate and assess the levels of inventive activity in Fintech companies in the country and their relation to efforts being made to spur such activity. It will give the researcher some perspective as to why inventors generate IP and what can be done to spur their innovation and inventive activity.

3. To the public, encouraging production of inventive goods is an important part of information policy. The production and commercialization of IP through the

innovative and inventive thrift of creative employees can result in innovative solutions to socio-politico economic problems hence the importance of understanding how innovation can be incentivized. This will matter much in the broader context by the country to stimulate growth of the economy through inter alia innovation and creativity. In such context the study will also contribute towards translating technical findings into necessary and practical interventions to spur inventive creativity necessary in generating IP.

1.8. Delimitation of the study

This research is about the incentive function of IP and its relation to other factors that spur inventive activity by employed inventors in the generation of IP goods or materials. It approached this matter from a concession that in general and save in the limited circumstances provided by some national laws, ownership in the IP generated by employed inventors generally lies with the employer. It does not challenge the legitimacy of either that general view of employer-ownership of IP generated in the course of employment interesting as it may be or of IP as a driver of technological advancement. Rather it discusses the concepts about and potential of reward and recognition through appropriate compensation and/or benefit sharing schemes within the context of the incentive purpose of IP to motivating inventive activity and the generation of IP material. In other words it explores the question whether those that participate in the hunting, *to wit* employees who have contributed to the generation of IP, have not earned a place in the skinning and roasting, *id est* economic benefits of IP, and if that economic view explains if they may feel motivated to want to participate or contribute again. A case study of a

group of Fintech companies was considered without discrimination on their nature, business or size. It has considered perspectives from employed inventors on the subject matter. The study was limited to Harare for practical purposes relating to feasibility in data collection and analysis and costs associated with extending coverage to a vast geographical area. Besides, most if not all major players, in the Fintech sector are conveniently located in Harare. In terms of timeframe the study determined activities of these companies over the past five to ten years.

1.9. Limitations of the study

There were difficulties in collecting data from companies owing to confidentiality agreements that were in place and which tended to constrain potential participants. This created challenges with reliability of data as the researcher was limited to targeted individuals he had access to. The incidence of Covid 19 and hard lockdowns as well as other measures implemented also created special limitations in administering questionnaires and carrying out interviews due to limited physical interaction and employees having to work from home which made it difficult to access them. The target population itself generally has small companies or small teams within larger organizations which limited the researcher to an even smaller sample than he would have desired. There were time constraints owing to the short period allowed for carrying out research coupled with personal work commitments of the researcher. Difficulties in accessing literature was experienced especially as the major part of study was being carried out through distance learning and also given the scarcity of local literature and previous research on the study area. Funding and resources also presented challenges to the researcher.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1. Introduction

In this chapter we turn to consider related literature that has significant bearing on the problem under investigation. The chapter surveys, summarizes, analyzes and synthesizes current knowledge and writings of experts and researchers of note that was available and accessible to the researcher. There is not much available by way of local literature and previous study dealing with the subject matter in Zimbabwe that the researcher could reflect on to understand the experience of technical and inventive employees and what drives them. Hence effort was made based on available information and experiences from elsewhere in so far as it is relevant and applies to the problem at hand.

2.2. Theoretical Framework

Mc Nally (2012) observes pertinently that the question of incentives has traditionally been a topic of concern to IP scholars. IP has traditionally been justified on the basis of incentivizing creative and inventive behavior through recognition and reward and by granting rights to exclude others. Both the utilitarian and labor theories place prominence on the role of incentives to motivate inventive/creative behavior, and thus provide a justificatory theoretical framework for a proper discourse on IP and incentives.

2.2.1. Utilitarian theory and its relevance to the study

Under the utilitarian or economic theory which was championed by economist Bentham and Mill, creators require some economic incentive to create works of the mind and disseminate them. For organization this is reflected in their interest to recover their investment in terms of time, effort and the costs of production which are at risk if copyists who bear low costs of production and thus can offer consumers identical products at very low prices are permitted to undercut them. For an employed inventor this is reflected in his or her interest in some monetary reward or compensation as they want to earn a living from their creative and inventive effort. According to this theory while society benefits from solutions provided by inventions to technical problems, creators of such inventions will do something only because they will get something, it is a *quid pro quo*. The utilitarian theory has as its policy goal the aim to provide the optimum incentive level required to induce the greatest amount of creative and inventive behavior necessary to produce IP goods.

However, a criticism of the theory is that it does not account for other factors that stimulate innovation and creation of IP which are non-pecuniary for instance to satisfy a natural urge or curiosity, necessity or fame to mention but a few. Cuntz (2018) argues that pecuniary incentives and rewards only explains some *(my emphasis)* of the creative activity we observe but not all of it. Mc Nally (2012) agrees and says that inventive and creative behavior has taken place throughout human history and is a natural trait of human species. He explains that IP is produced not only for financial gain but for other reasons as well some of which he identifies as recognition, political and religious ends and altruism. Du Bois (2017) adds to say that there is no proof that only property rights provide the envisaged incentive to create. This is more the case as intimated above that quite often

creators are not owners of property rights and it cannot be told how much compensation would provide sufficient incentive (Ciro, 2005)

2.2.2. Labor theory and its relevance to the study

The labor theory emanates mainly from John Locke's idea that an author has a natural right to the fruits of their effort for having labored upon resources that are either unowned or held in common where the laborer seems to contribute to the value of finished products. Again, it carries the incentive motif in that the creation comes from the effort and creativity of its author who must be entitled as is the case with any other proprietary rights to the enjoyment of the property, to exclude others from using the property without his authorization and to transfer ownership to whosoever he wishes. This incentive is a just desert and therefore the inventor deserves a fair reward. A related concept is to be found in the incentive (reward) theory from proponents like Kant and Hegel which advocates that society has a duty to compensate and reward inventions and creations of intellectual work. However, Du Bois (2017) reasons that both the Labor and the Reward theories share a shortcoming in that they both do not say what the form the reward should take or even whether it needs to be property based.

2.2.3. A blending of the two theories

There is apparently a mixing of the labor and utilitarian theories across all systems of property (Boyle, 1996). Courts in IP cases both acknowledge the role incentives play in encouraging innovative behavior (utilitarianism) and stress the importance of a just and

fair reward to the creator(naturalism) (Mc Nally, 2012). For instance, in Millar v Taylor (1769) the court remarked that it is wise in any state, to encourage letters, and the painful research of learned men. The easiest and most equal way of doing it, is, by securing to them the property of their own works…He who engages in a laborious work, (such as, for instance, Johnson's Dictionary,) which may employ his whole life, will do it with more spirit, if, besides his own glory, he thinks it may be a provision for his family.

In this remark can be gleaned elements of both the utilitarian theory in the thought of the creator of IP protectable material earning financial reward for his thrift, and naturalism in the equitable concept of securing to him the property for his work which is his just dessert.

2.2.3. Beyond Utilitarianism and Labor theories

As perhaps intimated above, common criticism of the ex-ante incentive theory is that it is based on a very specific and narrow conceptualization of the incentive function (Tong, 2016). Conceptualization of the question of incentivizing innovation defies precise disciplinary boundaries of legal and economic theory. Analyzing incentive structures and innovation outcomes utilized by companies to foster innovation is multifaceted spilling over into psychological and sociological considerations. There is a wide range of factors other than just the economic incentive underpinnings or justifications upon which IPR's are founded. It becomes apparent the limitations that exist in placing sole reliance on one or more of the traditional theories on which IPR's are normally justified. Another approach known as the critical theory recommends itself. This consists of a supra disciplinary method of analysis focusing on interconnections that cut across disciplinary

fields such as law, economics, culture and society (Kellner, 1989; Morrow and Brown, 1994).

The theory is relevant in that it transcends disciplinary fragmentation allowing for examination of IP well beyond economic and legal frames. Its normative viewpoint allows for both critique of existing premises and emphasizes on and envisions alternatives. The fact that analysis is not limited to the *a priori* assumptions that innovation and creativity is incentivized through pecuniary incentives deriving from IP but considers other factors that also foster innovation makes critical theory relevant to the inquiry.

2.3. Relevance of theoretical framework to the study

Landsburg (2012) makes the point that most of economics can be summarized in four words: 'People respond to incentives.' Thoughtfully designed incentives carry the potential to encourage great innovation and generate significant economic growth. Having said so one may ask what sort of incentives are necessary to foster innovation and produce IP goods and what is their incentive effect.

2.3.1. Intellectual property rights as incentive

Going by the *raison de tere* for the grant of IPR's *to wi*t that those who put work and effort into an intellectual creation should be encouraged through exclusive rights which bring financial reward, Hideo and Sadao (2011) note a discord in that most innovators are employed and generally much of the revenue generated from their inventions may not accrue to the inventor himself. This they note creates what they describe as a traditional

moral hazard where inventors by extension of reasoning ought to exert less effort than is efficient. Mc Nally (2012) sees this as a confounding factor in that though incentivization rhetoric of IP is framed in terms of incentives for individuals who create IP goods primarily inventors and authors, and while individual activity is central to production of IP goods, ownership of the IP often ends up with organizations whose incentive framework differs. Tong (2016) chronicles the long history of the position of employee-inventors, how it places the employee at a disadvantage in negotiating adequate reward for their contribution to intellectual work that then accrues to the employer, concerns regarding protection of employee inventors and efforts to address the apparent dissonance between IP laws and labour laws.

Suffice to say in the background of all this that it is hasty in the circumstances to assume for works created by employees that IPRs significant as they may be to employed inventors are a sole or primary incentive (Vaver, 1991). Hence discussing IPRs in terms of incentives to individual creators oversimplifies consideration of the role of incentives and obscures the reality that IPRs create incentives for more than those who invent or create IP goods. It is necessary to go beyond the general rhetoric that IPRs provide incentive and interrogate the question of their allocation between employers and employees as well as consider what else motivates those actors who actually invent and create IP goods held, commercialized and widely distributed by organizations that employ them so as to understand how to foster that inventive creativity.

2.3.2. Extrinsic and intrinsic motivation

In early literature on IPRs much was said about the importance of non-pecuniary incentives on creation, while the more modern view seems to place emphasis on monetary motives behind creation (Liebowitz & Watt, 2006). Though the basic premise of economics is that the more money a person receives the more he or she is induced to work, there is in fact countervailing evidence (Frey & Oberholzer-Gee, 1997). Literature identifies other factors discussed herein other than just economic based factors relevant as they may be in spurring or fostering inventive creativity.

Frey & Oberholzer-Gee (1997) explain that human behavior is influenced by both extrinsic and intrinsic motivation. Extrinsic motivation draws from external factors such as IPRs, competition, evaluation, recognition, pecuniary rewards or other tangible incentives. Intrinsic motivation on the other hand is driven by no apparent reward other than the activity itself. A person engages in inventive activity out of curiosity or interest, for the passion of it, just because they like to do so or for some internally rewarding consequences such as feelings of competence and self-determination (Deci, 1975). For researchers overcoming a challenging task, coming up with solutions to difficult problems and the advancement of scientific knowledge fulfills this quest. At any rate even well prior to the earliest known form of IP in 500 BCE when Sybaris, a Greek state, made it possible for citizens to obtain a one-year patent for "any new refinement in luxury", through to the more modern system of IP beginning in medieval Europe, inventive and creative behavior had been taking place all through human history and is a natural trait of the human species. A practical illustration of intrinsic motivation can be observed in the case of open-source software development where contributors enjoy working on a 'cool' project, derive gratification from peer recognition as well as skills improvement and can advance their

careers by attracting offers of employment or venture capital funding (Lerner & Tirole, 2005). There is also the case of open access materials that are made freely available and there is no monetary reward for those that made the works.

The relevance of and relationship between extrinsic and intrinsic motivation has been of interest to many scholars. Benabou & Tirole (2003) in their discussion of the interplay between extrinsic and intrinsic motivation observe that while the central theme of economics is that incentives promote effort and performance, and there is evidence that they do, 'dissonance theorists' argue that rewards may actually impair performance and may not be ideal in the long run. Social psychologists claim that extrinsic rewards could 'crowd out' intrinsic motivations under certain conditions (Frey 1997, Deci, Koestner, & Ryan 1999, Frey & Jegen 2001). What they mean by this is that external incentives can sometimes counter intuitively undermine intrinsic motivation for performing by reason of a control condition resulting in an overall *decrease* in the total performance or reduced incentive.

2.3.3. Pecuniary incentives

Mc Nally (2012) comments that the economic approach to human behavior has resulted in a propensity in economic literature on IP to emphasize pecuniary incentives as the main method for encouraging the production of IP material. Consistent with the focus on pecuniary incentives common in IP discourse the practice of giving monetary compensation for successfully patented and commercialized inventions is widespread and, in some cases, underpinned by national patent laws though there is much less consensus

on how much compensation organizations should give to their employee inventors. Tong (2016) observes that in their engagement in the tripartite meeting of the International Labor Organization (ILO) on salaried authors and inventors, employed inventors' concern which they have always had was to ensure that their contributions were recognized mainly in monetary terms. In this sense rewarding employed inventors is viewed as a matter of justice since it is by their labor and thrift that the enterprise gets to enjoy a well-protected competitive advantage. Put differently, the perspective was that it is or should be the business or agenda of IP systems to optimally allocate reward in a manner that expresses the purpose of the IP system namely to incentivize the generation of intellectual work. Remuneration of employee inventions calculated as an equitable share of the profits made on the basis of the patented invention giving due regard to the respective contributions of the employee and the enterprise to the invention will operate as a strong incentive to inventive and innovative activities within the enterprise itself. A well remunerated inventor becomes an active participant in the running of the enterprise since he has a stake in it (WIPO, 1999). While there is no instrument which is binding at the international fora addressing the question of reward to employed inventors for inventions, WIPO Model law 1965 provides some model for national laws that is instructive. It recognizes an employee's right to remuneration for inventive activity more particularly where the invention was of exceptional importance (Tong, 2016).

National systems greatly vary in their recognition and treatment of the question of employed-inventor remuneration, ranging from those where employed inventors are rarely awarded additional compensation for their work generated inventions in beyond their salaries to those where benefit sharing is common practice if not altogether required.

Hideo & Sadao (2011) observe that the patent law in Japan requires firms to pay an appropriate amount of monetary compensation to employee inventors and often Japanese firms have been successfully taken to court by former employee inventors for not paying them enough. For instance, in 2004 the Tokyo High Court ordered Hitachi LTD to pay a former employee ¥165 million (approximately US$1.46 million) for the transfer of rights relating to a reading mechanism of optical discs. In 2005, the Tokyo High Court mediated a dispute and reached settlement in a matter where a former employee's contribution was estimated at 5% of the earnings attributable to the patents concerned, and Nichia agreed to pay approximately ¥838 million (approximately US$8.2 million) (Meir, Schubert & Jaenichen, n.d.).

The United Kingdom Patent Act of 1977 contains in its section 40(1) and (2) a similar provision to that in the Japanese patent law on compensation of employees for certain inventions where: (1) the patent belongs to the employer and the patent is of "outstanding benefit" to the employer or (2) the patent belongs to the employee and has been assigned or exclusively licensed to the employer and the corresponding benefit for the employee is inadequate. The provision entitles an employee to seek as against the employer in a court or from the comptroller remedies for compensation for inventions in the given circumstances. Pursuant to that provision the United Kingdom Patents Court awarded two employees a total of 3% of the benefit which their employer had derived from the patents, amounting to a total of £1.5 million in the case of Kelly v GE Healthcare Ltd (2009). More recently in Shanks v Unilever Plc and others (2019])Mr. Shanks succeeded in a claim for compensation by Unilever where he was awarded a 5% share benefit amounting to £2 million. Elsewhere in Europe other countries that have a legal provision for employed

inventors to get remuneration include Sweden which requires that such employees be paid reasonable remuneration, France and Germany. Per contra Italy has a more conservative approach that considers for the most part the employee to be already compensated by his salary.

A similar provision for inventor remuneration is to be found under Chinese Patent Law Article 16 which sets out the requirement for inventor reward and remuneration for service inventions made by employee-inventors. In the United States of America on the other hand there is no general federal law that obliges employers to pay inventor remuneration neither do the state laws oblige the employers to pay, though however employer made reward plans (both with lump sums and royalties) are more common and most relationships between employer and employee are largely contractual (Merges, Robert P, 1999; Lobel, 2014). Again, in Australia there is no obligation in its national law to provide inventor remuneration and there is no judicial precedent on the matter, such issues being purely contractual (Linde S, 2010; Camm, 2019). What we see therefore is that national laws are diverse on the requirement to provide inventor remuneration, itself an extrinsic form of incentive recognized and required by some national laws. Even where the requirement does not exist such as in the case of the United States America, organizations as a matter of good practice still apply some form of pecuniary incentive. In the United States of America though the Bayh-Dole Act is generally recognized as providing in a sense for contributor reward in publicly financed inventions. Suffice nonetheless that a teething issue in practice however pertains to what constitutes reasonable reward or compensation.

Closer home, under South African law, the Publicly Financed Research and Development Act (2008) is much more straightforward regarding financial compensation for employed inventors. It provides in section 10 thereof for a statutory mandated compensation of 20% of revenues accruing from the commercialization of IP emanating from publicly financed research and development. That benefit must be shared equally among qualifying creators or their heirs unless agreed to the contrary by the creators and recipients or institutional policies. Elsewhere under the Patents Act (1978) the position is much more complex. Tong (2016) considers the matter from the perspective of assignment of rights in the IP. She reasons that under the Act the only way an employer can acquire rights in IP is either through assignment by the employee or devolution by operation of law. She further remarks that section 59 (1) of the Act tempers the use of contracts by employers to divest the employee of ownership of IP where the invention bears no relation to the employment relationship or if it occurs one year after the employee has left employment. Having observed regarding devolution by operation of law that there is conflicting opinion as to the effect of section 59 (2) as a statutory devolution, she argues that the Act does not imply a statutory rule which devolves the right in the IP to the employer by operation of law. She further argues that though there is sentiment supporting a common law basis for employer ownership of rights in IP created by employees in the course of employment its legitimacy is doubtful given a general failure by authors to provide compelling precedent or sustained argument and also the inconsistency in the formulation of such rule. The relevance of this discourse to the subject of the present dissertation and more particularly the question of pecuniary incentives lies in the incentive potential of ownership of IP rights and the entitlement of employee to either commercially exploit the IP or negotiate an assignment of it to the employer on quid pro quo terms thereby realizing a pecuniary

reward. Put simply and as Tong (2016) concludes the system works to reward the individual inventor at the expense of firms whose only claim to ownership of employee-inventions which they have funded and initiated must be derived from their relationship with the employee. Put differently the question of reward is largely contractual.

A recent case which makes interesting reading in South Africa concerning the question of compensation is that of Makate v Vodacom Limited (2016). It concerned an employee's claim to compensation for an invention which had resulted in substantial financial success for his employer. The technology developed was not a patentable invention but rather a business idea and no patent was filed. However, it potentially raised the question of ownership in the innovation, mainly as a defence by Vodacom to Makate's contractual claim for compensation (Tong 2016) The remark in Jafta J's judgement was instructive where he stated: "'Please Call Me'] had become so popular and profitable that revenue in huge sums of money was generated, for Vodacom to smile all the way to the bank. Yet it did not compensate the applicant even with a penny for his idea. No smile was brought to his face for his innovation... This leaves a sour taste in the mouth". This remark resonates with the labor (natural rights/lockean) theory that an author or inventor as it were has a natural right to the fruit of his labor.

The Zimbabwean Patent Act 1971 unlike the Japanese and German laws is silent on the question of ensuring that an employee inventor does not go unrewarded for a successful IP protected invention created in the course of employment. Suffice that the issue may however be implied from some sentiment with regards to the position under common law that exists on decided cases in the matter of Brown NO v Simmons (1947) that employee

inventions made in the course and scope of their employment belong to the employer (Gerntholtz, 1968). More to the point in Morewear Industries (Rhodesia) (Private) Limited v William Michie Irvine (1960) the court applying principles it had derived from English authorities reached the conclusion that absent agreement to the contrary, there is a common law rule that inventions made by employees in the course of employment belong to the employer. Arguably, where the employee is obliged to assign inventions he or she is not entitled, as a matter of course, to compensation from the employer. The employee would be entitled to his or her salary in the normal course (Tong, 2016). That however is not to say employers in Zimbabwe may not nonetheless through contractual arrangements benefit from the American best practice of utilizing some form of pecuniary reward as an incentive to foster innovation even in the absence of a statutory requirement in place imposing an obligation to give reasonable compensation for an in-service invention made by an employee. This is especially so as the Morewear case recognizes that this is a matter that may be regulated by employment contract conferring such rewards, especially so given its incentive potential.

2.3.4. A balanced approach

Hideo & Sadao (2011) remark that if the ‘crowding out’ debate holds true striking a balance between intrinsic and extrinsic incentives would be imperative. They go on to say that the effect of the interplay between extrinsic and intrinsic motivation is material for organizational structure and management of research and development divisions. In a study they carried out in Japan they observe on empirical evidence the relationships among income, levels of effort and innovative outputs whereupon they concluded that

intrinsic motives are more important determinants for inventor productivity than other motives monetary incentives included. They specifically identify two intrinsic motives in the form of what they describe as ‘taste for science’, that is to say satisfaction from contributing to science and technology, and what they also described as ‘taste for challenge’, meaning interest in solving challenging technical problems. They also found that firms with more intrinsically motivated inclined employees are less likely to utilize revenue-based compensation for their inventions. They note that further research on possible interactions between intrinsic motivation and monetary incentives for research and development employees would be useful to provide empirical evidence on productivity impact of incentives at individual level in the research and development function.

Suffice to say from all the foregoing discussion that while pecuniary incentives and other forms of extrinsic motivations have their place in spurring inventive and creative activity, the role of other more intrinsic forms of incentives is often overlooked if not downplayed in economic analysis of IP which proceeds on the assumption that exclusionary rights and pecuniary interest or compensation motivate creation. The assumption often made which as may be noted above takes an overly simplistic view of the matter and misses the point is that monetary gain is not just one of the incentives but is ‘the’ incentive. What of the joy of inventing and other pre-existing motives for creating? Moreover, the quality of creative output does not necessarily rise with the size of the financial reward (Huang, Singh, & Mukhopadhyay, 2013). If we have learnt anything at all from a holistic review of literature it is that while IP brings an additional dimension of monetary incentives for intellectual work, it does so in the face of already pre-existing wide ranging and often

quite powerful non-monetary incentives (Mc Nally, 2012). This is not to diminish the relevance of monetary incentives neither do inventors need to be driven by only one motivation to the exclusion of other factors.

2.4. Incentive Schemes and inventive employees

2.4.1. The concept of incentive schemes

Incentive schemes or systems speak to a combination of several more or less coherent incentives built into a package or program that may be implemented to foster inventive behavior. Incentive systems reside within organizations, their structure, rules, human resource management, opportunities, internal benefits, rewards and sanctions et cetera. Whether based on perception or reality, organizational incentive systems do have a significant influence on the performance of individuals and thus the organization overall (UNDP, 2006).

Incentive systems make use of incentive measures or programs that appeal to either of or better still both intrinsic or extrinsic leanings to motivate employees to increase performance. Effective incentive schemes recognize, value and reinforce both material and non-material incentives. It is essential to understand what makes people tick and address those factors that drive and foster innovation among the target group of inventive employees who generate IP goods and products through an appropriate reward and recognition program.

Caudron (1994) notes that scientific and technical employees are different from the average employee. They are not motivated by traditional incentives such as title and promotion. Rather the freedom to innovate and recognition for their scientific breakthroughs, what Hideo and Sadao (2011) intimated above describe as the 'taste for science' and 'taste for challenge', matters more to them. A good comprehensive reward and recognition program encourages and motivates innovation and creativity, and is essential in recruiting and retaining technical employees in what is increasingly becoming a highly competitive job market. Malanowski (2007) suggests that while some reward and recognition programs exist for all employees at a company-wide level, research and development functions are unique. A company culture focused on being leading edge and innovative may see the need for separate and unique awards for scientific and technical staff. Leavitt (2002) observed quite pertinently that while asking employees to be innovative could be easy enough, fostering a creative environment and leveraging valuable ideas that result in viable new products and processes is what often proves to be quite a challenge.

2.4.2. Reward and recognition programs

There are various ways in which scientists and engineers in both research and development and commercial companies are recognized and rewarded. Malanowski (2007) identifies five categories of programs that provide reward and recognition for technical professionals for innovation as follows;-

a. Long standing excellence recognition where one has internal honor societies and where they award research grants to innovators for greater ability to make an impact to the organization.

b. Recognizing and rewarding distinguished individual and team contributions during the year or in respect of a specific project with annual and spot awards in the form of bonuses, trophies or plaques, technical stipends, vacations and other financial rewards.

c. Motivating inventors to pursue inventions by offering patent rewards because they solely benefit the company and are difficult work. The program which will be discussed hereinbelow provides cash or other financial awards for original ideas and patent filing.

d. Royalty compensation plans also considered in detail below which involve the sharing of percentage profits from licensing and royalty fees or gross revenue with key contributors.

e. Obtaining funding for a project normally not available through a separate start up company or innovation bank.

2.4.2.1 Company Remuneration models and programs

As intimated above, incentives can be financial such as cash awards or bonuses and royalty plans, which are generally and traditionally though not always or exclusively so, associated with better performance. Remuneration schemes or pay-for-performance programs as an incentive to foster innovative thinking are much more common and rightly so because it conveys appreciation for the value that innovation brings to the company's success. Examples of pay-for-performance programs in some international companies that can be gleaned from their respective websites include a patented rewards program at Samsung where it has financially rewarded employees who submit patent applications on its behalf, as well as team members who apply the new technologies to its products. Motorola was known to issue cash awards according to the expected dollar value of the eventual patent. Hewlett Packard would provide fixed cash awards for ideas per submission and an additional fixed award for ideas that reached patent application stages.

O'Connell (2015) argues that the view that inventor employees are in any event paid to invent and thus are already compensated through salaries fails to consider that putting forward an invention involves extra work for the inventor(s), filling out the invention report, answering questions posed by the patent attorney, reviewing the patent application, writing the invention article for publication (or working with an editor). This is typically work that is not in project plans for getting products/services out of the door. Financial compensation is in practice an effective route when you need to motivate employees at least in the short-term. Approaches within this category are plentiful such as for instance bonuses, cash-for-ideas, or stock options.

Implementing a financial compensation rewards plan for generating IP products in particular is an equally confounding and complex exercise. Several questions that must be considered include how much financial reward is reasonable? How may this be calculated? How does the amount compare and contrast with competitors? Is the financial award per invention (most common approach) or per inventor, as a percentage of inventions will have more than one inventor named? Or is some hybrid approach to be taken? When is the financial award to be paid? What stage of the patenting process has to be reached to trigger an inventor award? Is the award to be a once off payment or paid out at key milestones and if so what are the milestones and how much is to be paid at each milestone? Is the amount to be paid the same for every invention / patent or does it vary depending on the rating or importance of the invention / patent? Is there a financial award to be paid out for other outcomes other than filing a patent (e.g. publishing the inventive idea, keeping it as a trade-secret)? Is there any flexibility to adjust the predetermined award payment for special cases, and if so, what qualifies as a special case? Are awards to be paid to employees who have since left the company, and if so, how are these people to be located? Are inventor awards to be paid to student interns, to subcontractors and/or to collaboration partners (i.e. non employees)? Who in the company is responsible for administering the inventor award program? How are award payments communicated to the inventor(s)? From whose budget is the inventor award to be paid? How is the company to keep a track of who is due to be paid plus when payments are outstanding and overdue? Does the company have some mechanism for monitoring total award payments for financial management purposes? (O'Connell, 2015)

Linde (2010) suggests some answers to some of these questions and explains that such remuneration can be paid out according to different models as may be convenient to each company. This she says includes ways of calculating remunerations that may include royalties and/or lump sums. She discusses the respective pros and cons of either method and prefers lump sum payments which she perceives as easier to organize into a systematic procedure and even better if the lump sums can be a standardized sum paid out to all inventors without discrimination as to type of invention or its success. She sees difficulties with the royalty based approach in respect of the expensive, cumbersome and altogether inconvenient method of calculating the royalties especially as payments stretch out over a long period that is the life of a patent which requires management on all payments and inventors. Of note in her observations is the allocation of risk if the invention is not profitable which may not favour the inventor in the case of royalty based financial incentive.

As regards when an award may be given Malowski (2007) thinks of either of three recognition criteria namely submission of ideas, filing the patent and issuance of a patent. The most commonly used of the three is filing of a patent. Her own survey of New England Compensation Consortium agreed with Linde's (2010) views that the royalty compensation plan is not too popular and she thinks that this may be due to problems associated with singling out one inventor when many other people and functions contributed to making a commercial product successful.

In the same vein Leavitt (2002) cautions of the risks associated with extrinsic rewards for innovation that the organization must be wary of certain pitfalls. These include attributing

more importance to money than it actually has, confusing compensation with rewards, stifling team work by individual recognition, overlooking intrinsic factors, and that a financial reward decreases in effectiveness overtime.

2.4.2.2. Other forms recognition

An inventor reward and recognition program should ideally include other forms of employee recognition and not just financial payments. Non-financial incentives come in many forms such as

a. Gifting, where the company gives some creative gift that carries enough perceived value to incentivize employees, for instance premium champagne sent to an employee who exceeded expectations on a project.
b. peer recognition, for instance at Zappos.com an online clothing and shows company runs a program where employees award cash bonuses to their colleagues in recognition of their innovation.
c. Other non-monetary rewards such as pins, plaques, luncheons, annual award dinners, travel.

Some are more tangible than others since they are visible and/or can be compared to financial benefits. Less tangible incentives relate for instance to work flexibility, independence of working, recognition of one's work, and the possibility of advancement.

The value of non-financial material incentives seems to be perceived as a function of psychological processes. There are also a range of distinctions to be made for non-

materialistic incentives. Like materialistic incentives in general, non-materialistic incentives can be “self-interested”, such as psychological benefits related to the status of power. On the other hand they can be of a genuinely “altruistic” nature, based on one’s own desires and moral beliefs. (UNDP, 2006).

The difficulty with intrinsic incentives is that motivations are dynamic and they change with age, context and trends, views and preferences. While the opportunity for travel, for instance, may be very attractive for young, single professionals, it may become a burden for a family setting. By extension of reasoning motivations and responsiveness to incentives also varies with gender. Therefore recognition and reward programs involve lots of variables that require much flexibility

2.4.2.3. Further alternatives

Fostering innovation and inventive behavior involves further alternative approaches such as educating and training inventors. These fit within the opportunities incentive framework. Malanowski (2007) cites the examples of Hewlett-Packard’s ‘InventShops’ and ‘Innovation Workshops’. At InventShops, in-house lawyers present the case for patents and teach employees how to write disclosures. At Innovation Workshops, engineers conceive new ideas and generate invention disclosures. Glaveski (n.d.) suggests other formal corporate innovation programs that companies use to foster innovation and inventive creativity which it can provide funding for under its rewards and recognition program, such as

(a) spin-ins, where a company has an external inventive team that can be integrated into the core business of the company

(b) incubators or labs, which is an internal concept and talent development program that allows for research and development by technical and creative employees

(c) innovation teams, where the company creates a central team that oversees and executes innovation initiatives

(d) startup accelerator programs, which is an external program used to identify and nurture synergistic startups,

(e) spin-outs where you have an internal project team that cannot operate internally.

2.5. The Evolution of Fintech

According to FSD Africa (2020), at its most basic level, fintech is the intersection of finance and technology. That would mean any company that is using technology to carry out the many functions of the financial sector can be said to be a fintech. Fintech in common usage has come to represent new ways of using technology in finance beyond the traditional back-end banking systems and front-end delivery channels. It represents the potential of technology to increase outreach, speed, efficiency and cost effectiveness of financial services as opposed to a traditional bricks and mortar model. It is technology that is used in the provision of financial services and may include for instance such things as

- Software for electronic payments using conventional currency,
- Software for making transactions using blockchain distributed ledger,

- Quantum equipment and software for implementing ‘quantum money’,
- Trained machine learning systems for making automated-lending decisions for loans to individuals or businesses,
- Software for automated trading or securities and/or derivatives,
- Software used by an enterprise, for automated price setting of goods or services sold by the enterprise in particular markets,
- autonomous, rule-based systems for providing financial advice to individuals, and
- Trained machine learning software for anti-money laundering enforcement.

As the research focuses on the Fintech sector, brief background to the industry and its relevance to IP will be apposite.

2.5.1. A brief historical overview of the Fintech industry

Arner, Barberis & Buckely (2015) remark that the interlinkage of finance and technology is not a new concept. They trace its history back to what they describe as Fintech 1.0 described as being from analogue to digital, an infrastructure stage in the period 1886-1967. It was characterized by technologies such as the telegraph as well as railroads and steamships that allowed for the first-time rapid transmission of financial information across borders. Key events in this phase include the first **Transatlantic Cable** in 1866 which connected one side of the Atlantic Ocean to the other through a submarine communications cable connecting, **Fedwire** in the USA (1918), the first electronic fund transfer system which relied on now-archaic technologies such as the telegraph and Morse code, and the credit cards in the 1950’s to ease the burden of carrying cash.

This was followed by Fintech 2.0 from 1967 to 2008, which saw the development of traditional digital financial services. Key developments in this era were heralded by the first automated teller machine (ATM) installed by Barclays Bank in 1967. In the early 1970's the **NASDAQ**, the world's 1st digital stock exchange was established, which marked the beginning of how the financial markets operate today. In 1973, **SWIFT** (Society for Worldwide Interbank Financial Telecommunications) was established and is to this day the first and the most commonly used communication protocol between financial institutions facilitating the large volume of cross border payments. The 1980s saw the rise of bank mainframe computers which brought about **Online Banking**, that flourished in the 1990s with the Internet and **e-commerce business models**. Online banking brought about a major shift in how people perceived money & their relationship with financial institutions. By the beginning of the 21st century, banks' internal processes, interactions with outsiders and retail customers had become fully digitized. The era ended with the Global Financial Crisis in 2008.

Fintech 3.0 is from 2008 to present date and it is characterized by what Arner, Barberis & Buckely (2015) describe as democratization of digital financial services. It saw the emergence of new players alongside the already existing ones such as banks. They conclude that the financial services industry since 2008 has been affected by a "perfect storm", financial, political and public in its source, allowing for a new generation of market participants to establish a new paradigm known today as FinTech. In Zimbabwe platforms such as Ecocash developed, which is said to have more than 96% market share in its space. Ecocash took advantage of the cash crisis which hit the country since 2008,

as well as the repeated liquidity crunch of in or about 2016 through to about 2019 and the platform has successfully managed to interoperate with almost every Zimbabwean bank. The same era saw the **release of Bitcoin v0.1** in 2009 and its impact on the financial world and followed by the emergence of different cryptocurrencies. Mass-market penetration of smartphones which enabled internet access for millions across the world and exposed them to financial services also aided Fintech. Google wallet was introduced in 2011 followed by Apple in 2014. (Chiraerae, 2019).

Arner, Barberis & Buckely (2015) outline what they term a comprehensive topology of the FinTech industry today which comprises five major areas namely, (1) finance and investment, (2) operations and risk management, (3) payments and infrastructure, (4) data security and monetization, and (5) customer interface. They also add to these the use of technology in regulation itself.

2.5.2. Intersection of Fintech and IPRs

Fintech intersects with IP when it comes to questions of protection and commercialization of the inventions or creations. IPRs protect things such as software, hardware and branding. Fintech companies may use a combination of various protection tools or mechanisms that include patents, copyrights, trade secrets, trademarks and industrial designs to secure and protect their IPRs. Patents for underlying technology allows companies to shield their inventions while they gain market share though. Patents may however be hard to obtain since the core of fintech innovation very frequently comes down to so-called business methods or computer implemented inventions patentability of which

is problematic in some jurisdictions. Suffice that in Zimbabwe patentable subject matter in section 2A of the Patents Act does not exclude the said so called business methods or computer implemented inventions. Software based innovations may be protected through copyright of the computer code. However, because the essence of the copyright is in protection of expression of the idea and not the idea itself, this type of protection is vulnerable to reverse engineering by competitors and therein lies its Achilles heel. Trade secret protection is an alternative form of protection for secret business information and may protect material such as confidential backend server processes and codes though this again is vulnerable to reverse engineering and cannot be used to bar independent processes. It may nonetheless offer protection for indefinite durations provided the owner of IP takes reasonable steps to keep it secret. Unauthorized use of trade secrets constitutes unfair trade practice for which the owner may obtain a remedy. Industrial designs may be used to protect the appearance and operation of physical items such as electronic cards, transaction devices, computer interfaces and icons especially if these features promote the distinctiveness of the brand, products and services or if it increases the usability of the product.

Suffice that where competitive technology is involved, understanding the issues associated with the development and deployment of IPRs is crucial.

2.6. Patent metrics and innovative activity in Zimbabwe

IP goods, products and processes are an output of innovation. As may be noted from the foregoing, patents are of particular importance to innovation activity in that they are

commonly used to protect the exploitation of inventions that are 'new, involve an inventive step (non-obvious) and capable of industrial application' (TRIPS Article 27 (1), 1995). It is in that respect that therefore patenting records from national and regional receiving offices offer a rich source of information and insights on inventive activity. Bergquist, Fink & Raffo (2017) sound a caution that patent data provides only an incomplete and imperfect picture on inventive activity and is an even less perfect metric for innovative activity in the broad sense. The reasons or limitations they list as rendering patent data an imperfect metric are that; -

(a) Patents are primarily concerned with technological innovations and not other organizational and logistical advances that are a source of productivity gains in an economy. This research is not concerned with those other areas of innovation though.

(b) Inventors may opt to use other IPRs to protect their technological inventions like trade secrets and software copyright thereby limiting the efficacy of patent metrics in covering those innovations.

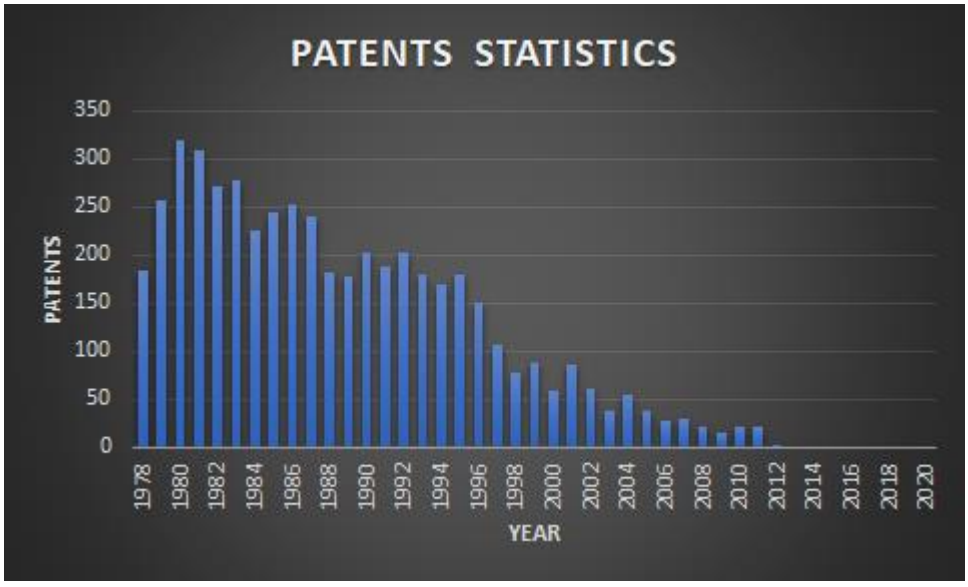
(c) Some industries use the patent system more intensively than others, depending on the nature of relevant technologies and prevailing business strategies. Small and medium-sized enterprises (SMEs) and start-ups are more inclined to use trade secrets rather than patents as a form of protecting their inventions to stay competitive. The main reasons given by SMEs for shying away from patenting their inventions include high costs and complexity of the patent system.

(d) Some patents are more valuable and technologically important than others. Research points to a highly skewed distribution of patent value, with relatively few patents accounting for a high share of the overall value of patents.

Nevertheless, and with the foregoing caveat in mind, patent data does provide relevant information metrics for innovation research which ought to be interpreted within the confines of its limitations.

Below is information obtained from the Zimbabwe IPOffice (ZIPO) on patent statistics in Zimbabwe. The information reflects filings since the office was set up in 1934 though patent data is documented only from 1978.

Fig. 1



The graph shows a declining and weak use of patents in the country with virtually no patent filing at all in the period from 2013 to date. This is despite an ongoing drive by the country to foster innovation, in particular technological advancements highlighted in the background to this study and some considerable progress made. While this could be evidence of low innovative activity after properly taking into account the limitations with patent metric as a measure for innovative and inventive activity, or it may as well be just an imperfect picture of the general levels of inventive activity in the country. For instance, it could be that national companies prefer other methods of IP protection like trade secrets and software copyright which may not necessarily depend on filing for their validity. Further the type of innovation which the fintech companies may be carrying out could be incremental rather than disruptive and hence it may not meet the stringent requirements for patentability in which event alternative forms of protection such as utility models with a lowered level of inventive step may be more suited. Juma & Ojwang (1999) observe that most developing countries have no utility model protection which causes quite a number of useful technologies that miss the stringent requirement for patentability to be excluded. Thus, the low levels of patent activity while worrying and being a possible indicator for the levels of inventive activity generally existing in the country, it may just be an incomplete picture as well.

2.7. Chapter Summary

To conclude on this chapter, its main aim was to provide a critical analysis of existing literature relating to the research area. It highlighted the theoretical framework relevant to the concept of IP and incentives for it. It discussed the concept of incentives as it emerges

from economic literature on IP, its criticism and the interplay between extrinsic and intrinsic motivations. It presented a comparative study of their treatment in national legislations and considered incentives schemes and their corollary reward and recognition programs. The chapter then proceeded to analyze the history and application of IPRs in the fintech industry and considered patent statistics in Zimbabwe as a metric of innovation and invention. Having done a comprehensive review of the research area, the areas of concern can then be fully attended through an appropriate research methodology in the next chapter so as to answer the research questions.

CHAPTER 3 METHODOLOGY

3.1. Introduction

This chapter provides an account of the research instruments that were be used in gathering data. In order to get the amount of information and analysis needed for the research, methods and procedures used are of vital importance to the empirical value of the study. Methodology is important in gathering necessary data and valuable information through appropriate research instruments.

3.2. Research Design

3.2.1. Design

Research design refers to a detailed outline of how an investigation has taken place, how the data was collected, what instruments have been employed, how the instruments were used, and the means used for analyzing the data collected. Burns and Grove (2003) defined research design to be a blueprint for conducting a study, with maximum control over factors that may interfere with the validity of findings. It provides the logic that links the data to be collected and the conclusions to be drawn to the initial questions of study (Yin, 2003).

In order to carry out the assessment required for this research, the researcher took a descriptive research. Descriptive research is one that attempts to explore and explain a phenomenon. Whilst providing additional information about the topic, a researcher

collects information to describe what is happening in more detail (Seltman, 2011). The value of this approach in relation to the topic under consideration is that it gave opportunities to explore and gather details on the kind of incentives or programs that companies and organizations under consideration are utilizing which explain the incidence of innovation in their organizations.

3.2.2. Approach

While the researcher was more inclined towards qualitative research which is generally preferred for social science, (Saunders, 2009) he did perceive the complementarity of data obtained through mixed methods. This is brought about by the ability of qualitative data to illuminate the numbers, while the quantitative data adds more precision to the data presented in words or pictures to introduce flexibility in investigating more complex problems from different perspectives (Johnson & Onwuegbuzie, 2004; Johnson, 2004). The mixed method study in the circumstances thus addressed the need for an empirical research on how Fintech companies under consideration incentivize and foster innovation of its inventive and creative employees to generate IP goods. A triangulation mixed methods design was thus used where different but complementary data was collected on the same topic.

The flexibility generally found in quantitative methods really enables one to uncover trends in practices and approach and provides an analysis of the effectiveness of programs and activities that the target companies utilize to encourage or incentivize their employees to be inventive and innovative notwithstanding that those employees do not own rights in

the invented work. This is because a qualitative approach collects and works with non-numerical data and seeks to interpret meanings from them. However, a numerical measure of the levels of inventive activity and its correlation to incentive programs and activities of the company may not be altogether avoidable. Thus, collecting both qualitative and quantitative data in the circumstances brought together both forms of research to compare results and explain the phenomenon under consideration.

3.3. Population and Sampling

3.3.1. Target Population

As already mentioned, the research specifically targeted innovations by companies utilizing financial technology to provide financial services. The most prominent of these include but are not limited to some already intimated above namely

(a) Zimswitch that owns Zimswitch Instant Payment Interchange Technology (ZIPIT), a mobile payment system that allows a user to send money to any bank, buy airtime to mention but a few. They also provide Point of Sale (POS) solutions, Automated Teller Machine (ATM's) systems, and internet banking solutions.

(b) Paynow, a secure online payments platform that allows one to pay for various bills like television subscriptions, internet from telecommunications service providers et cetera. Apart from Mastercard and VISA support, it is also integrated with local mobile payment solutions like ecocash and telecash.

(c) Bitmari is a bitcoin-based money remittance service for the Zimbabwe market. It allows people out of the country to send money to local recipients using Bitcoin through a Bitcoin wallet.

(d) Cassava FinTech which provides mobile money solutions, social payments services, digital banking, international remittances and mobile micro insurance.

(e) Cash Ledger which provides financial management software for businesses. It features solutions for bank reconciliation, transaction monitoring, reporting, mobile wallet monitoring, performance management, tracking cash transactions and more.

(f) Zapper, a mobile app that provides an e-payment solution by allowing merchants to provide a QR code payment option for funds.

These are just but to mention a few of the companies in the Fintech business which all are either established or claim to provide innovative services. As Fintech has slowly been embraced by the banking sector, banks such as FBC, First Capital Bank Limited, BancAbc and a few others implementing digital finance are also developing fintech products and services and for that reason they were also considered in the study. Most fintech companies outside the formal financial sector are really micro, small and medium enterprises (SMEs) and they have very few employees while the IT departments in the banking sector where technology development is carried out are small. That makes the

target population quite small. The research thus endeavored to survey about thirty (30) employees drawn from at least five (5) of these institutions who were either developers, employed in their information technology (IT) department or were in a managerial position. Developers and those employed in the IT departments are technical persons who ordinarily may be expected to be creators and innovative of products while those in managerial positions were being considered from the perspective of being administrative staff in the know of company policies and systems.

3.3.2. Sampling Method

The sample was randomly selected from a group of companies involved in Fintech business. The method involves collection of data from a random sample of units which have been selected with known probabilities of selection from among all units in the target population.

3.4. Data Collection Instruments

Two instruments were used in collection of data as follows; -

3.4.1. Questionnaire

A mixture of online distributed and self-administered structured questionnaires was used. The online questionnaire was distributed using free internet software known as google form. Respondents who are scientific and technical employees in the Fintech companies and management employees were requested to respond

to the pre-designed questionnaire. The questionnaire had both open ended and closed ended questions. The close ended questions are those that limit respondents to provide alternative answers to given questions. These were used to ascertain specific predetermined information such as whether or not the respondent had generated IP protectable material or goods and if they know whether any filing was made for their invention. Open ended questions allowed the Respondents freedom to provide answers widely and appropriately, for instance what the respondent felt would be helpful to encourage him or her to inventive work or products.

3.4.2. Document review

The researcher also reviewed documented texts and materials such as websites and publications of the targeted companies, patent, design and copyright registers and documents at the national IP office (ZIPO) and the regional IP office (ARIPO) and any other IP documents.

3.5. Pilot study

A pilot study was carried out with 5 respondents and after each subject finished responding to the interview questions, they were debriefed to ensure their understanding if the items had been as intended and to identify any ambiguous or potentially offensive items. After the pilot study, corrections were made to address the anomalies which were identified.

3.6. Method of data collection

Both primary and secondary data was used as the basis for information collection. Primary data was obtained through well-structured questionnaires while secondary data was obtained through websites and publications of the targeted companies, patent filing records and other IP related materials, texts and journals

3.7. Analysis and Organization of Data

The data was analyzed mainly using the framework analysis method. This is a method that consists of several stages that include familiarization, identifying a thematic framework, coding, charting, mapping and interpretation. Quantitative data collected from questionnaires was coded and entered into an electronic data file then analyzed through statistical packages such as SPSS and/or excel. Descriptive statistics were used to provide the general overview of the levels of inventiveness and generation of IP by companies in the Fintech sector. Qualitative data was coded either manually or through qualitative data analysis software such as NVivo. Organization of data included a process of cleaning it, coding it, reading and reviewing it and the eventual integration of the data. The data was reviewed and analyzed to inform findings and conclusion.

3.8. Ethical Considerations

Ethics may be defined as the appropriateness of the researcher's behavior in relation to the rights of individuals and organizations who become the subject of the researcher's study (Saunders, 2009). The question of ethical consideration is pertinent in a research

such as the one at hand. Effort was therefore made to ensure that the research design is both methodologically sound and morally defensible to all the stakeholders involved.

The Africa University Ethics Committee Guidelines was used in conducting the study and the researcher endeavored to ensure that the guidelines are followed. Prior informed consent was sought from the participants who were happy to volunteer to answer the questionnaire. The researcher endeavored to keep the names of the participants confidential and shall not disclose their personal information.

3.9. Chapter summary

In this chapter was covered the framework and method by which data for the research topic was to be collected, collated and analyzed. This included research components, instruments, sampling and data collection methods relevant to the nature of study undertaken.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter contains summaries, tables, figures, computations, analysis and interpretations presenting findings of the study in relation to research questions as amplified by the questionnaire. The chapter addresses the research objectives and presents the sources, validity and demographic features of the respondents. It further presents the findings for each objective and analyses the data for further interpretation. The chapter thereafter proceeds to provide interpretations of the results in terms of how the research objectives were achieved. It also gives a summary of the results and inferences to be drawn from the data analyzed based on what was gathered in the research.

4.2. Data Presentation and Analysis

Primary data was solicited from randomly sampled respondents drawn from various companies in the Fintech sector as per the list provided in appendix 4. The data collection process involved a request sent directly to respondents either through electronic mail (e-mail) or on WhatsApp accompanied by a link to a google form questionnaire soliciting for specific information required to achieve the research objectives. A pilot survey carried out indicated that the respondents preferred anonymity and that they insisted on a digitalized questionnaire. After being stored the google forms collected were integrated with Stata and R Programing for processing and analysis of data. Generally, the target population of technical and managerial employees in the Fintech industry is not a large group. The response rate was even more leaner in an already small population.

4.3. Sample description/demographic profile

Demographic statistics indicate the following relevant information; -

Table 4.3.1.

Gender	Freq.	Percent
Female	3	15
Male	17	85
Total	20	100

It may be observed thus that the sample is dominated by male respondents (85%) in comparison to female respondents (15%).

The age of the respondents ranged from 21 years to 42 years old with a mean age of 30.15 years. This is reflected as per table below:

Table 4.3.2

Variable	Obs	Mean	Std. Dev.	Min	Max	Median	IQR

Age	20	30.15	6.046095	21	42	29.5	9.5

This shows that the industry is mostly occupied by a young population. This is relevant because propositions from literature suggest a shift in people's motives with age, not necessarily that there will be a general decline in motivation with age, but rather and more pertinent for purposes of this research that older employees are less motivated by extrinsically but more by intrinsically-rewarding job features (Inceoglu, Segers & Bartram, 2012)

As far as experience of the respondents the range was between 1 year and 15 years, with at least 60% of the respondents being more than 3 years of relevant experience as reflected in the table below. The 36 findings hence show that all employees considered were in a position to provide reliable information to the study because of having had enough minimum relevant experience.

Table 4.3.3

Relevant Experience in years	Freq.	Percent	Cum.
1	1	5	5
2	3	15	20

3	4	20	40
4	1	5	45
5	3	15	60
6	1	5	65
7	1	5	70
10	1	5	75
12	1	5	80
13	2	10	90
15	2	10	100
Total	20	100	

4.4. Organizations providing incentives to generate IP protectable materials

There is a general practice by most companies in the Fintech sector in Zimbabwe to encourage creativity and innovation by offering some form of incentive for the generation of IP protectable material. As can be seen in the table below, the majority of the respondents (75%) indicated that they are attached to an organization/company that recognizes or gives a reward on innovation.

Table 4.4.1.

Policies that recognize innovation available	Freq.	Percent	Cum.
No	5	25	25
Yes	15	75	100
Total	20	100	

Further and as apparent from the following table, half (50%) of the respondents indicated that they have at least a current research in or have at some point developed an innovative product that their company is using.

Table 4.4.2

Research in or developed an innovative product that your company is using	Freq.	Percent
No	10	50
Yes	10	50
Total	20	100

4.5. Whether there is higher generation of IP protectable materials in companies that give incentives as compared to those which do not give incentives

Table 4.5.1.

	Policies that recognise innovation available		
	No	Yes	Total

	No	2 (40%)	1 (7%)	3 (15%)
	Yes	3 (60%)	14 (97%)	17 (85%)
high generation of IP protectable materials	Total	5	15	20

Pearson chi2(1) = 3.2680 Pr = 0.071

After performing a chii square test, there is 90% chance that the proportion of participates who work for organizations that do have policies that recognize innovation are associated with a higher generation of IP protectable materials in comparison to participates from organizations that do not have policies that recognize innovation.

4.6. Form of incentives given and the impact thereof

As apparent from chapter 2 herein, literature generally identifies incentives as falling in either of two forms, namely financial and non-financial incentives. Out of 15 respondents to the survey that are in organizations that have in place policies that recognize and reward innovation and creativity, the majority of them highlighted that their organizations use a combination of financial and other forms of incentives in comparison to either of financial or other forms separately. As a matter of fact, while there were others that indicated the exclusive use of financial forms of incentives, there were none that indicated exclusive use of non-financial forms as incentives. The table below summarizes the responses with respect to forms of incentives in use by Fintech companies in Zimbabwe:

Table 4.6.1.

If the answer is yes, is it monetary/financial, in other forms or both	Freq.	Percent	Cum.
FINANCIAL	5	33.33	33.33
Other forms	0	0	33.33
BOTH	10	66.67	100
Total	15	100	

The next table illustrates the impact of the particular form of incentive on levels of innovation and/or inventive activity;

Table 4.6.2.

		Research in or developed an innovative product that the company is using		
		No	Yes	Total
Type of incentive	Both	0	10	10
	Financial	1	4	5
	None	2	3	5
	Total	3	17	20

Pearson chi2(1) = 2.1429 Pr = 0.143

The results in the table above suggest that the form or type of incentive has no real impact on the generation of IP protectable materials. It would appear that what matters most is the fact that there is some form or recognition and/or reward.

4.7. Suggested strategies for the generation of IP protectable materials in the Fintech industry in Zimbabwe.

Asked to explain what drives their creativity most respondents (60%) as apparent from the following table acknowledged the love of science/art as the major driving force to innovation. While this finding on the face of it appears to contradict the earlier indication that there is a general higher level of creativity and innovation where there is some form of extrinsic motivation. This nonetheless may be reconciled from the perspective that while generally employees respond well to incentives for them to generate IP protectable material, that is not the sole source of their motivation as they are driven by intrinsic factors such as in particular the love of science/art. Therefore, strategies for the generation of IP protectable materials ought to be guided by these findings on the driving factors for incentivizing employee's inventive and creative activity.

Table 4.7.1.

Inventive driving factors	**Freq.**	**Percent**	**Cum.**
Reward and recognition (be it financial or otherwise)	5	25	25
The burden of contributing to existing art/knowledge	3	15	40

The love of science/art (solving problems)	12	60	100
Total	20	100	

4.8. Discussion and Interpretation of data

Based on the above analysis of data one may comprehend that Fintech companies in Zimbabwe as is the experience elsewhere in the world, do offer incentives to their employees to generate IP protectable materials. Despite virtually negligible levels of filings as highlighted in Chapter 2, as half of the Respondents indicated either working on some research or having previously developed IP protectable material, there is some creativity and inventive behavior going on but there may be very low levels of utilization of registrations as a means of protecting IP work. Suffice to say that where there is some form of reward and recognition offered to employees to incentivize them to generate IP protectable material they tend to respond well to such incentives. There is a general inclination towards mixed form of incentives *to wit* financial and non-financial forms. The data tends to point towards a co-mingling of extrinsic and intrinsic factors as both relevant in the incentivization of the generation of IP protectable material.

4.9. Chapter Summary

This chapter analyzed data and literature using the adopted research methodology in chapter 3, in order to achieve the four research objectives and the arising research

questions. The main aim of the analysis was to examine if companies in the Fintech industry in Zimbabwe do offer any incentives to employees so they can feel motivated to generate IP protectable material. This follows the perception in literature review under chapter 2 that the role of IP as offering individual incentive may be limited with respect to employees who in most cases do not own rights to IP material generated in the course and scope of their employment. The findings from analysis and interpretation of data herein sought to assess and explain other factors relevant to incentivizing employees to generate IP protectable materials in the circumstances. The sections in this chapter were organized in accordance with the research objectives. What follows in the next chapter is an overall conclusion and brief discussion on the factors relevant to incentivized the generation of IP protectable materials in the workplace in general and Fintech sector in Zimbabwe in particular, making any necessary recommendations arising from findings and discussion in the research done.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter summarizes the research findings with reference to the statement of problem, objectives and research questions. A brief discussion of the findings ensues, implications for findings are noted culminating in recommendations and suggestions for future research.

5.2. Discussion

This study was made necessary by the need to evaluate and assess if beyond a salary employed inventors need to be stimulated to create the inventions that they do create, and if do how whether in the case of Fintech companies in Zimbabwe that is being done and how. It evaluated the theoretical framework for incentivizing individual creativity and inventive behavior. The main feature from these was that IP discourse emphasizes on the concept of reward and in particular financial reward to incentivize creative and inventive behavior. The study further looked at regulatory systems across a number of jurisdictions with regard to the principle of compensation of employed inventors for their contribution to successful inventions. It emerged from that survey that some countries have a framework for compensating employee inventors though there are others also that do not recognize the principle. There are other countries which like Zimbabwe have regulatory frameworks that are silent in the issue of compensating employed inventors for their contributions but there exists a general best practice of incentivizing creativity through some forms of reward and/or recognition.

Literature review established that there exists both extrinsic and intrinsic motivators that are relevant in incentivizing creative activity. Reward which economic theory of IP places emphasis on is a form of extrinsic motivation along with other forms of recognition be they financial or non-financial. It also emerged however that creativity and innovation necessary to the generation of IP material cannot be exclusively or sufficiently explained on the basis of extrinsic motivation alone but also on account of other intrinsic factors.

The study evaluated the relevance of filings such as patent matrics in reflecting IP activity, there being a very poor record of patent filings in the Zimbabwe national filing office suggesting that there is very little generation of IP material. The study explored this phenomenon with a view to understand if at all in relation to the Fintech sector Zimbabwe which as elsewhere in the world has experienced a rapid rise in the past decade, there are companies incentivizing the generation of IP material and whether if they are there, they have experienced increased generation of IP material.

5.3. Conclusions

The study reveals that despite absence of national laws in Zimbabwe underpinning reward and recognition of employed inventors/creators for their contribution to generation of IP materials, companies in the Fintech industry are as a matter of practice offering some form of incentives for the generation of IP materials. It confirms and agrees with literature which argues that employees respond well to incentives as there is evidence of increased levels of innovation among employees who are encouraged with incentives. Findings from the research did show however albeit in the minority that there are some employers who subscribe to the more conservative thinking as is the case in such countries as Italy with

the approach that considers for the most part the employee to be already compensated by his salary. Suffice to say the findings confirm a positive correlation between the offer of some form of reward and increased levels of creativity and innovation necessary in the generation of IP material. In this respect the findings depart from the study by Hideo and Sadao (2011) who found that intrinsic motivation factors in particular two which they identified to be satisfaction from contributing to science and technology "taste for science", and interests in solving challenging technical problems "taste for challenge" to be more important determinants for the inventor productivity than any other motives. It merely confirms that bread and butter issues enjoy primacy in employees' hierarchy of needs and therefore they provide greater incentive. The difference in the findings may be an important indicator of differences between values in the developing world and the developed world with regard employee's perception of incentives to employee creativity and inventive behavior. While every organization has its unique method of motivating employees generally the most common form of reward and recognition from the survey is financial and in the majority of cases it is offered along with other non-financial rewards but in none of the responses was there a case of non-financial rewards being offered exclusively. The findings nonetheless do validate the contention by Curtz (WIPO, 2019) that a wide range of factors and not income alone motivate and drive creative individual as the participates confirmed that other more intrinsic factors such as those found by Hideo and Sadao (2011) supra to be relevant do matter to them.

5.4. Implications

Findings from the study point to the need to encourage and reward individual inventors, and in particular the employed inventors who are creating and developing such inventions.

This after all is the cornerstone of the IP system which has long been premised on the *apriori* that extrinsic incentives such as copyrights and patents are necessary to get people to produce artistic works and technological innovations. The thinking is that the whole idea of IPRs is that people won't create things or invent without incentives (Johnson, 2012). The study herein confirms this to be generally true in the experience of employed creators/inventors albeit overly simplistic and conceptually narrow. It is nonetheless true that incentives propel better performance in employees, and that some form of reward is necessary to incentivize their contribution to the generation of IP material. This is consistent with global patent metrics that reflect countries such as China, Japan and Germany which incidentally have in place an employee compensation policy through a regulatory framework as having higher levels of inventive activity and generation of IP material. However even in the absence of a regulatory framework imposing the requirement to compensate employees for successful inventions as in the United States of America where there is a general practice of companies incentivizing employees to be creative through bespoke models, organizations may still at company level effectively implement incentives schemes to recognize effort and motivate the generation of IP material. Employed inventors in some of these countries have really done well for themselves. No matter how rare the occasions may be but when an inventor strikes it rich it is those occasions that provide chief justification for the IP system for it was to encourage him that the IP system was created (Wright, 1962). Findings in the present research similarly attest to the fact that employees respond well to incentives. Therefore, the argument that there is no broad necessity for incentives for intellectual labor (Johnson, 2012) seems rather extreme and not justified, at least in the experience of Fintech companies in Zimbabwe. It may be rather too far-fetched or rather too early as yet for

organizations to abandon altogether the use of rewards and incentives as motivation as was advocated for by Kohn (1993). National IP laws must therefore address the issue of inventor employee compensation and benefit sharing so that there is clear policy on incentivization of employed inventors and creators. Provisions in national laws concerning inventive and innovative activities and inventors' rights are very useful and necessary for securing the protection of rights and interests of inventors, in particular employed inventors and innovators (WIPO, 2004).

Findings that intrinsic motives are do matter to employees suggest that an efficient motivation program ought to be broad minded as to factor a mixture of both extrinsic and intrinsic rewards instead of focusing on any one particular one.

Beyond the question of the role and impact of incentives in generating IP material in the workplace is the question as to what form the incentives should take, mainly whether it be financial or non-financial. As observed above, the experience in other jurisdictions is that when IP law does concern itself with the question of rewarding employees it tends to focus on monetary incentives. However, the study illustrates that in practice and as is consistent with the contention by Cuntz (2019) a wide range of factors and not income alone drive creative individuals and employers would do well to use a variety of forms of incentives. Findings from the study suggest that in the experience of the respondents it is rather the fact that there is some form of incentive that matters more than what types of incentive it is. The findings show no significant impact on the generation of IP protectable materials in relation to particular forms of incentive.

5.5. Recommendations

The following recommendations are made from the study

5.5.1. Organizations would do well to realize that incentives do work in driving employee motivation to contribute towards the generation of IP protectable material. They are therefore urged to be more deliberate in encouraging the generation of IP material by their employees through appropriate incentives.

5.5.2. Companies need to invest in attracting skilled human resource necessary to increase their generation of IP material through appropriate incentives that encourages creativity and inventive behavior among their employees.

5.5.3. Companies are also encouraged to develop IP policies with appropriate incentive schemes designed to motivate creativity and inventive behavior and which strike an appropriate balance between intrinsic and extrinsic factors.

5.5.4. To develop its full potential as a mechanism to generate incentives for creative behavior, the national IP policies and laws would needs to be developed so that it reflects the IP incentive function and matches international best practices in employee compensation and benefit sharing in products of their innovation.

5.6. Suggestions for further research

5.6.1. This research focused on a very small sample of creative and inventive employees in the Fintech sector. It is hoped that it will serve as a platform for future research that will cover a larger population which will be more representative and thereby more generalizable. Whatever the nature of future investigation, it is essential that research on incentivization of the generation of IP material continue to be conducted not only to add to the academic literature but also to help inform companies and other policy makers on factors that will lead to increased generation of IP material by employees who are willing and motivated to contribute to the creation of IP material by their organizations.

5.6.2. Further research may be needed to ascertain the extent of investment in research and development (R&D) by Zimbabwean companies which is key to the generation of IP. Countries that have industrialized and/or transitioned into innovation driven knowledge-based economies have significantly invested in R&D (Sibanda & Strauss, 2020). Similarly, companies that have achieved dominance in markets have significantly invested in R&D including appropriate inventor employee compensation. It is important to understand if the country and companies within the economy are moving in the right direction in terms of R&D which is a key driver of innovation and the generation of IP.

5.6.3. Further research may also be useful in seeking to understand if there is effective utilization of IPRs by companies in Zimbabwe as reflected in IP metrics such as patent filings.

5.6.2. Further research may be necessary to ascertain specific forms of incentive schemes and their effectiveness in motivating creativity.

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APPENDIX 1 - AUREC Approval letter

AFRICA UNIVERSITY
(A United Methodist-Related Institution)
DEDICATED TO AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU1872/20 25 January, 2021

Evans Talent Moyo
C/O CBPLG
Africa University
Box 1320
Mutare

RE: **INCENTIVISING THE GENERATION OF IP PROTECTABLE MATERIALS IN THE WORKPLACE: THE CASE OF FINTECH COMPANIES IN ZIMBABWE**

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal
b) Data collection instruments
c) Informed consent guide

- **APPROVAL NUMBER** AUREC1872/21
  This number should be used on all correspondences, consent forms, and appropriate documents.
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** January 25, 2021
- **EXPIRATION DATE** January 25, 2022
- **TYPE OF MEETING** Expedited
  After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.
- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATORFOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

APPENDIX 2 - Informed Consent form

INFORMED CONSENT GUIDE

My name is EVANS TALENT MOYO, a final year (Master in Intellectual Property (MIP)) student from Africa University. I am carrying out a study on incentivising the generation of Intellectual Property goods in the workplace. I am kindly asking you to participate in this study by filling in a questionnaire.

What you should know about the study:

Purpose of the study:

The purpose of the study is to assess levels of generation of Intellectual Property goods or materials by companies in the Fintech industry and evaluate incentives offered by companies for same. You were selected for the study because you are employed as a developer or technical and/or scientific employee.

Procedures and duration

If you decide to participate you will be asked to complete a questionnaire. It is expected that this will take about fifteen to twenty minutes of your time.

Risks and discomforts

There are no reasonably foreseeable risks, discomforts or inconveniences save perhaps confidentiality limitations that may have been placed on you by your employer. It is

proposed either that permissions shall be sought from your employer to allow you to participate in the survey or that you will complete it anonymously.

Benefits and/or compensation

Participation in this study is voluntary and as such the researcher will not be able to offer any compensation for your participation in the study.

Confidentiality

Any information that is obtained in the study that can be identified with you will not be disclosed without your permission. Names and any other identification will not be asked for in the questionnaires.

Voluntary participation

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect your future relationship with your organisation or other authority. If you choose to participate, you are free to withdraw your consent and to discontinue participation without penalty.

Offer to answer questions

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

Authorisation

If you have decided to participate in this study please sign this form in the space provide below as an indication that you have read and understood the information provided above and have agreed to participate.

EVANS TALENT MOYO **26 - 01 - 21**

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Name of Research Participant (please print) Date

Signature of Research Participant or legally authorised representative

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

Name of Researcher: EVANS TALENT MOYO

APPENDIX 3 - QUESTIONNAIRE

RESEARCH ON THE INCENTIVISION OF THE GENERATION OF IP PROTECTABLE MATERIALS IN THE WORKPLACE: THE CASE OF FINTECH COMPANIES IN ZIMBABWE

This is a study to be submitted in partial fulfillment of the Master's Degree in Intellectual Property offered by Africa University in conjunction with the World Intellectual Property Organization (WIPO) and the Africa Regional Intellectual Property Organization (ARIPO)

The purpose of the questionnaire is to gather information and experiences on incentivisation of the generation of intellectual property protectable material by employees with a case study of companies in the Fintech sector. The information gathered by way of this questionnaire shall serve as the research basis for exploration and analysis of the factors relevant to foster innovation and inventive behavior by employed creators/authors.

CONFIDENTIALITY

Although this questionnaire requests your company name and other specific information regarding your individual circumstances which you or your employer may regard as confidential, this is only for the researcher and will not be passed on to third parties or attributed directly in any public way. In the presentation and

analysis of data any personal information represented shall be in redacted format so that it cannot be identified with you or your employer.

PART 1: BIO DATA

1. Please tick to indicate your gender? Male: Female :

2. What sort of services or products does your company offer/trade in? …….

……
…

3. What is your role/position/job title? ……

4. Kindly describe your duties in brief? ……

……
…

5. For how long have you been employed there? …….

6. Prior to your employment at your current company were you employed in a Fintech company before? ……

7. If the answer to 7 above was yes what would you say was your main reason for leaving?

…….

PART 2: RESEARCH AND DEVELOPMENT AND INVENTIVE ACTIVITY/ GENERATION OF INTELLECTUAL PROPERTY

8. Does your company have a formal research and development department? ……

9. Have you ever done any research in or developed an innovative product that your company is using?

YES: **NO:**

10. Are you aware of any new, novel and/or innovative products developed or generated by someone else in your company within the last five (5) years which it is using?

YES: **NO:**

11. If there are any kindly state in brief state what some of those inventions or innovations are:

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12. Has your company commercialized any of these inventions/innovations?

YES: **NO:**

13. If yes kindly explain how if you are aware: ……

…….....

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14. If there are no new, novel and/or innovative ideas generated by your company in your view what may be the reason for that? ……..

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15. Have you ever privately developed a new, novel and/or innovative product or material on your own?

PART 3: LICENSING AND PROTECTION OF IP WORK

16. Are you aware of intellectual property (IP) and protection of inventions? Kindly respond by ticking the relevant box

a	Somewhat aware but not sure how it works	
b	Aware of IP but I don't know if we have any at our company	
c	Not aware	
d	Aware and able to use it	

17. To your knowledge has your company ever sought registration of any IP right on any of its inventions?

YES: **NO:**

18. If no kindly explain why if you are able to: ……..

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19. Is your company using any patents/inventions under license?

YES: **NO:**

20. If the answer is yes, is the patent/invention foreign owned or locally owed?

FOREIGN: **LOCAL:**

21. Are there any improvements you or someone else employed by your company made to the licensed technology?

YES: **NO:**

22. If yes, have you made any attempts to get protection over the improvement?

YES: **NO:**

23. If yes, what sort of protection did you seek? ……

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PART 4: INTELLECTUAL PROPERTY STRATEGY AND INCENTIVES

24. What sort of factors/motivation do you feel drive you to be inventive? Kindly rank them in order of importance to you

a	Reward and recognition (be it financial or otherwise)	
b	The love of science/art (solving problems)	
c	The burden of contributing to existing art/knowledge	
d	Other	

25. If your priority in 21 above is (a), kindly indicate what sort of reward you feel motivates you the most be it monetary or otherwise: ……..

……..

26. If your answer to 21 above includes (d), kindly explain what other motivations drive your efforts to invent:

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……..

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27. Does your company have in place a policy and/or program to reward and recognize innovation and/or inventive efforts?

YES: **NO:**

28. If the answer is yes, is it monetary/financial, in other forms or both?

FINANCIAL: **NON-FINANCIAL:** **BOTH:**

29. If financial, how is it administered/given and under what conditions? ……...

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30. If there are other non-financial incentives provided kindly explain what they are and how they are given:……

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31. Do you feel your company is doing enough to motivate/incentivise you to be creative/inventive/innovative?

YES: **NO:**

32. If no, kindly explain what else you feel your company can do to foster your creativity/inventive efforts

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PART 5: GENERAL OPINIONS AND SUGGESTIONS

33. Do you believe that the factors/activities/programs employed by your company to incentivize your inventiveness are being effective?

YES: **NO:**

34. Please explain your answer:

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35. Would you have any suggestions you can give on what more companies can do to incentivize/foster innovative and/or inventive activity among its employees?

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36. Do you see yourself with your current company in the next five years?

……

37. If your answer above is no, why not?

……..

Thank you for your time.

APPENDIX 4 - LIST OF FINTECH COMPANIES SAMPLED

Cassava Smarttech

Zimswitch

Fresh -in -a- box

Getbucks

Paynow

FBC Bank

BancAbc

POSB Bank