



ADVANCES IN BUSINESS AND MANAGEMENT

VOLUME

9

William D. Nelson
Editor

NOVA

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VOLUME 9

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AND MANAGEMENT**

VOLUME 9

WILLIAM D. NELSON
EDITOR



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CONTENTS

Preface		vii
Chapter 1	Implementing Automated Fare Collection Systems in Emerging Markets Transit: Challenges and Learnings <i>Aneto Okonkwo and Lucia Terrenghi</i>	1
Chapter 2	Regional Social Responsibility and Knowledge Economy: The Italian Case <i>Mara Del Baldo and Paola Demartini</i>	13
Chapter 3	Board of Directors, <i>Emotional Biases</i> and Firm Financial Decision <i>Mohamed Ali Azouzi and Anis Jarboui</i>	37
Chapter 4	A Theoretical Application of Experiential Marketing: The Case of Festival Tourism <i>Marta Estrada and Diego Monferrer</i>	73
Chapter 5	Designing “Friendship” into Emotional Branding and Design <i>Hui-Yun Yen, Po-Hsien Lin and Rungtai Lin</i>	85
Chapter 6	Construction Workers’ Personality: As a Key for Improving the Occupational Health and Safety Performance in Construction <i>Begum Sertyesilisik, Heyecan Giritli, Husnu Murat Gunaydin, Engin Deniz, Mustafa Nadar, Gurkan Emre Gurcanli, Yavuz Erisen, Nadir Celikoz, Gulfer Topcu Oraz and Egemen Sertyesilisik</i>	103
Chapter 7	Computing Export-Import Quantities and Prices of Agricultural Commodities for Selecting the Ports of a Country Using Transportation Model <i>Nazmun Nahar and Mossa. Anisa Khatun</i>	133
Index		147

PREFACE

The authors of this book examine the latest research in business and management, including the challenges, strategies and impact of implementing an Automated Fare Collection (AFC) system for electronic ticketing in bus transit in emerging markets; territorial competitiveness and social responsibility; the existing relationship between the emotional aspect and decision-making processes; a theoretical application of experiential marketing on festival tourism; an analysis of brand emotion and product design; the literature on Enneagramme as a potential tool for enhancing occupational health and safety; the use of swarm intelligence in the field of information technology; and computing export-import quantities and prices of agricultural commodities for selecting the ports of a country using a transportation model.

Chapter 1 - This chapter discusses the challenges, strategies and impact of implementing an Automated Fare Collection (AFC) system for electronic ticketing in bus transit in emerging markets. The insights are drawn primarily from the authors' experience in designing and rolling out an AFC system in Kenya between 2011 and 2014: In the chapter the authors also discuss learnings from research in Brazil, India, Indonesia, Mexico, Nigeria, Philippines and South Africa conducted during the same period.

Bus transit systems serving cities in Emerging Markets are typically different from the ones in developed markets. In major urban areas such as London, New York, and Hong Kong the transit systems are run by government authorities, whereas in cities like Nairobi, Lagos, and Manila a large portion of the bus transit is run by many individual owners who are loosely organized in private associations.

Electronic payment systems in bus transit benefit consumers by reducing the need to carry change and by increasing safety and convenience. Bus owners, on the other hand, benefit from electronic payments because drivers and conductors need to handle less cash, thus improving transparency and sales accounting. The main challenges of growing AFC adoption in Emerging Markets include: consumers' education, conductors' resistance and transit network coverage.

Consumers in cash-based economies need to learn and get accustomed to the habit of using stored electronic value (e.g., in a prepaid card) to pay: Although people perceive safety as one of the main benefits, they also have concerns about the coverage of transit where the AFC system is accepted and ability to cash-out easily. This is particularly important in markets with high percentage of low income population, where liquidity of cash is often a major issue. Conductors in those markets show resistance to AFC adoption because the

system adds more scrutiny to their sales reports and performance, an effect that they do not necessarily want. Last but not least, the coverage of transit networks with AFC systems is particularly challenging due to the very fragmented transit routes.

Building on the authors' experience in the field, in this chapter the authors discuss strategies to cope with some of the challenges above: The authors outline possible solutions around marketing efforts, regulatory approaches, and deployment of field agent staff.

Chapter 2 - This paper presents a knowledge resource perspective applied to territorial competitiveness and social responsibility. The latter is defined as a pathway promoted by networks of a plurality of local actors - public and private, belonging to the for-profit and non-profit sectors who find that relationships and social cohesion are the drivers for the construction of shared territorial governance and whose policies are oriented towards sustainable development.

Our study integrates an extensive literature review with data from longitudinal empirical research. The authors have adopted the methodology of qualitative research-based case study. In particular, the authors focused the authors' analysis on the Italian projects of territorial governance and social responsibility promoted in different regions and the authors emphasized the case of the Marche. This region was selected as a case study because it is emblematic of the Italian context; the territory is characterized by small businesses diffused throughout the socio-economic fabric and by the proactive role taken by local governments.

Applying this model in public policy initiatives would be innovative. The perspective offers a powerful instrument for raising awareness of the gaps that local policy makers should address through their initiatives in the knowledge economy.

Chapter 3 - This chapter deals with the relationship existing between the emotional aspect and decision-making processes. More specifically, it examines the links between emotional biases and effectiveness of the governance mechanisms. The Board of Directors is considered one of the mechanisms governance and protection of shareholders' interests most active and most factor in the control process manager. Thus, in order to improve the explanatory power of the law and finance of the governance the authors integrated the behavioral dimension in the board of director's role analysis. The objective of this chapter is to show the behavioral biases effect on directors board members control over their investment decisions and corporate finance choice. The primary purposes of this paper are to: consider emotional biases as new research ideas that make important contributions to society. Its incites governments to establish training programs aimed at the development of learning of emotional intelligence. Thus, it has important implications for enhancing the well-being of individuals, organizations and society as a whole.

Chapter 4 - The emergence of increasingly well-informed consumers demanding personalized, memorable and meaningful experiences has called into question the way today's businesses develop. New consumers are constantly looking for ways to satisfy psychological needs such as inspiration, authenticity and a feeling of belonging to a community. In the future, only firms that can provide a relevant consumer experience and that adapt to social demands will enjoy success. This idea is reflected in the recent literature, which defends the impending need to support the development of the value of emotions as a determining factor in purchasing and consumption processes. In this vein, the literature has shown a growing interest in recent years in what is known as experiential marketing and its application in specific sectors. In this context, the present study takes the tourism sector as its

starting point to apply the general theory of experiential marketing to the particular case of festival tourism.

For many years, the Spanish tourism industry focused almost exclusively on promoting sun-and-beach holidays to attract foreign visitors. However the decline of this model has triggered the search for new alternatives to regenerate and boost one of the main driving forces of the Spanish economy. In this context, a new consumer has emerged who seeks an alternative form of tourism: another way of experiencing their holidays, enjoying different wine, cultural and musical experiences, among others. In this regard, the specialized tourism literature highlights the growing importance of events and festivals as tourism products that bring considerable benefits to the area where they are held. The explanation for this phenomenon is a direct consequence of the new tourism demands from a tourist/visitor who is looking for experiences charged with emotional meaning. Various authors have argued that tourism marketing needs to be refocused on the experience rather than the product/service. Indeed, festivals tend to take advantage of the personal to share values and strengthen interpersonal ties, creating a feeling of social identity from which to establish a space that embraces cultural, social and human relationships. In summary, the festival represents an experience associated with a series of activities that involve the consumer, and result from an interaction between the event (festival) and the person who enjoys it, whether this be at a physical, emotional or even spiritual level.

The present paper takes this changing perspective in marketing into account to develop a theoretical approach to the study of the tourism experience and consumer behavior at music festivals. It presents a theoretical model that incorporates the dimensions of the experience and their impact on the flow (satisfaction) and subsequent return visits to the festival.

Chapter 5 - "Emotion" plays an important role that will be a key product evaluation point in the brand and design fields. The use of the affective value of a product to confirm its market position can enhance its brand image and facilitate the identification of its product advantages. Designing "Emotion" into brands and products will be a design trend in the global market. "User-Friendliness" is essential in brands and products with embedded emotional design, and designing "friendship" into brands and products will become a core value in emotional design. Therefore, this chapter focuses on the analysis of brand emotion and product design by a case study. First, this chapter uses measuring scales to perform an analysis of the emotional features of brand and product. Then, a conceptual framework is established for brands and products that applies to evaluating models of designer and user that can be experienced in emotional design. Finally, based on a literature review and case study, it is demonstrated how "friendship" added value of design into a value-added brand and products by the emotional brand and product framework.

Chapter 6 - Occupational health and safety performance of the construction industry remained poor despite of all precautions undertaken. This fact reveals the importance of innovative solutions so that accidents rates in construction can be reduced. This chapter introduces psychometric testing as a tool for improving occupational health and safety performance in construction. This chapter introduces to the literature enneagramme as a potential tool for enhancing occupational health and safety. The chapter includes the following topics: occupational health and safety performance of the construction industry; main causes of accidents; the relationship between personality, and safety as well as personality and job performance; effects of the workers' personalities on accidents rates; the psychometric tests (the Myers Briggs Type Indicator®, Eysenck Personality Questionnaire,

the Belbin team-role self perception inventory, Enneagram tests) covering cases from the literature and their suggested usage for enhancing occupational health and safety performance in construction. Both the researchers and practitioners can get benefit from this chapter which is expected to contribute to the improvement of the occupational health and safety performance in construction industry.

Chapter 7 - The agricultural commodities are rarely produced in a country in exact accordance to the requirement of the country. Some regions produce excess whereas some produce less than needed. As a result, the commodities flow from surplus regions to shortage regions. It is not practical to assume that total demand and supply of an agricultural commodity in all areas of a country is in balance. There remain some surpluses or deficits which have to be exported or imported respectively. It is essential to import the deficiencies to meet the need of local people and export the excess to avoid wastage of country productions and to increase earnings. This paper specifically deals with the unbalanced supply demand situation for a single agricultural commodity in a country which eventually creates the need for export or import. Again, when a country knows how much to export or import, goods are delivered to different ports which have their own limitation to export or import to/from foreign countries. So, selection of ports is an important issue. On the other hand, pricing for the commodity is crucial while exporting or importing. It must be accomplished by calculating world equilibrium price assuming overall balance in total supply and total demand of the product. The government has the responsibility to determine the price for an exporting or importing goods. Three problems related to these issues discussed above are addressed in this paper. Firstly, a Modified Transportation Model with equal and mixed constraints is used to determine optimum quantity in Export/Import scenario (unbalanced situation of supply and demand). Secondly, selection of ports to ensure minimum transportation and production costs is done using the same model. Well known VAM method can be used to solve the problems. Finally, a Two-Country model is used for simplification of the complicated problem of calculating price of the commodity involved in export or import.

Chapter 1

IMPLEMENTING AUTOMATED FARE COLLECTION SYSTEMS IN EMERGING MARKETS TRANSIT: CHALLENGES AND LEARNINGS

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ABSTRACT

This chapter discusses the challenges, strategies and impact of implementing an Automated Fare Collection (AFC) system for electronic ticketing in bus transit in emerging markets. The insights are drawn primarily from the authors' experience in designing and rolling out an AFC system in Kenya between 2011 and 2014. In the chapter we also discuss learnings from research in Brazil, India, Indonesia, Mexico, Nigeria, Philippines and South Africa conducted during the same period.

Bus transit systems serving cities in Emerging Markets are typically different from the ones in developed markets. In major urban areas such as London, New York, and Hong Kong the transit systems are run by government authorities, whereas in cities like Nairobi, Lagos, and Manila a large portion of the bus transit is run by many individual owners who are loosely organized in private associations.

Electronic payment systems in bus transit benefit consumers by reducing the need to carry change and by increasing safety and convenience. Bus owners, on the other hand, benefit from electronic payments because drivers and conductors need to handle less cash, thus improving transparency and sales accounting. The main challenges of growing AFC adoption in Emerging Markets include: consumers' education, conductors' resistance and transit network coverage.

Consumers in cash-based economies need to learn and get accustomed to the habit of using stored electronic value (e.g., in a prepaid card) to pay. Although people perceive safety as one of the main benefits, they also have concerns about the coverage of transit where the AFC system is accepted and ability to cash-out easily. This is particularly important in markets with high percentage of low income population, where liquidity of cash is often a major issue. Conductors in those markets show resistance to AFC adoption because the system adds more scrutiny to their sales reports and performance, an effect

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that they do not necessarily want. Last but not least, the coverage of transit networks with AFC systems is particularly challenging due to the very fragmented transit routes.

Building on our experience in the field, in this chapter we discuss strategies to cope with some of the challenges above: We outline possible solutions around marketing efforts, regulatory approaches, and deployment of field agent staff.

INTRODUCTION

This chapter discusses the challenges, strategies and impact of implementing an Automated Fare Collection (AFC) system for electronic ticketing in transit in emerging markets. The insights are drawn primarily from the authors' experience in designing and rolling out an AFC system in Kenya between 2011 and 2014. The AFC system that we introduced in Kenya was called BebaPay. "Beba" is a Swahili word which means "carry." The phrase "Beba, beba" is commonly used by bus conductors in Kenya to attract riders to the buses.

The technology for the AFC system was developed by Google and taken to market in collaboration with Equity Bank, one of the largest banks in East Africa. In the BebaPay system, customers loaded value onto smart cards that used Near Field Communication (NFC) technology. The bus conductors carried Android based smartphones running the BebaPay cashier application. Payment transactions were completed by selecting a payment amount on the BebaPay app and tapping the customers' card on the mobile device. The BebaPay system also included other components such as security, risk, customer service tools and analytics for customers and merchants. Equity Bank handled all regulatory and money movement responsibilities and the bank also distributed the BebaPay service to customers and merchants through their branch and agent network. The BebaPay service was primarily deployed on the bus network of Nairobi, Kenya's capital and largest city. At the peak of BebaPay, around 50% of the city's estimated 1 million transit riders had registered for the service.

While the BebaPay AFC service was focused on buses in Kenya, we believe that the insights from our experience can apply more broadly to other transit modes and other countries in Emerging Markets. This was confirmed by the field research that we conducted in India, Indonesia, Kenya, Mexico, Nigeria, Philippines, and South Africa, to better understand their transit systems and how AFC could be beneficial in those markets. In each city, we rode local buses, met with bus company owners, local government officials and payment system providers such as banks and mobile operators during the same period of the BebaPay rollout.

BACKGROUND ON AFC

Automated Fare Collection (AFC) systems are pervasive in the developed world but are still nascent in Emerging Markets (EM). In AFC systems, customers are usually able to purchase a card from a ticketing office or an automated vending machine at a transit station. Customers can add value to the card at the same point using cash or electronic payments such

as debit or credit cards. In some cities, customers can also add value or top up the cards online. Usually they are prepaid stored value equivalent to the amount of money that the customer loaded onto the card. The cards can sometimes be configured in different ways: In some cities, the cards have some time duration (e.g., 1 hr, 1 day, 1 week, etc) or some fixed number of rides (e.g., 10 rides). Once a card has value, the customer can use it to pay when entering a transit station or the mode of transit (e.g., bus) itself. Usually, this is done by tapping or swiping the card on a payment terminal which may sometimes be attached to a gate or turnstile. The payment terminal checks whether the card is valid and whether there are sufficient funds on the card and deducts the value from the card. Usually by the end of the day, all the transactions have been synchronized from all the payment terminals across the transit network. At this point, the funds are remitted to the transit authority.

AFC in Developed Markets

All the major cities in the world are marked by efficient public subway, train and bus systems which have a unified transit network. The network is centrally managed by a single authority (usually but not always a government funded provider). This means that customers of the network can seamlessly switch from one route to another and one mode of transport to another but still be traveling within the network run by the same provider. The cities and their systems typically include AFC. London's Oyster card system and Hong Kong's Octopus card are some of the longest running and most advanced AFC systems in the world. Both systems were very costly to build and underwent many years of deployment. The AFC systems of different cities are rarely interconnected. For example, the Boston AFC system (Charlie card) and the Chicago AFC system (Ventra) are both from the same manufacturer (Cubic Transportation Systems) but the systems of the two cities are not interconnected. This means that a Charlie card cannot be used on the Chicago transit network and vice versa.

AFC in Emerging Markets

The transit systems in most EM cities are a stark contrast to the major cities described above. For the purposes of this chapter, Emerging Markets refer to Africa, India, Middle East, Latin America, and South East Asia (notably excluding China and Russia). EM cities typically do not have unified transit networks. There might be one or more government funded transit providers but the majority of transit providers are independently operated by private owners. There is typically high fragmentation with thousands of independent owners. While EM cities sometimes have subways, light rails, trams, trains, buses and taxis, the EM cities also have informal transport such as mini-buses, motorcycles and auto rickshaws or tuk-tuks.

The majority of transit payments in EM are cash based. Transit riders carry cash and change and pay for their rides as they enter a vehicle or during the course of the journey. The customers might sometimes receive a paper receipt or ticket. At the end of a shift or at the end of the day, the driver or conductor will typically count up his/her sales. The sales are then shared with the vehicle owner if such parties exist.

Most advanced - Brazil, India, Mexico

When it comes to AFC in EM cities, there is typically a major AFC system running in parallel to the informal cash based payment. The coverage and adoption level of the AFC system is higher in more developed EM countries such as Brazil, India and Mexico. In Sao Paulo, Brazil, customers can pay for transit with cash or by a smart card called Bilhete Único (“Single Ticket”).¹ The card is accepted across SPTrans (São Paulo Transporte), municipal public buses, the EMTU (Empresa Metropolitana de Transportes Urbanos de São Paulo) the bus lines in the greater Sao Paulo region outside the city, and CPTM (Companhia Paulista de Trens Metropolitanos, or Paulista Company of Metropolitan Trains in English) for metropolitan trains.² In Bangalore, India, transit riders can choose between two stored value cards, Varshik and Sanchar which can be used on the Bangalore Metro Rail (BMRC). However, the city buses run by the Metropolitan Transport Corporation (BMTc) have their own system of day and month passes for different customer demographics (student, senior citizen, disabled, etc.).³ There are also numerous taxis and autorickshaws in Bangalore. In Mexico City, transit riders can pay with the rechargeable card called Tarjeta DF on the metro (Mexico City Metro, or Metro de la Ciudad de México in Spanish), the light train, trolleybus and Metrobus systems as well.^{4,5,6} However, only cash payments are accepted on regular bus services run by “Red de Transporte de Pasajeros” (RTP), and the local micro buses.

Showing Promise - Indonesia, Philippines and South Africa

The next category of EM countries such as Indonesia, Philippines and South Africa have established AFC solutions but the systems have not yet received wide adoption and coverage among the total transit ridership. In Jakarta, Indonesia, the city bus service known as TransJakarta uses an e-payment solution called the JakCard. However, motorcycles account for 70% of vehicles on the road because of the ability to weave in and out of traffic. There are also motorcycle taxis (ojeks), becaks (bicycle taxis), taxis, buses and minibuses (angkots). Angkots serve the most passengers. These minibuses have a predetermined route, but no fixed stops. Payment transactions in these vehicles are entirely cash based. In Manila, Philippines, transit riders can pay with paper tickets on the Light Rail Transit System (LRT) or Metro Rail Transit System (MRT). However, a large portion of transit happens on buses and minibuses (Jeepneys) where customers pay with cash. In South Africa, Johannesburg transit riders can use the Gautrain Gold card. Durban has the Muvo card and Cape Town has the My Connect card. However, most of the transit riders in South Africa pay with cash on the mini-buses which are called “taxis” locally.

¹ http://www.sptrans.com.br/bilhete_unico/comum.aspx.

² <http://www.cptm.sp.gov.br/>.

³ <http://www.mybmtc.com/>.

⁴ <http://www.metro.df.gob.mx/>.

⁵ <http://www.milenio.com/cdb/doc/noticias2011/c196e3ff83274045e678264f36ab100b>.

⁶ <http://www.mexperience.com/blog/?p=3372>.

Nascent and Growing - Kenya and Nigeria

The final category of EM countries such as Kenya and Nigeria have one or more AFC solutions which are still very nascent. In Nairobi, Kenya, the authors have direct experience from rolling out the BebaPay service. The BebaPay service operated alongside the Abiria card from Kenya Bus Service and My1963 from Safaricom M-Pesa. These AFC systems were used primarily on large buses whereas the vast majority of transit ridership occurs on mini-buses (matatus) where customers pay with cash. Finally, in Lagos, Nigeria, the LAGBUS has rolled out the ETC smart card to select routes but this has yet to scale up. The vast majority of bus transit in Lagos happens on other bus companies as well as mini-buses (Molues or Danfos) where customers all pay with cash. The EM cities described above give a sense of the similarities and differences among the level of adoption of AFC systems.

BENEFITS OF AFC SYSTEMS

AFC systems have many benefits for consumers, merchants, the government and society as a whole. For consumers the benefits include reducing the need to carry change, increasing safety and convenience and tracking expenses. For merchants, the benefits are less need for drivers and conductors to handle cash and increased transparency and sales accounting.

The cost of most transit rides in EM are low value amounts. This means that customers often have to carry change in order to pay the exact fare. This is quite a hassle as change can be heavy, can be lost easily and is difficult to track. With AFC, transactions are recorded and customers can go back to check their expenses and better budget. This is particularly relevant for customers that have limited funds, as AFC allow them to store value in the card, thus avoiding the risk of spending it in other places. In addition, the drivers and conductors don't always have exact change and so customers could lose out on their change. Safety is also a major concern for consumers in these markets. Transit vehicles are often the main targets for pickpockets and robbers since there are a high number of people in close proximity. When customers pay with cash, they need to bring out their wallets or open their purses and this might also expose how much funds they are carrying. With AFC systems customers can benefit from a higher level of privacy and therefore feel safer.

AFC systems present important benefits for transit companies too. First, they force a higher level of transparency from their staff, e.g., from bus conductors. Second, they make accounting much more accurate and efficient, as sales are automatically tracked rather than relying on manual cash counting. Third, they can improve operations, as they provide new ways of tracking fleets and detect possible problems on the routes. Lastly, they allow transit companies to establish closer, more loyal relationships with their customers and better fine-tune their pricing: For example, merchants can offer special deals to loyal customers or on routes in certain hours of the day. This would be close to impossible if they had to rely on conductors managing the different offers manually, using cash.

There can also be benefits for the government and society as a whole from AFC systems. Some governments might choose to tax the transit companies via the collected funds. Many governments have national cashless programs that try to increase the volume of electronic payments to improve transparency and fight corruption. Helping the transit industry to adopt

AFC can be a powerful wedge to spur other industries. There is also the hidden cost to the government and society of printing cash and coins and distributing these around the economy. AFC can also help the society overall by making transit more efficient and payments more cost effective. Passengers can complete their transactions faster and more conveniently. The sum total of these increases in efficiencies can add up to a substantial impact over time.

CHALLENGES AND SOLUTIONS TO GROWING AFC ADOPTION

The top challenges in rolling out AFC in EM are consumer education, conductor resistance and transit network coverage. We also address some of the technical challenges although these are minor compared to the non-technical challenges.

Consumer Education

Consumers need to understand the benefits of usage of AFC and overcome the barriers to adoption. The largest barrier to adoption is the habit of using cash and change. There are some early adopter customers who will sign up for the AFC system once it is launched but the vast majority will take a long time to adopt the system and will do so only when they'll see some clear benefits and trustworthiness of the system.

Especially in EM, where the transportation sector is fragmented and industry players come and go in the fluctuant ecosystem, many customers are worried about the longevity of the service and whether it will only be a pilot or a long lasting system that will expand. Furthermore many customers are not familiar with electronic/digital solutions: this fact raises risk aversion to trying new things: This can be especially true for customers of an older age or lower literacy levels. Customers also have a difficult time trusting how the system works: Whereas they can see and feel physical money with cash and change, with AFC customers have a plastic card and the transfer of value is electronic and invisible. Additionally, their money is stored on the card and therefore locked in the system: In markets where the majority of people have low and inconsistent income this becomes a problem as people might need liquidity to cover other more urgent costs. Lastly, customers may lack awareness that the AFC system exists or understanding of how it works.

Marketing Strategies

For all the challenges the top solutions are various marketing strategies and deployment of field agent staff. In terms of marketing, there are promotions and brand awareness efforts. Promotions can help to grow both customers as well as merchants' adoptions: The latter see promotions run through AFC as efficient ways to optimize their business, for example by offering discounts in low traffic periods. Promotions might involve special pricing for AFC customers: for example, free rides on vehicles that have the AFC system or some percentage discount or some kind of loyalty program (e.g., buy 10 rides get 1 free). The higher the discount, the more attention will come from customers towards the AFC system. Ideally, one

can offer an aggressive discount and also require some vehicles to become AFC only, which means that these vehicles will not accept cash. These types of promotions are more effective for introducing customers to the AFC system and generating a lot of card signups. However, they can be very costly to run for a sustained period of time across a large number of vehicles. We found that when we offered a promotion for a week at a time (in order to see enough results) for random weeks within a period of several months this had a more sustained effect. Customers would carry their cards more regularly because they were not sure when the promotions might be in place. These type of discounting strategies make a huge difference for low income customers (who are often prevalent in EM) because one of their barriers to adopting AFC is their lack of funds. As discussed above, when customers have a low amount of money, they are reluctant to “lock in” their funds to an AFC card by prepaying the amount. They would rather retain the flexibility to pay as you go for their day to day activities.

Another strategy are marketing campaigns to grow awareness and educate customers about the AFC system. First of all people need to become aware of the availability of the service. For this, traditional media such as radio, TV, billboards, and flyers, as well as transit specific ones like bus shelters or trains stations are appropriate. Furthermore, people need to learn where they can sign up for the card, how and where they can top up, and what benefits they have. Indeed, for customers and conductors in EM, using a plastic card to pay on buses, for example by tapping an NFC (Near Field Communication) card against the mobile phone of the conductor, is a new behavior that needs to be learned. In order to educate people about the actual usage of the card, a high touch approach through an agent network can be needed, as discussed in the next section. Agents can reassure the customers about how to use the card, help them with signing and topping up.

Deployment of Agent Staff

In EM it is critical to deploy field agent staff on transit vehicles to promote and sell the AFC system to customers and handle frontline customer service. In developed markets, some of this role can be provided by automated vending machines and online channels. In EM, the infrastructure for deploying and maintaining vending machines, such as consistent electricity and security for the machines, is weak. This fact drives up the cost of deploying such machines. At the same time, labor costs are generally low in EM. Thus, it is much more cost effective to deploy large numbers of agent staff than to invest in vending machines especially at the outset of the AFC system. This strategy has already been adopted by mobile operators, for example, which have large networks of agents present in the regions. Thus, people are familiar with going to a place to sign up for services, topping up accounts, asking for help. Once the AFC system is mature, some of the agents' role can be handled by other channels. Currently, most customers in EM are not yet online and thus they need physical channels for customer service.

The role of the agent staff includes marketing the AFC system to customers and answering their questions, dissuading their fears about the system. The agents can also sign up customers for the card and load value onto their cards. One needs a high number of agents especially at the onset of the system. For example, one might need 2 or more agents per transit vehicle in order to try and sign up as many customers on each vehicle as possible. One

of the risks of having agents is that the agents can be targets for theft if they carry large amounts of cash.

Also, the agents might perform abuse on the system such as defrauding customers or colluding with conductors in order to meet their performance targets. For example, if an agent is compensated based on the number of card signups that he/she completes, then the agent may just signup a large amount of “fake” customers who never transact on the system. The way to combat this is to introduce a nominal card fee for each new signup and/or introduce a minimum deposit for each new signup. This introduces a marginal cost for each signup that will be difficult for an agent to handle. Agents might also collude with conductors in order to meet their performance targets by signing up for “fake” cards that do not belong to real customers and then asking the conductors to transact on the cards even if no transit journey was completed. The result of this is that the agent receives cash back and then can re-use this cash to load value onto more “fake” cards. At the same time, the conductor is increasing the amount of sales that go through the AFC system, thus increasing their commission but no actual real income is generated. It is the same funds circulating in the system. To combat this type of abuse, one can introduce a nominal merchant transaction fee (e.g., 1% of each sale) that can be used to fund the operations of the AFC system. This now introduces a cost for each transaction. Also, one can introduce limits for the number and amount of transactions that can happen on a particular card. One can also block or blacklist offending cards.

It is critical that the standards for agents who are hired are high and that agents are rigorously trained and retrained at periodic intervals. They are the physical manifestation and representatives of the AFC system and their ability to convince customers to sign up and repeatedly use the system is critical. The agents should be on a performance based compensation plan and have adequate number of supervisors to monitor and support their activities and performance. If possible, there should be a healthy balance of fixed agents who are available at popular transit stops and roaming agents who ride onboard the transit vehicles to meet customers where they are.

Conductor Resistance

Conductor resistance is the most difficult challenge of rolling out an AFC system. On our visits to many different countries in EM, we found that conductors and drivers collect the cash payments and then pass the sales on to the owners of the vehicle. Usually, the owners of the vehicle set targets of minimum expected daily sales. The conductor gets to keep any additional funds over the minimum sales. The conductor can then use the leftover funds to pay themselves and all other daily expenses such as fuel, vehicle repairs, insurance, license fees. Conductors often earn very little and their incomes are highly variable depending on ridership from one day to another. The result of this is that conductors have an incentive to underreport the sales to the vehicle owners in order to minimize the owners target of minimum expected daily sales and thus maximize the take home pay of the conductor.

When AFC is introduced, it is direct threat to the conductors income. With AFC, the funds flow directly to the owner, then the owner must pay a salary or commission to the conductor. If the owners pay the conductor a low salary or commission or if the owners fail to pay the conductor regularly at all, the conductor will reject the AFC system. The conductor may do this by sabotaging the AFC hardware, rejecting customers cards with excuses such as

“the system is not working,” overcharging card paying customers or giving discounts to cash paying customers. In our experience in Kenya, some conductors may even physically or verbally abuse card paying customers in order to deter them from using the card. Of course, the result of these types of experiences is that customers will develop a lack of trust for the AFC system.

It is important to have an easy and free customer service channel such as free SMS shortcode where customers can report their complaints of poor service by conductors. However, it is difficult to act on these reports quickly and owners have limited ability to act on these reports. The owners cannot react to the reports in real time and if they can, they have very little ability to influence the conductors since they are the key revenue generator and they are not on any type of performance based contract. The owners’ only option is to fire the conductor (which happens quite often) but the replacement candidates are not typically much different from the previous conductor.

Even when conductors willingly use the system, some of them may act in ways that are counterproductive to the growth of the AFC system because their approach is more efficient for them and makes their work easier. For example, if a customer tries to pay with cash, the conductor could accept the cash of the customer and pay for the customer with the conductor’s card. The result of this is that the customer will never sign up for a card on his/her own and will continue to pay cash. Also, any discount or promotion that apply to card customers will go to the conductor. This kind of abuse is difficult to curtail because the funds will flow to the transit company owner as expected but there will be much less active customer cards in circulation than actual passengers.

The recommended solution to all types of conductor resistance includes fair contracts and compensation structures, training and abuse prevention mechanisms. In terms of fair contracts, conductors in EM are rarely on any kind of employment contract with the bus company owners. The result of this is that they don’t have any guaranteed income, they can lose their job at any time and they don’t get any benefits. When one considers this, their resistant behavior when rolling out an AFC system is very understandable. We found that when conductors were offered a fair contract which gave them some job security there was almost no conductor resistance. In this contract, the conductors compensation should be tied to their performance on the AFC system. For example, the conductor should receive some kind of percentage commission of sales that pass through the AFC system. The compensation should also be paid on a regular monthly, weekly or even daily basis if possible. This type of contractual change must come from the transit company management and it is difficult to get many transit owners to adopt this approach in a short period of time.

Training for transit conductors can also help to reduce resistance. Most conductors in EM have only achieved a basic education level such as primary or elementary school. Some might have attended some years of secondary/high school, but potentially not completed the degree. Thus, there are a lot of fears and confusion that might surface from the conductors when the AFC system is rolled out if it is not explained thoroughly in a training session. From the training, conductors can learn how to use the AFC system, how they will be compensated, how to perform customer service and so on. We found that conductors really enjoy these training exercises because for many of them, it is the first opportunity in a long time that they have been able to increase their skills through a continuing education program. One can also consider adding ancillary content to the training such as basic financial planning and IT skills in order for the conductors to receive other valuable skills.

For the issue of conductors using the AFC system in an abusive way, the solution is to put technical limits on the number of times a card can be used in a given time period and how much can be spent from a given card in that time period. Once these limits are set, conductors will have to sign up for multiple cards in order to continue their scheme. One can then monitor for situations where multiple cards are used by the same conductor in abnormal patterns. For example, most customers use the transit system 2-3 times per day. If there is a card which is being used on the same vehicle 10 or more times per day then one can block or blacklist this card. This means that the card will become unusable and the value in the card will be locked. If the conductor still continues to abuse the system one can block his/her access to the AFC system assuming that the AFC system uses a login mechanism for each conductor. It is likely not possible to ever fully eradicate abuse by conductors but with the techniques mentioned above the abuse can be curtailed to a reasonable level.

Transit Network Coverage

Transit network coverage involves the number of transit routes and the number of vehicles within each route where the AFC system is available. It is critical to achieve high coverage of AFC system as quickly as possible in order to have many places where customers can use their card. If there are only a few vehicles where the card can be used, then customers will be reluctant to sign up for the card and load value onto the card since the value will be “locked.” Getting high coverage of AFC on transit vehicles is tough because of the time required to sign up each transit owner, the cost of deploying the system on each vehicle, and the training of the conductor staff.

Signing up each transit owner is difficult because of the high fragmentation of transit owners that is typical in EM. This was described earlier in the chapter. Additionally, some transit vehicles or associations of vehicles have multiple owners. Some approaches to solve to the transit network coverage issue include having high number of merchant sales staff who are high skilled and well trained. It also helps to provide incentives to transit merchants for joining the system. These could include bonuses for quick signup or meeting AFC sales targets. The incentives could include branding deals where the inside or outside of the transit vehicles are branded with the AFC system if their signups happen by a certain deadline.

The most effective mechanism of getting high coverage of the AFC system is through regulatory approaches. This could be achieved by the local city government consolidating all of the the different transit owners under one umbrella instead of having the fragmentation of many different owners. Once the umbrella organization decides to adopt the AFC system then the rollout process is smoother. Another approach is to enact a government regulation that requires all licensed transit providers to deploy the AFC system. This is less desirable than the first approach as one will have to sign up each transit provider but at least there will be a stronger incentive for the transit owner to adopt the system. Enacting either legislation will likely be politically challenging and will meet much opposition. It might take several months or even years to go from proclaiming the legislation to actually enforcing it. In fact, in some EM, where the rule of law is weak, the legislation might never be fully enforced. AFC system providers should hire or partner with consultants who can help to navigate the policy debates in enacting such a legislation.

Technical Challenges

The technical challenges of rolling out an AFC system in EM are more tractable than the non-technical challenges discussed above. Speed and reliability of the card signup process and the payment transaction is critical. Network speeds are often slow in EM because networks might be slow or congested particularly in urban areas. This challenge can be overcome by using offline communication technologies such as Near Field Communication (NFC) and then using a “store and forward” approach for uploading information to the system. With this approach, transaction information is kept locally on a device and then uploaded once the network becomes available.

Security of the system is critical for any payment system. AFC providers should ensure that their systems are tamper proof to avoid duplication of cards or manipulation of card balances or transaction records. This can be achieved by using the latest secure hardware as well as well recognized security protocols and algorithms. There should also be a risk monitoring component to track abuses on the system. Continuous power and battery life can also be an issue for the AFC system, particularly in markets where power supply can be inconsistent sometimes. The solution is to select AFC hardware that can be battery operated with a long life.

Finally, the design of the system should be as simple as possible. Interfaces should have as little text and as few buttons as can be allowed and interactions should be 1 step if possible. The higher the complexity of the system, the higher levels of literacy, education and training required to deploy it among customers, bus conductors and merchants.

CONCLUSION

AFC systems offer many benefits to customers, merchants, governments and society. However, the cost and effort required for rolling them out are very high. Cities in EM are some of the fastest growing in the world and their populations are expected to swell as urbanization increases. Thus, it is imperative that city officials, urban planners, and financial institutions partner with AFC system providers to deploy these systems. We hope that our experience with the BebaPay system in Kenya summarized with the challenges and solutions in this chapter will be helpful to future AFC deployments in EM. Although the road to AFC deployment may be long and difficult, we found that the results at a macro level for the society and at a microlevel for individual transit owners, conductors and customers can be highly rewarding.

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Chapter 2

REGIONAL SOCIAL RESPONSIBILITY AND KNOWLEDGE ECONOMY: THE ITALIAN CASE

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ABSTRACT

This paper presents a knowledge resource perspective applied to territorial competitiveness and social responsibility. The latter is defined as a pathway promoted by networks of a plurality of local actors - public and private, belonging to the for-profit and non-profit sectors who find that relationships and social cohesion are the drivers for the construction of shared territorial governance and whose policies are oriented towards sustainable development.

Our study integrates an extensive literature review with data from longitudinal empirical research. We have adopted the methodology of qualitative research-based case study. In particular, we focused our analysis on the Italian projects of territorial governance and social responsibility promoted in different regions and we emphasized the case of the Marches. This region was selected as a case study because it is emblematic of the Italian context; the territory is characterized by small businesses

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diffused throughout the socio-economic fabric and by the proactive role taken by local governments.

Applying this model in public policy initiatives would be innovative. The perspective offers a powerful instrument for raising awareness of the gaps that local policy makers should address through their initiatives in the knowledge economy.

Keywords: knowledge, social capital, regional social responsibility, sustainable development, local network, regional growth, territorial governance

1. INTRODUCTION

Corporate Social Responsibility (CSR) is seen as a useful framework within which new ways of collaboration between companies, governments and civil society can lead to the development of innovative mechanisms for governance based on partnership projects (Nelson and Zadek, 2000; Albareda et al., 2004, 2008; Richter, 2004; Midttun, 2005). The EC emphasizes the importance of national and sub-national CSR and sustainability-oriented policies (WCED, 1987) and clearly states that many public policy measures to support CSR are best carried out at national, regional and local level. Coherently, local and regional authorities are encouraged to make smart use of EU structural funds to support the development of CSR, especially amongst SMEs, and to partner with companies to better address problems such as poverty and social inclusion (EC, 2011, p. 12).

Even if governments work in partnership with the private and social sectors, governmental drivers and responses are often divergent, since they are based on different cultural and political frameworks – i.e., the welfare state typology, the organisational structure, as well as the business, social and cultural background (Midttun et al., 2006; Matten and Moon, 2008; Reed and Reed, 2009; Jamali and Neville, 2011; Rahim and Nasrullah, 2013). Individual EU member-states have developed diverse “CSR-oriented governance” strategies, or, in other words, different approaches to CSR (Gribben et al., 2001; Aaronson and Reeves, 2002; Albareda et al., 2008; Fifka, 2012). According to the Albareda et al.’s classification (2007), the policies enforced by European states to promote CSR can be divided into four ideal approaches: the “Nordic model” or “partnership model” (used in Denmark, Sweden and Norway); the “business in the community model” (adopted in the United Kingdom); the “sustainability and citizenship model” (diffused in Germany and France), and the “agorà model” (used in Spain). With reference to these models, in Italy – where laws making CSR practices mandatory do not exist, the “territorial social responsibility” approach, which is founded on the rediscovery of common values shared by economic, social and institutional actors within a territory appears as the most diffused and effective (Del Baldo and Demartini, 2012a,b; Del Baldo, 2015; Del Baldo, 2016 forthcoming) since the CSR multi-dimensionality implies an organized involvement of different actors, on the basis of the different competences put into play, leading to a high presence of regional and local CSR interventions (Lombardo, 2010).

Researchers in different disciplines within the social sciences have recognized that regions are an important focus of analysis, because political, social and production processes and interactions take place there (Tomaney and Ward, 2000; Moulaert and Sekia, 2003; Becattini, 2004). Consequently, regional analyses must become far more central to research

and policy formulation in competitiveness and economic development. Since many of the essential determinants of economic performance seem to reside in regions, national policies are necessary but not sufficient, and much of economic policy should be decentralized at the meso-level (Porter, 2003, p. 571).

The importance of regions may explain why countries with greater economic decentralization, such as Germany, USA and Italy, have been historically successful.

It may also explain why certain provinces or states in countries such as China and India have recently experienced growth rates dramatically higher than others. However, before planning policies for territorial governance, it is important to disentangle the specific key factors underpinning the strength and vitality of a regional economy.

In the light of these considerations, our research question is the following: what are the critical resources affecting the responsible and sustainable growth of local and regional economies?

In order to answer to address this question, this paper will combine two different - but complementary - streams of research.

A first stream of research emphasizes the role of required intangible factors (rules and values “rooted” in the territorial community from which convergent norms and behaviors are produced) that allow the positive evolution of a business context: ethics, legality, social cohesion, and sustainable development (Del Baldo, 2009, 2012; Del Baldo and Demartini, 2012a). The second one identifies assets such as those critical and strategic knowledge resources that affect a specific regional system’s performance and processes of value creation (Teece, 2000; Marr and Schiuma, 2001; Marr et al., 2004; Boschma, 2004; Bounfour and Edvinsson, 2005; Schiuma et al., 2005, 2008; Lerro and Carlucci, 2007; Schiuma and Lerro, 2008; Lerro and Schiuma, 2009; Lerro, 2011). Building on these two streams of research, our paper aims at drawing an interpretative framework in order to identify the intangible drivers influencing regional systems’ competitiveness and sustainable growth.

This will then serve as the framework for analyzing a particular experience of territorial governance promoted in Italy and in particular in the Marche Region. The latter was selected as a case study because it is emblematic of the Italian context; indeed, the territory is characterized by the diffuse presence of small businesses in the socio-economic fabric and by the proactive role of the local government.

This paper proceeds as follows: In section 2 a literature review is presented in order to draw an interpretative framework; section 3 outlines the research methodology and the findings of the analysis are presented in section 4. Finally, discussion and conclusions follow in section 5.

2. THEORETICAL FRAMEWORK

2.1. A literature Review on Regional and Territorial Social Responsibility

Recently, the economic literature is turning its attention to the universe of the SMEs in order to verify and support their role in promoting corporate social responsibility (CSR) and forms of sustainable territorial development (Carroll, 1999; European Commission, 2002; European Union, 2004; Spence and Schmidpeter, 2003; Spence et al., 2003, 2004; Perrini,

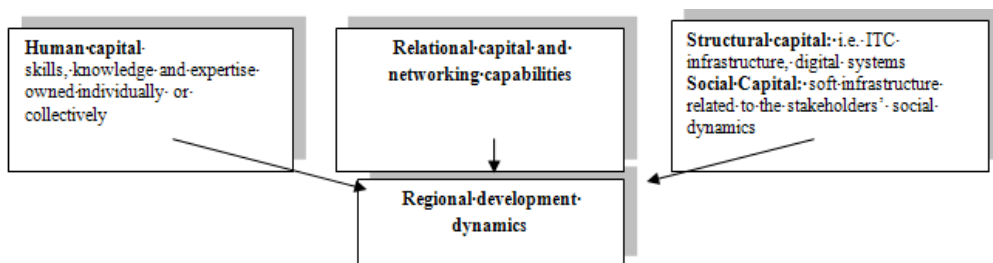
2006). Researchers agree that good CSR practices are linked to, and reinforced by, the personal characteristics of small entrepreneurs who are deeply rooted in their socio-economic context. In particular, CSR depends on the entrepreneur's ethical orientation and values (Morsing, 2006; Longenecker et al., 2006). As far as Italy is concerned, the above-mentioned values spring from a mix of rural culture and an urban culture stemming from Renaissance Humanism, which provides the basis of Italy's civil economy and is considered the heritage of the nation (Bagnasco, 1981; 2004; Putnam, 1993; Del Baldo, 2010). When there is a common aim to improve the quality of life that bind individuals and organizations belonging to the same territory, it is possible to introduce the notion of Territorial Social Responsibility founded on the rediscovery of shared values such as identity and a sense of belonging to a precise cultural and ethical context, which the territory's economic, social and institutional actors know how to reinforce, thanks to solid networks of relationships (Del Baldo and Demartini, 2012a,b).

The sharing of values and behavior patterns - creating a climate of collaboration and dialogue and to establish a set of relationships between different actors - generate the relational infrastructure of the territory, its capital context, its ability to express intangibles that are distinctive and difficult to reproduce elsewhere, and the ability to generate socio-economic development. This "territorial capital" is linked to the concept of social capital as a set of beliefs, norms, traditions and attitudes that drive the behavior of individuals and organizations belonging to a definite community (Bourdieu, 1985).

However, this approach can be applied only in specific social and economic contexts where all local actors have absorbed a common culture that spreads in trust and mutual values with respect to the way business is run.

As the literature poses (Becattini, 1990), there are some territories in Italy (such as the Marche Region – along with other Italian territories such as Tuscany, Emilia Romagna and the Veneto) that are characterized by an environment in which local actors share a collective identity based on the history of the region where they live (Bagnasco, 2004; Putnam, 1993; Del Baldo and Demartini, 2012a).

In those regions where the sharing of values and behaviour patterns create a climate of trust and collaboration, the routes of sustainable development are based on the capability to take part in (as well as to activate) networks which include several actors: institutions such as municipal, provincial and regional authorities; enterprises; trade and entrepreneurial associations, consumer and non-profit organizations; universities; chambers of commerce, banks, etc. These networks, whose goals are to promote a model of sustainable economic development, are assets of Territorial Relational Capital (see Graph 1).



Graph 1. Key intangible assets as per the knowledge-based regional development perspective.

Coherently/Accordingly, key intangible assets as per the Territorial Social Responsibility perspective include Social Capital (intended as common beliefs, traditions, values and attitudes oriented toward social responsibility) and Relational Capital (developed through territorial networks and regional public-private networks for a sustainable development).

A strong territorial component characterises the public policies implemented in Italy where “local public entities are among the more active promoters of CSR and sustainability issues” (Lombardo, 2010, p. 9). Initiatives include direct contributions (in terms of money or service), also addressed to companies and other organisations; indirect contributions (i.e., practices aimed at promoting CSR culture in favor of workers) and mixed contributions (I-CSR, 2009; Fondazione Operandi, 2008). Moreover, CSR policies are intense at the regional and provincial level where trade and entrepreneurial associations (i.e., Confindustria and Unioncamere) carry out an important role alongside public and private institutions, with particular reference to private life/work balance, health and safety (through initiatives such as quality and safety certifications). The coexistence of different private and public approaches is due to the complex nature of the Italian socio-economic system that for structural (i.e., the predominance of SMEs and the role of local districts) and historical reasons (i.e., the importance of the cooperative movement) have characterised its attentiveness to social relationships and is at the base of the “Territorial model of social responsibility” which is typical in Italy.

2.2. Italian Experiences of Territorial Social Responsibility

The Italian National Action Plan on CSR 2012-2014 (Ministry of Employment and Social Policies and Ministry of Economic Development, 2012) defined the national strategy for CSR with reference to the European strategies profile⁷, government commitments, and for the first time defined the territorial dimensions of CSR and of the other protagonists involved. A specific section of the Plan is explicitly dedicated to the territorial dimension of CSR and the actions of central administrations as well as those of regions and other local administrations. “With the emphasis on the internal and external relations of enterprises with respect to the stakeholders and their territory, we can speak of Territorial Social Responsibility when public policies promote synergies and partnerships at a local level” (Italian National Action Plan - Ministry of Employment and Social Policies and Ministry of Economic Development, 2012, p. 10).

The priority ambits of CSR regional actions are business and employment (Ministry of Labor and Social Affairs, 2004). There are only two cases (Umbria and Tuscany) in which regional laws exist, which specifically regulate CSR. In the context of more than 50 initiatives completed up to 2011 (Perrini et al., 2006) CSR is considered in operational programs co-funded by structured European funds in eight cases.

⁷ The European strategy departs from indications on CSR contained in Europe 2020 and is structured around three priorities: intelligent growth (develop an economy based on knowledge and innovation); sustainable growth (promote a more efficient economy within a profile of greener and more competitive resources); inclusive growth (promote an economy with a high rate of employment which favors social and territorial cohesion). The lines of actions relative to the first phase carried out through the Action Plan of the European Commission for the period 2011-2014 include: the promotion of CSR visibility and the spreading of good practices; the improvement of processes of self-regulation and co-regulation; emphasizing the importance of national and sub-national policies relative to CSR; the best alignment of European and global CSR approaches.

In the territorial social responsibility context the administrations' actions are shared by other protagonists such as: trade associations, Chambers of Commerce - which assist companies through information and training - trade union and non-government organisations (those belonging to the non-profit sector, active citizenships and civil society) and the financial system (through the actions of the forum for sustainable finance, ABI – Italian Bank Association - banks, and ethical finance).

In the following table (Table 1) we enumerate the earliest Italian experiences that have promoted concrete CSR and sustainability-oriented strategies and practices in their respective local contexts (regions, provinces, towns) based on the collaboration among mixed networks of actors for the construction of a shared territorial governance.

Table 1. Some examples of territorial social responsibility experiences

Italian Region	Initiatives (network actors, project's aims, expectations and results)
Emilia Romagna	<p>Among several territorial projects oriented to local sustainable development one can mention the following:</p> <p>1) <i>The experience of Modena's districts</i>, centered on improving the quality of the environment, economic well-being, social cohesion, and innovation – among the main Modena's industrial districts (i.e., mechanics, ceramics and textiles) whose promoters are represented by Focus Lab, an independent research and service center, the Province of Modena, the local Chamber of commerce, the municipality of Modena, the association of ceramics producers and other industrial and social organisation (Sancassiani and Frascaroli, 2009).</p> <p>2) The territorial governance model “<i>Strategic Plan of Rimini</i>,” which has been developed by the Province of Rimini, the local Chamber of commerce and a local bank foundation (the “Cassa di Risparmio di Rimini” Foundation) and is centered on the participation of the different city's economic, social, and cultural organizations (eight working groups consisting of 300 people who represented over 50 organisations took part in a numerous multistakeholder forums) aimed at raising the quality of the landscape in the productive areas, sustain innovative and high-quality businesses (i.e.: across agencies for innovation, observatories of innovation, agencies of international relations, the creating of a technological park, a free zone of innovation) (Baldarelli, 2007).</p> <p>3) The “<i>Responsible economic district</i>” in the Province of Rimini, promoted in 2004 by the non-profit association Figli del Mondo (“Children of the World”) and the Rimini Chamber of Commerce, aimed at spreading the culture of CSR and sustainability in the local areas through the project “PercoRSI” (CSR Pathways) which is based on a continual and dynamic networking activity with local institutions, trade associations, professional orders, for profit and not for profit companies and civic organizations (Sbraccia, 2010).</p>

Italian Regions	Initiatives (network actors, project's aims, expectations and results)
Liguria	<p>In December 2012 the Liguria Region endorsed the <i>Inter-regional project for the "Creation of a network to spread social responsibility in companies"</i> to carry out a study comparing the standards and indicators of RSI and social-environmental sustainability adopted by the various Italian regions (Liguria, Marches, Tuscany, Veneto, Lombardy "Good Practices" project developed by Unioncamere Lombardy).</p> <p>The comparison was extended to standards adopted by national organisations (i.e., Confindustria, ABI-Associazione Bancaria Italiana (Italian Bank Association) standard CSR-SC Social Statement (promoted by the Italian government) and other national and international standards of accountability and process (i. e. GBS, GRI, ISO26000) (Lombardo, 2012).</p>
Lombardy	<p>Similar paths of territorial responsibility, founded on sharing the social, relational and structural capitals of a community are the following:</p> <p>1) <i>The Province of Piacenza</i> (Regional law 17/2005: "Norms for the promotion of employment, quality, security and legality of labor") implemented the theme of CSR and sustainable development, and supported the project called "The Regional Mark of Social Quality" based on the collaboration among the local Prefecture, the provincial director of labor, the local branches of the State healthcare system and the local Chamber of Commerce, focused on sharing and monitoring emergent local CSR practices (Monaci, 2007).</p> <p>2) The consortium for productive and social quality "Brianza Development" (formed by several Municipalities, the Province of Milan, the Milan's Chamber of Commerce, business associations, trade unions, no-profit organizations, multi-utility firms and the credit system) is a mixed network that promotes forms of local governance oriented to improve the territory's productive and social qualities (Sviluppo Brianza, 2009).</p>
Marches	<p>The first Marcheian territorial network "SIRM project" (The Marche Region's Responsible Business System) created in 2005 for implementing socially responsible systems and to institute a regional registry for SME- that adopt and promote socially responsible practices.</p> <p>The Marche Region's I.Re.M. Project 2009-2011- Responsible Businesses of the Marche Region - aimed to create "ethical territorial networks" to improve the quality of life and the quality of work in the Marcheian territory (Regione Marche, 2006; Del Baldo and Demartini, 2012c).</p>
Tuscany	<p>An example of territorial "operationalization" of CSR centered on cooperation around environmental sustainability was experienced in <i>the Province of Lucca</i> through two projects, respectively promoted by networks composed of local public authorities, industrial local organizations and businesses belonging to local clusters: 1) <i>the LIFE-funded PIONEER Project</i> - Paper Industry Operating in Network: an Experiment for EMAS Revision and 2) <i>the COOPERATE Project</i> - Corporations Operating in a Responsible and Transparent Environment (Molteni, Antoldi and Todisco, 2006).</p> <p>A further example is provided by the <i>Fabrica Ethica project-Tuscany for</i></p>

Table 1. (Continued)

Italian Region	Initiatives (network actors, project's aims, expectations and results)
	<i>social responsibility in businesses and in its territories.</i> In this case the Regional Department of Productive Activities promoted (through several labor groups of co-analysis, co-planning multistakeholder approach) the management system of ethical certification SA8000 in the leather and tanning regional industry through the supply of a contribution to a fund and tax breaks (Paloscia, 2007).
Veneto	The main territorial-based projects of CSR and sustainability include: <i>1) The Venetian Laboratory "Veneto Responsabile,"</i> a regional network for CSR born in 2002 as a no-profit association (later converted into a consortium) based in Padua, whose aim is to promote a business culture oriented toward CSR and to facilitate the diffusion of best practices through the construction of a public-private network among diverse subjects belonging to the socio-economic and institutional regional context (the Veneto Region, popular banks, foundations, cooperatives, forum for the third sector) oriented to construct the common good through a multi-stakeholder approach. <i>2) The Shoemaking District in the Brenta Riviera,</i> which include several Provinces in Padua and Venice, businesses, trade associations and unions involved in different project such as agreements of intent (1995), territorial pacts (2000), a territory-wide council of shoemakers (2001); territorial brand (2002) (Peraro and Vecchiato, 2007).

2.3. A Literature Review on Knowledge Assets at a Meso-Level

The concept of a "knowledge-based economy" acknowledges that knowledge represents a key strategic source of growth and wealth creation in today's complex business environment (Teece, 2000; Marr and Schiuma, 2001; Marr et al., 2004; Perrini and Vurro, 2010).

Lerro and Schiuma (2009) identify knowledge assets as those critical and strategic knowledge resources affecting a specific organizational and territorial system's performance and processes of value creation: human capital, structural capital and relational capital (Dakhli and De Clercq, 2004; Huggins, 2003; Iyer et al., 2005; Sanchez Medina et al., 2007; Bontis, 2004; Pasher and Shachar, 2005; Noronha Vaz and Nijkamp, 2009).

The first category (human capital) pertains to people's skills, knowledge and expertise, which allow the individual to foster innovations, changes in activities, and economic growth (Coleman, 1988). Human capital can be developed through formal training and education (Dakhli and De Clercq, 2004). Better educated people, with more extensive work experience and an interest in investing more time, energy and resources into improving their skills, are more inclined to provide higher benefits for themselves, and at the same time are better able to contribute to the overall well-being of the society (Schiuma and Lerro, 2008: 128). With reference to a regional context, human capital essentially comprises the know-how

characterizing the different actors operating within a region. “In some cases, the know-how may reside in the individuals; in other cases, the know-how may be collectively owned by region’s stakeholders” (Schiuma and Lerro, 2008, p. 124). The second asset, relational capital and networking capabilities, represent another factor that is fundamental for innovation (Rondè and Hussler, 2005). Numerous scientific and policy contributions have outlined the importance of formal and informal relationships among the different regional stakeholders to activate and sustain value creation dynamics (Piore and Sabel, 1984; Becattini, 1990; Brusco, 1982; Storper, 2005; Cappellin, 2003).

Some researchers linked the diversity and the cooperation of local networks with theories concerning organizational learning, underlining the importance of the cognitive processes involving the different actors of a network (Nonaka and Konno, 1998). This approach is strongly based on the concept of a “learning region,” which posits that a local system’s ability to evolve is strictly related to its capacity to sustain a continuous learning process (Maillat and Kebir, 1999).

Thirdly, the importance of structural capital emerges as a knowledge-based dimension that grounds region’s capacity for innovation (Lambridinis et al., 2005; Schiuma et al., 2008). Structural capital includes all of those assets which are tangible in nature but play a fundamental role in the development, acquisition, management and diffusion of knowledge at the regional level. A relevant component of structural capital is represented by technological infrastructures, which support a region’s capacity for innovation. These include information communication technology (ICT), digital communication systems, and networks. Moreover, particular attention should be paid toward the fundamental role of local firms as repositories for knowledge that can activate and sustain virtuous pathways for regional development. Other regional knowledge repositories are universities and research centers.

Finally, social capital (Nahapiet and Ghosal, 1998) is a special component of regional structural capital (Adler and Kwon, 2002; Lerro and Carlucci, 2007; Schiuma et al., 2005, 2008). Social capital comprises knowledge assets related to the soft infrastructure of a region, which are predicated on dynamic interdependencies that link regional actors. The social dimension is a fundamental factor affecting a region’s capability to create value, since it is related to stakeholders’ social dynamics contained within a local system, which includes their values, culture, routines, behaviors, networks, identity, and atmosphere.

2.4. A Combined Conceptual Framework

The idea to combine these two perspectives was suggested in a seminal paper by Porter and Kramer (2011) entitled “Creating Shared Value” which argued that a new way to achieve economic success would be to develop new skills and knowledge – such as a far deeper understanding of societal needs, the company’s productivity, and the ability to collaborate across for-profit and non-profit fields.

With reference to the regional context, Porter and Kramer suggested that the creation of shared value could enable the development of local clusters since the success of every company is affected by other connected companies and regional infrastructure. Productivity and innovation are influenced by the concentration of firms, service providers and logistical infrastructures in particular fields such as ICT into clusters. Clusters include not only businesses but also research centers, trade associations, and standards organizations. Local

clusters provide public benefits such as high quality schools and universities, fair competition laws, business ethics and market transparency. On the other hand without a supporting cluster, innovation and productivity suffer. Building on the above-mentioned streams of research, Territorial Social Responsibility and Regional Knowledge-based Development, our paper aims to construct an interpretative framework that can identify the intangible drivers influencing the competitiveness and sustainable growth of local systems. Both of these strands of research emphasize soft intangibles such as common beliefs, traditions and values which are prerequisite for trust and effective regional stakeholders interactions.

However, within the first research perspective, these common values are the basis for the orientation of companies and institutions toward social responsibility and sustainability, which is interpreted as a new, individual and collective capability to create shared value. Thus, accepting this proposition, we suggest that social capital (here including values and attitudes oriented toward social responsibility) is the meaningful intangible asset that influences the dynamic capability of regional stakeholders to strengthen the others.

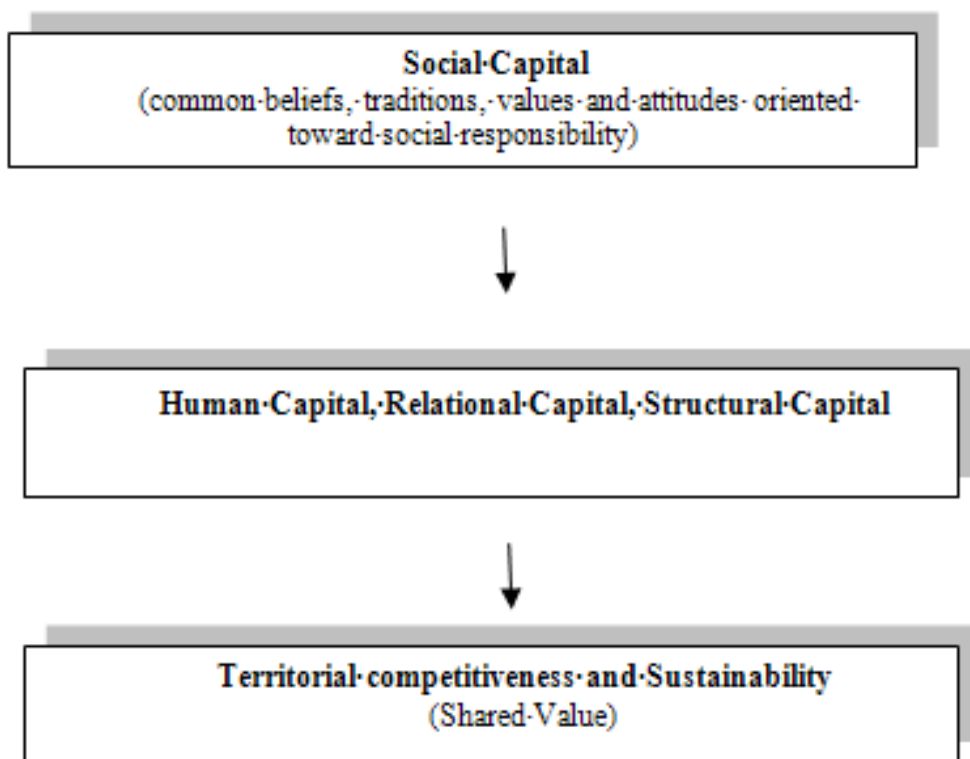
On the other hand, we think that the second strand of research offers an important contribution for understanding the process of sustainable local development through a region's capacity for innovation. The latter includes both the innovation dynamics taking place at the regional level, and those which could be developed by policy and management activities aimed at leveraging local knowledge resources (Lee and Choi, 2003; Marr et al., 2003; Darroch, 2005; Noronha Vaz and Nijkamp, 2009; Andreeva and Kianto, 2012; Kianto et al., 2013).

Moreover it is important to emphasize that human, relational, and structural capital have a strong impact on the dynamics of regional development. In fact, best practices of local development stem from the combination of several forms of knowledge assets that complement and strengthen one another (Schiuma and Lerro, 2008). In light of the above-mentioned propositions, our conceptual framework is depicted in graph 2 below.

3. METHODOLOGY

This conceptual framework will be applied to a case study of the Marche region. The Marche is of particular interest for two main reasons:

- 1) the presence of numerous SMEs who excel in providing for the economic and social well-being of their community. One study by Unioncamere (2014) reveals that 18.3% of the businesses regarded for their best practices come from the Marche region.
- 2) a regional Public Administration that is particularly sensitive to its citizens' quality of life and to the themes of CSR and sustainability, and, since 2005, have initiated pathways of territorial social responsibility through the projects Sirm and I.Re.m, which will be analyzed below.



Graph 2. A conceptual framework for territorial competitiveness and sustainability.

The empirical study was developed according to a qualitative approach and a case study methodology (Yin, 1994) for the dual objectives of detailing the principle characteristics of the phenomena, and for both understanding and analyzing the dynamics of a given process (Lerro and Schiuma, 2009). Methodologically, the development of a case study represents a strategy of research that is concentrated on the comprehension of the dynamics that characterize specific contexts (Eisenhardt, 1989; Eisenhardt and Graebner, 2007).

The analysis was based on information collected in a multi-year period - the first period between October 2009-November 2010 and the second beginning in the second half of 2013 and continuing up to the second half of 2014- through in-depth semi-structured interviews as well as informal conversations addressed to regional public administrators from the Marche Region (Department “Public sector and labor market” - Working Group for Sustainable Development) who are involved in the projects presented below. In addition, interviews were conducted with diverse actors within the regional network: public officials from the Provinces, representatives of associations, trade unions and institutions in the Marche region (i.e., Chamber of Commerce), entrepreneurs, managers of KPMG Advisory Spa (technical partners and coordinator of the I.Re.M. project). We performed face-to-face interviews of two top managers of Marche Region, two public officers, three entrepreneurs and six professionals.

With the permission of the interviewees, the interviews were tape-recorded. The interview format, though semi-structured, allowed additional questions. We transcribed

approximately 30 hours of interviews, which varied in length from 30 minutes to two hours, averaging 50 minutes each.

This transcription greatly facilitated the narrative of the case study that follows. Field notes and informal conversations complemented the taped interviews.

The primary data were then combined with secondary data from the public institutions and companies' websites, newspapers and magazine articles and other internal documents.

Finally, we informally observed the interactions (with internal and external stakeholders) of the network's actors during technical committees, forums and workshops (triangulation of methods). First, a narrative description of the selected case study will be presented; next the investigated phenomenon will be interpreted in the light of our conceptual framework.

4. THE ANALYSIS

4.1. The Narrative of the Case-Study

What follows is an analysis of the roles and forms of diverse actors in experimental projects promoted by the Marche Region, defined as "ethical territorial networks." This term marks "a type of coalition between local institutions, businesses and civic organizations that commit themselves to voluntary, reciprocally advantageous relationships, and follow a common social objective: to improve the quality of life and the quality of work in the Marchegian territory" (Regione Marche, 2006, p. 6).

The First Marchegian Territorial Network: The Marche Region's Responsible Business System (S.I.R.M.)

The Marche Region's Responsible Business System was created in 2005 by a consortium of 120 Marchegian businesses, assisted by institutional partners (among them, the Marche Region's social service ministry) and by diverse civic and institutional organizations (trade unions, non-profits, consumer associations). Its scope was to foster synergy among territories, institutions, businesses, entrepreneurial associations, social actors and informal networks in civic society, which encouraged firms to adopt best practices of social responsibility. In particular, the project had two principal goals: to institute a regional registry for SMEs, agricultural businesses, non-profits, and public administration organizations that adopt and promote socially responsible practices; and to fund the implementation of socially responsible systems by local public administrators, non-profits, agricultural businesses and SMEs in the Marche Region. The initiative involved a pilot sample of small and medium-sized Marchegian businesses (19 companies).

The Second Phase: The I.Re.M. Project - Responsible Businesses of the Marche Region

The Marche Region's I.Re.M. (2009-2010) aimed to improve the inroads already made with S.I.R.M. (2005) by inaugurating a second phase of the model of Marchegian social responsibility. Specifically, the objectives of the project included creating a regional CSR system; developing regional CSR guidelines; implementing a CSR code of conduct; extending the test to 50 firms in all sectors, with a particular focus on the footwear and

furniture industries; developing and applying the designation of Socially Responsible Business; and creating a database of socially responsible enterprises, organized by the level of responsibility they have achieved, which can be accessed from the Marche Region's website. The advantages for the participating actors and their respective roles were clearly identified through a network instrument and reciprocal comparisons (Table 2).

The Third Phase: Toward the Inter-Regional Network

In February 2013 the Marche Region, after having developed two regional CSR projects (Del Baldo and Demartini, 2012c), supported and approved the adhesion to the agreement protocol for carrying out an inter-regional and transnational project for the creation of a CSR network entitled "The creation of a network for the spreading of corporate social responsibility," with the support of the Ministry of Employment and Social Policies and the Ministry of Economic Development (Regione Marche, 2013). This unique protocol has been undersigned by thirteen Italian regions (out of 20 regions) of the North, South and Centre (Friuli Venezia Giulia, Valle d'Aosta, Piemonte, Lazio, Liguria, Lombardia, Abruzzo, Umbria, Toscana, Veneto, Puglia and Sardegna).

The activities were funded with European Fund resources of the 2007-2013 program. The objective of this agreement, open to other regions (recently Campania and Emilia Romagna have joined) is to collaborate to define common paths for spreading social responsibility. One of the first steps was to share the results of CSR and sustainability-oriented programs from different local experiences. The governance of such a network is represented by an inter-regional and technical Committee which co-ordinates activities in the realm of the agreement and is composed of managers who are specialists in their subjects and representative of each of the member administrations. Their tasks are summed up in the table below (Table 3).

This agreement further develops (from a regional level to an inter-regional level) the paths and projects of territorial responsibility in the Italian regions and posits the shift to a progressive intermediate level.

Table 2. The roles and advantages of network actors

Role of actors	Advantages of participating actors
Associations and representative organizations Raise awareness among associates to favor participation in the project, and to bring associations into project development initiatives.	Associations and representative organizations Create opportunities for their associates and promote the development of an entrepreneurial culture that is responsible and attentive to innovation.
Large-scale businesses Plan meetings between SME providers (i.e., workshops) to create a "responsible supply chain"	Large-scale businesses Utilize the I.Re.M. project to formalize the development of a socially responsible supply chain.
Small businesses Participate in the experimental phases of the project.	Small businesses Benefit from the support of a society of external consultancy to utilize guidelines, put in place pathways of social responsibility, and to valorize intangible capital.

Table 3. Tasks of the Inter-Regional Technical Committee

1	Steering, monitoring and evaluate activated initiatives
2	Share tools, products, practices and knowledge on CSR
3	Ensure the systematic flow of information, in order to consolidate a stable process of consultation and sharing of each other's programs and activities to pool experiences
4	Identify and implement cooperation, for the exchange and development of activities, products and services of common interest
5	Supervise the implementation of initiatives, through operational meetings (including any contacts or interlocutors identified by the partners themselves), aimed at ensuring the realization of the projects according to the time and manner to be agreed.

The presuppositions are represented by internal contingent factors (the willingness and orientation of institutional protagonists, of companies and other subjects participating in the CSR projects already undertaken) (Del Baldo and Demartini, 2012a) and by external contingent factors related to the normative references at a national and European level (EC, 2001a-b, 2002a-b, 2006, 2011).

In the light of these presuppositions, the regions have established a shared course of CSR action taking into consideration that:

- The EU ruling n. 1081/2006 of the European Parliament and Council of 5th July 2006 relative to the European Social Fund sustains transnational and inter-regional actions, in particular through the sharing of information, experiences, results, good practices and the development of joint strategies and actions.
- The administrations adhering to the protocol consider in their operative programs and lines of intervention aimed at promoting the completion and development of networks on an inter-regional and transnational basis.
- The members share the willingness to carry out operations for the exchange and diffusion of good practices at a local, national, European and international level relative to CSR and to highlight it more in regional politics.

4.2. Interpreting the Case-Study through the Lens of the Suggested Conceptual Framework

In Table below (Table 4), the investigated case study will be outlined in the light of our conceptual framework. In particular, we will apply it to the projects promoted by local authorities of the Marche Region to enhance business responsibility. Our aim is to assess if these initiatives have succeed on strengthen the effective intangible key factors promoting a regional sustainable development.

The experimental phase produced a number of positive results. In particular, it allows for the analysis of the state of CSR within the participating businesses, which helps define the values contained in their codes of conduct and appreciate the importance of Marchegian culture and traditions. It also helps businesses to more clearly define their sustainability profile.

Table 4. Intangibles output of the Marche Region project

Social Capital		
Appreciating the importance of Marchegian culture and traditions		
Human Capital	Relational Capital	Structural Capital
Learning about other national and international experiences	Multi-stakeholder forums	Development of instruments of external communication (i.e., “sustainability scorecard”)
Training for certification in ISO 9001, OHSAS 18001, ISO 14001 e SA 8000 management systems		However, the process of adhering to the system and outlined the process of recognition and rewarding (awards, incentives and fiscal relief, tax breaks) have only been envisioned and not implemented.

It also helped every firm identify aspects for improvement, so that they could embark on a pathway of social responsibility; grow in their understanding of the importance of the adoption of socially responsible practices by learning about other national and international experiences; and develop instruments to monitor and manage CSR processes.

The interaction among network actors has also helped redefine base indicators of the territory, of the operative sectors and of the different business typologies; it also improved the process of defining a minimum level of social responsibility, paying particular attention to the most diffuse management models. Finally, it helped develop instruments of external communication through a “sustainability scorecard.”

Nevertheless, we should not consider the project as finished, but rather the beginning of a future phase. Stemming from participants’ evaluations of the multi-stakeholders forum and from the needs expressed by the territory’s businesses and stakeholders, this future phase should accomplish the following objectives: first, to introduce criteria for different levels of evaluation and for developing cohesion within a regional system; second, to implement a rewards system; and third, to institute a permanent, independent supervisory organism to check the regional system.

Moreover, the inter-regional network agreement represents a further step along the meso-level path to CSR which is the result of two “tensions.” The first one is endogenous, in the sense that is attributable to the Marche region, in view of its typical social, cultural and economic framework, which incorporates (and at the same time strengthens) the CSR and sustainability orientation.

The second one is due to a synergistic effect, because the CSR orientation is reinforced by comparison with the experiences of other Italian regions, such as Tuscany or Veneto (Paloscia, 2007; Peraro and Vecchiato, 2007), allowing to lead the path from the meso to a macro level and to follow a bottom-up logic (Del Baldo and Demartini, 2012b) on the basis of considerations shared by regional administrations whose premises consist of internal contingent factors (such as the orientation of the institutional actors, enterprises, the other participants in the CSR projects already undertaken) and external contingent factors (represented by legal national and European regulations).

5. DISCUSSION AND CONCLUSION

The following reflections are articulated around two points that focus on the most relevant aspects emerging from our analysis.

1) Awareness of Key Intangibles for Territorial Competitiveness and Sustainability

The study of businesses and their territories was first framed by the perspective of univocal observation. More recently, the hypothesis of the co-evolution of subjects and contexts was suggested, emphasizing both how the evolution of the firm is more than just simple adaption to outside environmental factors, and how it is essential to penetrate the sustentative mechanisms to “capture” driving factors.

This key reading considers firms and territories as systems that are partially or relatively open, dynamic, and contextualized in time and space. Each system possesses a critical resource, and both search for a common logic for coexisting in a way that both derive mutual direct and indirect benefits at the micro-and meso-economic levels (Del Baldo and Demartini, 2012).

This holistic development requires the diffusion of soft factors (common rules and values from which shared norms and behaviors are produced) that help the positive evolution of the business-context: ethics, legality, and social cohesion.

Thus we deem that sustainable regional development requires the strengthening of key intangibles at the local level. This includes reinforcing social capital (ethics, legality, social cohesion, and attitudes oriented toward social responsibility), human capital (skill, knowledge and expertise owned individually or collectively), and high-quality knowledge-based infrastructures, which play a fundamental role in the development, acquisition, management and diffusion of implicit and explicit knowledge at the regional level (stored in depositories such as schools and academic programs, research centers, ITC infrastructure, digital systems, etc.). These are the prerequisites for creating shared value and enabling cluster development.

This model seems to be able to produce important medium to long-term effects and a change in culture and approach toward responsibility and sustainability as well as offering tools and concrete actions to implement planned CSR programs at a local level. Such an approach is facilitated by context factors which make up the social capital of regions and reinforces (through the multistakeholder approach) rational and human capital (Lerro and Carlucci, 2007; Lerro and Schiuma, 2009). However, the development of existing structural capital (intended as those infrastructural assets which, even if tangible in nature, incorporate codified knowledge which is essential to define the knowledge domains at the basis of regional economic and production activities) appears in some Italian regional contexts to be a “weak link” as it would imply a more proactive tendency to competition and innovation in the regional system of value production. This gap is due to the weak co-ordination among the policies of the various regional councillorships (in production, tourism and training) which would otherwise make a holistic approach to sustainability and responsibility more concrete by involving other policy makers in the project. For instance, the relationship with those stakeholders responsible for training, research and innovation should be reinforced (such as

universities and research centers), just as with those active in the social and financial sectors. Nevertheless, the different cases of territorial social responsibility, as well as the first Italian inter-regional experience, seem to be taking into consideration these weak aspects, but they are still in the early stages, and therefore it is not yet possible to assess the consequences in terms of competition and innovation for the different actors involved, since there needs to be a greater period of time to quantify the tangible and intangible benefits of CSR actions and tools, which develop and mature over the long term.

To enhance the above-mentioned key intangibles, networks of public, for profit and non-profit organizations play a central role.

2) The Role of Synergistic Networks

Porter (1998, 2003) argues that a company's purpose must be redefined by re-evaluating the importance of its "proximity" and its "local source of uniqueness," as well its need to participate actively by "engaging locally" in order to improve the local business environment and the local social capital, "because the health of the local business environment is important to the health of the company" (Porter, 1998, p. 88). Porter and Kramer also emphasize the need of working collectively – public and private – to create the conditions that promote sustainable growth. Governments, both national and local, have new roles to play, and in their industrial policy they "should strive to create an environment that supports rising productivity" (Porter and Kramer, 2006, p. 89). Our findings suggest that CSR and sustainability projects are planned and implemented by public, for-profit and non-profit organizations. The presence of non-profits – whose goals are not linked to producing profit, but to CSR itself - is essential to systematically guarantee levels of social responsibility. Stable and collaborative relations between these three types of organizations provide the foundation for mixed and synergistic networks (Gerencser et al., 2008).

Different actors can play different roles in the development of CSR and sustainability-oriented networks. The role of informer and educator, as well as the role of the regulator, quality controller and supervisor of CSR and sustainability is the realm of public organizations, which institutionally represent the interests of civil society. The role of the motivator and visionary is typical of the non-profit sector. Moreover, the role of stimulus and catalyst can be assumed by public organizations, non-profit organizations, or private companies acting in synergy.

From the analysis of Italian experiences of local governmental initiatives to promote CSR and sustainability through public-private networks, the hypothesis of a move towards the model based on territorial social responsibility in Italy has emerged. This territorial approach - which is based on the SMEs active involvement - facilitates the implementation of CSR and sustainability since it allows: the needs of the community to be met; the planning of initiatives and programs of investment aimed at favoring long-term socio-economic development; the construction of partnerships with local actors; and the evaluation of concrete results (Hutton, 2002). The international and national guidelines suggested by individual EU member-states to improve CSR and sustainability seem often too "far" from the specific culture, needs and expectations of the numerous diverse local environments. They are often characterised by a lack of efficiency at the local level - and, consequently, there is a need for a "contingent" approach in terms of statutory instruments and actions. Territorial social responsibility and

the forms of territorial governance in which it is realized represent a possible and effective response that can convert norms, principles and philosophies oriented to sustainable development into praxis. This is particularly true in Italy.

Finally, we deem that the role of the public organization is fundamental - at the local, national and international levels – but it becomes effective and proactive only when public institutions works in synergy with the actors of the for-profit and non-profit world, overcoming fragmented visions. Integration fosters interesting convergences and pathways of multi-sector networks mixing public/private/non-profit organizations, in which CSR, sustainability and performance growth, can be reached if each actor plays its role correctly.

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Chapter 3

BOARD OF DIRECTORS, *EMOTIONAL BIASES* AND FIRM FINANCIAL DECISION

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ABSTRACT

This chapter deals with the relationship existing between the emotional aspect and decision-making processes. More specifically, it examines the links between emotional biases and effectiveness of the governance mechanisms. The Board of Directors is considered one of the mechanisms governance and protection of shareholders' interests most active and most factor in the control process manager. Thus, in order to improve the explanatory power of the law and finance of the governance we integrated the behavioral dimension in the board of director's role analysis. The objective of this chapter is to show the behavioral biases effect on directors board members control over their investment decisions and corporate finance choice. The primary purposes of this paper are to: consider emotional biases as new research ideas that make important contributions to society. Its incites governments to establish training programs aimed at the development of learning of emotional intelligence. Thus, it has important implications for enhancing the well-being of individuals, organizations and society as a whole.

Keywords: emotional biases, optimism, loss aversion, overconfidence, behavioral corporate finance, investment decision, capital structure choice, dividend policy

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INTRODUCTION

The governance theories have evolved substantially, undressing a shift from create modeling, primarily based on the financial model, into more complex and, presumably, more realistic and pragmatic models involving the whole set of stakeholders, playing a great deal of importance on the productive capacity aspect as much as on the allocation aspect (Jensen and Meckling, 1976; Shleifer and Vishny, 1997; Rajan and Zingales, 1998; Blair and Stout, 1999; Laporta et al. 2000). Governance theories under the efficiency paradigm are all based more or less explicitly, on a particular model of value creation and distribution associated with a organization theory. Governance vision as a set of rules managerial fits the creation model and/or distribution of value retained, which is it self associated with a particular design and firm efficiency. We distinguish the current disciplinary cognitive power.

The first is based on the contractual view of the firm, in its standard version based on the arguments discipline. The firm is represented as a contracts node, that is to say, a policy center responsible for contracting and manage centrally, all contracts necessary for its activity. This argument underlies the firm contractual theories. It is of a restrictive and negative productive project. The source efficiency is “discipline” should be encouraged, monitor ... to ensure that the gains from cooperation are dispelled. The firm exists because it reduces better than the market, inefficiencies due to interest conflicts between stakeholders. The efficiency that underlies this perspective can be presented as an adaptation of the allocative efficiency criterion of Pareto. Milgrom and Roberts (1992), find that an organization is inefficient if there is another product which, on average, over all possible states of the environment, better results for the different stakeholders. Firm value creation finds its origin only in the conflicts interest resolution arising from information asymmetries. governance mechanisms role is to disciplined leaders to respect the firm different stakeholders interests. Difficulties in the application of this approach are that very often it is abandoned in favor of the only productive efficiency which assesses related production resources consumed. Governance Disciplinary vision remains a prisoner of limitations of theories of the firm that underlie that either ignore the dynamic productive, either give a restrictive vision limited to the impact of incentive systems on production choices.

The second is based on the firm cognitive theory. Rationality is assessed not in terms of the decisions consequences, but the processes that govern them. In these theories, value creation depends priority identity and competencies of the firm, designed as a coherent whole (Teece et al. 1994). The specificity of the latter is related to its ability to create knowledge, and thus to be profitable on a sustainable basis. The notion of efficiency used is dynamic. The central problem is not the reconciliation of interests but more than the qualitative coordination, alignment patterns and cognitive models of anticipation. Hence the role of governance mechanisms is essentially incentive and consultancy whose objective is the reduction of cognitive conflicts between partners.

Each approach (whether cognitive or disciplinary) has initiated a process phase in order to reduce the conflicts of interests, problems of wealth/profit distribution and cognitive conflicts. Despite these approaches, contribution in matters of governance, diverse aspects of the governance system have still remained misunderstood or not even perceived, hence there is the need to integrate the behavioral dimension within the governance approaches. In this respect, Sheffrin (2001) has stated that the introduction of a behavioral dimension leads to an

approximation of finance and governance convergence with the other management sciences, which may help mutual complementary overlapping and intermingling.

Thus, the Board of Directors role to evolve according to the changing human capital place in the organization decision analysis. In agency theory, Fama (1980) and Fama and Jensen (1983) attribute the board administration mission control key executives. Williamson (1985), in the framework of the transaction costs theory, considers the board of directors as an organizational mechanism to ensure the security of transactions between the company and its shareholders (capital providers) and between the firm and its leader (providers of managerial capacity). Then, the partnership approach to governance also leads to a different vision of role of the board. Blair and Stout (1999) consider the Board as a hierarchical body, in addition to its role as arbiter in the rent sharing must encourage teamwork. Finally, cognitive governance approach a new vision of the board whose role would also facilitate the development of skills and help build new strategic options.

Parallel to the evolution of the board of director's role, recently, the literature in behavioral finance departs from the traditional financial model to incorporate psychological evidence on non-standard preferences and beliefs, such as loss aversion, optimism and/or overconfidence. These influences tend to steer human judgment, preference and behavior away from the predicted outcome of expected utility theory and lead to systematic violations of the normative assumptions central to the economist's rational model. Members of the board of directors and external auditors are, for example, expected to care about their reputation and their prospects in the job market, which is theorized to discipline their actions. There are, however, limits to reputation as a determinant to behavior.

The Board of Directors is considered one of the mechanisms governance and protection of shareholders' interests most active and most factor in the control process manager. Thus, in order to improve the explanatory power of the law and finance of the governance we integrated the behavioral dimension in the board of director's role analysis. The objective of this chapter is to show the behavioral biases effect on directors board members control over their investment decisions and corporate finance choice.

SECTION 1. BOARD OF DIRECTORS,' *EMOTIONAL BIASES* AND FIRM CAPITAL STRUCTURE CHOICE

Leaders are special agents who can use company resources to entrench and increase their power and the various benefits they perceive (freedom of action, job security, pay, benefits in kind. Strategies developed by rooting leaders aim to increase their discretionary space using the means at their disposal, that is to say, human capital but also the company's assets, to neutralize the systems control and increase the dependence of all the partners of the firm to the resources they control (specific human capital, information asymmetry ...). Agency and transaction costs theories proposed control mechanisms (board of directors) and incentives (stock option) to increase the efficiency of management leaders. The entrenchment theory assumes that these mechanisms are not always sufficient to compel teams managerial managing the firm in accordance with the interests of shareholders. The confrontation of these different theories raises questions the conditions necessary for efficient control systems dimension integration in governance approaches helps to understand phenomena such as:

measures to limit executive compensation, to the extent that excessive compensation levels are likely to increase the over- confidence bias and strengthen leadership through emotional (envy, jealousy ...) certain categories of stakeholders. This involves taking into account the effects of behavioral biases (loss aversion, optimism and/or overconfidence) on the control of the management team. Indeed, the presence of these biases affects the ability to assess alternatives at the controllers and involves questioning the effectiveness of their controls.

Recent research in psychology, neuropsychology provides new insights into the emotions and skills associated with their regulations and generate new thinking and new bridges between disciplines. For Damasio (1994), far from being an obstacle to decision making rational in everyday life, enabling the harmonization of different cognitive processes, emotions, when regulated turn out to be a prerequisite for adaptation and optimal response to a given situation.

Start of this finding the purpose of this section is to show the impact of controller's emotions on the firm capital structure choice.

1. Board of Directors, Optimism and Capital Structure Choice

It is recognized that the degree and effectiveness of the control exercised by the board depends of its characteristics. According to Jensen (1993), in a disciplinary perspective, a board of directors composed of a higher proportion of independent members, chaired by a person who does not branch, and preferably small, would be better for protect the interests of shareholders (Godard and Schatt, 2004). Disciplinary authority of the board is often questioned by many researchers that Shleifer and Vishny (1988) for collusion between its members, but also because optimism can win administrators as it reaches the CEO.

A long line of researchers has commented on the impact of behavior and cognitive factors on decision-making in corporate governance settings. Several researchers have emphasized the importance of skills called "soft" in the field of management and job performance in comparison skills "hard" with more technical knowledge related to logical intelligence and IQ. Emotions are an integral part of many lives, but their over-evaluation is harmful to the individual and its partners. It is useful to know everyone manage to control his emotional proven its commitment to understand complex situations, to know how to decide and influence the behaviors of others.

In this part we will explain the effect of board members optimism on leader financial decision preference (debt, equity and resource internally generated).

1.1. Board of Directors, Optimism and Firm Internally Generated Resource Level

A founding assumption of the optimism behavioral approach to leadership is: leaders lead the company in the interest of shareholders. In other words, a leader optimistic works for the interest of shareholders. This assumption implies the absence of agencies problems neutralizes governance mechanisms role and expanded space discretionary manager. The presence of these control mechanisms considered unreliable with excess liquidity impel the leader to choose the internal resources to finance its projects (Pawlina and Renneboog, 2005). However, awareness of controllers that respect the leader interest shareholders affects the effectiveness of their controls and even the role of governance mechanisms. This implies that

the leader dispose a flexibility allowing it to undertake risky financial decision limiting its replacement. This implies negative correlation between board of directors' optimism level and internally generated resource level.

Optimism refers to the comparison between the estimated realization of positive and negative results. Suggests that positive outcomes are more likely than negative implies a certain level of optimism and influencing skills assessments in the head. The controller optimistic towards future results managerial decisions provides a margin for maneuver its leader and its control limit. The presence of this flexibility pushes the leader to undertake risky decisions including external financial choice.

Barabel and Meir (2002), show that optimistic decision maker (controller) will tend to overestimate their ability to control outcomes. He believes that the risk can be reduced by proper use of professional skills, which led him to choose the means of costly and risky external financing (debt and equity). In other words, this director will tend to overestimate expectations of returns on assets held in the portfolio and select methods of financing riskier. He accepts and encourages the manager to undertake risky financing options over the internally generated resources.

Goel and Thakor (2008), postulate that the investment cash flow sensitivity is significantly increased when leaders are optimistic and overconfident when firms have financial constraints. Comparing them to the agency theory and asymmetric information, these results complement the shortcomings of financial theory for the explanation of the sensitivity of investment to cash flows. In addition, these results justify the priority of the internally generated resource choice. In other words, board members optimistic administrations are aware that the market underestimates their businesses. They obligate the leaders to opt for internally generated resource.

Chang et al. (2009) show the existence of a positive relationship between optimism and uncertainty. This uncertainty regarding the adequacy of available information affects decision making. This uncertainty requires the controller to refuse leader risky choice. Consents is that the market underestimates the risk of his business. It forces its leader in the cash flow used for the limited firm loss risk. This implies positive correlation between directors' board optimism level and firm internally generated resource choice.

1.2. Board of Directors, Optimism and Firm Debt Level

Behavioral research on decision-making argues that bias inevitably affects the judgment of individuals, including that of board directors (Thaler, 2000; Rabin, 2002; Lovallo and Kahneman, 2003). Social-psychological factors thus have the potential to significantly undermine the work of the board as a mechanism ostensibly designed to monitor, guide and control CEO behavior (Prentice, 2003). Thus, the presence of directors extended the optimistic managerial discretion. It uses its leverage to decisional reported its performance. He opted for a supplementary level of debt indicating its discipline. This implies a positive correlation between the optimism of the board and the debt level of the company.

The evaluation of alternatives can be altered by various means both individual perception capacity. All this influences the controller's behavior in the evaluation of its leader financing options choice.

Gervais et al. (2003) have even show that the leaders' delivered stock-options, aimed reducing the agency problems, would encourage them to take even greater risks which contradicts the shareholders' interests. As an illustration, on facing an acquisition plan, and

owing to his their optimism, the leader can overestimate the synergies along with the target (Goel and Thakor, 2008; Campbell et al. 2011). This error of valuation will not necessarily be corrected by the board of directors or by the investors who are themselves victims of a bias of optimism (Rajan and Zingales, 2003). Therefore the presence of directors optimistic encourages the manager to make risky decisions. Well, its optimistic controller's overestimates the capacity of its firms to generate positive cash flow and accept risky decisions. Encourage their leaders to concretize all investment opportunities for their businesses independently to its firm financial capacity. They accept recourse to external modes which debt. This implies a positive correlation between the optimism of the board and the debt level of the company.

Optimism is an unrealistic overestimation of future events, unrelated to personal skills (Fairchild, 2009). A director optimistic sees much more its firm investment opportunities. There will be no tendency to discipline its leader. The latter having a space that allows discretionary decisions to undertake risky reporting performance management. It will tend to make dividend policies. This requires the distribution to choose a external financing method (debt capital market) to finance the perceived opportunities. This implies a positive correlation between the optimism of the board and the debt level of the company.

Mangot (2005) states that the individual is by nature optimistic and mostly will tend to overestimate expectations of returns on assets held in the portfolio. This shows that optimistic directors overestimate the future returns of the shares of the company. Therefore it tends to accept high levels of debt. He is aware that the presence of a high level of debt signal the CEO performance (debt is a way of discipline CEO).

Gervais et al. (2003) emphasize that optimism affects the ability to assess alternatives to the decision maker. Optimistic controller considered that the market overestimates the risk of his business. It accepts risky choices of its leader, the choice of an additional debt level. He is aware that the future performance will be superior to the risk of the company. This implies a positive correlation between the optimism of the board and the debt level of the company.

However, an optimistic director is advising the labor market undervalued its performance trend controller the choice of leader to improve its reputation. He is reticent towards a new issuance of debt deemed costly. This implies negative correlation between directors' board optimism level and firm debt choice.

Islam et al. (2007) point that the presence of asymmetric information the lenders increase the premium charged on the external financing mode (debt or equity). This impulse the controllers to minimize the use of its leader in fashion costly external financing. This optimistic director with his firm growth opportunities seeks to limit its risk by refusing financial external mode (debt). Advice is that the market overestimates the total risk of his business. This implies negative correlation between directors' board optimism level and firm debt choice.

1.3. Board of Directors, Optimism and Firm Equity Level

Directors have the legal responsibility for making virtually all major substantive decisions about the future direction of the company, and for the distribution of corporate income and assets. Optimism level of its directors affects the efficiency of their choice (capital structure choice). One optimistic director considers that the company is still undervalued by the market. This controller must take into account risk and uncertainty about the price movement of shares and takeovers. It therefore avoids the maximum to be financed

by the market (capital increase). This implies a negative relationship between board optimism and external equity financing.

Backer et al. (2004), consider the company policies as appropriate responses to overvaluation and undervaluation of firms by market. Optimistic directors are consent that the market undervalued his company. He is reticent about a new issue of action. This implies a negative relationship between board optimism and external equity financing.

Felton et al. (2003), Gibson and Sanbonmatsu (2004) illuminate the choices investment and financing sometimes risky optimistic leaders likely to seek information and their willingness to solve a given problem without worrying about the success of previous projects and the like. Optimistic controller's impulse their leaders to use the capital increase to take advantage of overvaluation can be offered by the market. They use the capital increase as a signal about its firm performance. This implies a positive relationship between board optimism and external equity financing.

Halov and Heider (2004) argue that a strong general informational asymmetry about the risk of a company leads to a problem of adverse selection that leads companies to issue equity securities. The presence of controller's optimistic leader pushes to materialize all firm possible investment opportunities. Thus, these controllers optimistic view that the market overestimates the risk of their business. They are consent their leaders can manage this risk. It motivates them to use all the funding opportunity which the capital increases. This implies a positive relationship between board optimism and external equity financing.

Executive leaders frequently cultivate susceptible followers and create the necessary conducive environment through their exploitation of a pronounced loyalty bias (Forbes and Watson, 2010). The creation of mutual trust environment between manager and controller affects the effectiveness of their control. In other words, it is aware that controllers optimistic leader working for the interest of his company. He argues in his risky choice even as the use of the capital increase. This implies a positive relationship between board optimism and external equity financing.

Goel and Thakor (2008), attest presence of a negative correlation between individual optimism level and his attitude towards risk. Increased level of optimism controllers reduce the feeling of risk aversion and promotes the presence of risky decision. In other words, the optimism of the controllers impel to encourage their leader undertake risky decisions valuing their companies on the market. They are consent that the use of markets and a good signal on the solvency of the company and its performance. Uses this external financial mode (equity preference) can better control the market leader. This implies a positive relationship between board optimism and external equity financing.

Optimism is an unrealistic overestimation of future events, unrelated to personal skills (Fairchild, 2009). A director optimistic sees much more its firm investment opportunities. There will be no tendency to discipline its leader. It accepts a new issue of shares. Aware that there is additional level of capital increase allows discipline leader. This implies a positive relationship between board optimism and external equity financing.

Optimism refers to the comparison between the estimated realization of positive and negative results. Suggests that positive outcomes are more likely than negative implies a certain level of optimism and influencing skills assessments in the head. The controller optimistic towards future results managerial decisions provides a margin for maneuver its leader and its control limit. The presence of this flexibility pushes the leader to undertake

risky decisions including external financial choice. This implies a positive relationship between board optimism and external equity financing.

2. Board of Directors, Loss Aversion and Capital Structure Choice

In most cases, the decision is complex because, in addition to the difficulty of choosing an alternative from a multitude of alternatives, the decision maker often faces the uncertainty of actions whose results are very imperfectly known at the time of choice. Managers must make daily choices related to the definition of sectors and business strategy, monitoring market investments or equipment, supply management and inventory management of financial risks, industrial or environmental, employment, and the launch of new products.

In recent decades, a significant amount of research in finance, both theoretical and empirical focused on the psychology of leadership and its impact on the process of decision making. These studies have contributed to the understanding of certain behavioral biases that affect the decisions made by leaders namely through loss aversion in the case of financing choices and investment (Kahneman et al. 1991, Stulz 1996, Zhang 1997, Helliard et al. 2005).

Loss aversion means that the decision maker is more sensitive to change negative compared to the reference state to a positive change of the same magnitude (Kahneman and Tversky, 1979). In this part we will explain the effect of board members loss aversion on leader financial decision preference (debt, equity and resource internally generated).

2.1. Board of Directors, Loss Aversion and Firm Internally Generated Resource Level

The individual, by nature, seeks to maximize and improve their well-being consistently. It is particularly annoying to see its financial assets deteriorate in each period. The individual working in the financial world has already met most of their needs and tends to self-esteem he wishes to satisfy. Director therefore threatened by the loss risk status seeking to promote his work as head of the Board of Directors through effective control of its leader financial decisions. It does not accept the use of external financing modes (expensive and risky) in the absence of internal resources. This implies a positive relationship between board members loss aversion and leader internally generated resource choice.

Cressy (2000), also postulates that the higher the level of wealth or financial health of a company increases, the risk aversion in the individual tends to decrease. Thus, the chosen leader cashes flows generated to fund its projects in order to minimize the degree of loss aversion in him and among partners of the firm. In other words, the presence of director's member's loss aversion is positively correlated with the leaders internally generated resources choice. This choice allows him to escape from their control and expand its discretionary space.

Anderson (1983) adds that uncertainty about the relevance of the information available leads to a risk-averse individual "the controller" pulsing has adopted a conservative posture and therefore refuses any decision that may change their current state. Director risk averse of its reputation loss denies any decision has a positive impact on the firm total risk whose fashion external financial mode choice. They force their leaders to use internally generated resource.

Ganzach (2000), documents the relationship between the perception of risk, uncertainty and the individual preferences of decision makers. The author shows that risk perception by

the decision is related to the quality and availability of relevant information. Thus, director uncertain about relevance available information relevance is averse to loss. It avoids the financial risky methods choice (debt: bankruptcy risk, and equity: risk of takeover) and requires the leader to use internal generated resource. This implies a positive relationship between board members loss aversion and leader internally generated resource choice.

Mangot (2005) points that certain lines of business are subject to strong biases, changing the stakeholders risk aversion: this is particularly the case of traders, financial analysts, portfolio managers and board directors members. Latter are subjected to through harvesting and processing information affecting their risk perceptions associated with their control. These individuals are highly showers reputation loss risk. They engage in control their leader and refuse any risky decision. Forcing it to choose internally generated resource to finance the firm investment project.

Verlaine (2008) shows that economic agents do not decide rationally on the basis of probability assessments events occurrence. And cognitive anomalies, fruits emotions and feelings opposed to a scientific and rational decision. As an illustration, a loss averse director seeks to improve its reputation by effective control. He is reticent with respect to financial mode expensive and risky. It does not accept the external financial mode choice that after the use of internal resources. This implies a positive relationship between board members loss aversion and leader internally generated resource choice.

2.2. Board of Directors, Loss Aversion and Firm Debt Level

Emery and Cantor (2005) show that a high financial risk limits the ability of the company to access additional debt. Thus, a director loss aversion and aware of debt negative consequences is interest to reduce its firm debt level. It requires the leader to limit the firm debt level.

Kisgen (2006) shows that the level of debt affects credit rating in a negative way. Thus, a loss averse controller seeks the probability of losses minimization (for him and his company) has an interest in enhancing its business in the financial market. He refuses soon as possible the use of debt financing to improve the rating and performance of its business.

Leary and Roberts (2005) point out that the level of risk companies restricts their access to additional debt. Thus, the level of business risk averse forces the controller to the loss imposed on the choice of a mode of financing without risk to minimize are likely to make losses. It limits therefore be financed by debt to avoid the costs of financial distress.

Rabin (2000) explains the choice of such a decision and the refusal of the other by the decision maker loss aversion level. It only shows that risk aversion (gain or loss) is insufficient to explain such a refusal and loss aversion (risk of loss only) is needed to better explain the choice. Thus, a loss averse controller always seeks the minimization of the losses probability through its control of leader strategic choices whose financing decision. It encourages the presence of funding less expensive (costs of agencies, transaction costs, bankruptcy costs ...) indicating its good management. It therefore requires the leader to prefer cash flow and limited use of debt and equity. This implies a negative relationship between board members loss aversion and leader debt choice.

Islam and Mozumdar (2007) argue that the presence of asymmetries information lenders seeking nature to hedge against the risk of non-recovery, are required to increase the cost of borrowing by an external finance premium. This premium on external financing leads to losses controller's showers encourage internal funding choice. they are reluctant about

external funding methods including debt. Thereafter they refuse the use of their leaders modes costly external financing. This implies a negative relationship between board members loss aversion and leader debt choice.

One explanation is that the individual, by nature, seeks the maximization and improving their well-being consistently. It is particularly annoying to see its financial assets deteriorate in each period. As an illustration, a loss averse director seeks to improve its reputation by effective control. He is reticent with respect to financial mode expensive and risky. It does not accept the external financial mode choice. This implies a negative relationship between board members loss aversion and leader debt choice.

Li and Lie (2006), explains the payment of dividends based on investor demand and the presence of a premium payment on the market. Furthermore, loss aversion refers to the tendency of people to prefer more the avoidance of loss rather than the acquisition of a gain (Kahneman and Tversky, 1979). Thus, a loss averse controller seeks to avoid the possibilities of loss through its decision-making. He refuses the establishment of a dividend policy positively affects the firm bankruptcy risk. In other words, the rejection of this policy allows the company to use internal funds to finance investment projects and reduce its reliance on modes of financing risky and expensive. This implies a negative relationship between board members loss aversion and leader debt choice.

Director risk averse of its reputation loss denies any decision has a positive impact on the firm total risk whose fashion external financial mode choice. They force their leaders to use internally generated resource. This implies a negative relationship between board members loss aversion and leader debt choice.

Chang et al. (2009) argue that the volatility of securities is an important determinant of ownership structure. Thus, directors' board, aware of harmful effects of new equity issues, refuses the use of external financing risky modes. Encourages its leader internally generated resources choice. Loss aversion directors one seeks to minimize it firm risk level through its leader decision control. He opposes against choice with a positive effect on the risk of its business, the choice of debt. This implies a negative relationship between board members loss aversion and leader debt choice.

Bertrand and Mullainathan (2003) argue that managers may have an incentive not to invest in order not to be questioned in their "quiet life." This kind of conservatism is a way to counter the risk of loss of control (Barberis and Thaler, 2002). Thus, loss aversion impulses directors' to reject investment projects necessitating the use of expensive external financing method. He refuses leader's strategic choices positively correlated with its firm risk level. It is therefore reticent towards a new issue of debt security. This implies a negative relationship between board members loss aversion and leader debt choice.

2.3. Board of Directors, Loss Aversion and Firm Equity Level

Halov and Heider (2004), show a strong asymmetric information about the risk of a company led companies to issue equity securities. The interpretation of this result is based on the assumption that differences in volatility capture differences in asymmetric information about the variance of cash flow. Another interpretation is based on the loss aversion of the controller. Loss averse director agrees to issue equity securities to avoid a costly debt increases the risk of bankruptcy of the company. This implies a positive relationship between board members loss aversion and leader equity choice.

Lemon and Zender (2004) emphasize that firms are constrained in their ability to issue debt equity securities. Indeed, a loss aversion director always seeks opportunities to reduce loss of his business. He therefore preferred the method of financing the least expensive. He rejects expensive debt and encourage its leader to use must the issue of shares. This implies a positive relationship between board members loss aversion and leader equity choice.

Director infected by the presence of behavioral biases (including loss aversion) rejects some decisions have a negative impact on the overall risk of the company. He uses his power to control (disciplined) therefore as a means of risk management of its business. It reduces reliance on external financing risky modes that's of new equity shares. This implies a negative relationship between board members loss aversion and leader equity choice.

Cliche (2000) shows that director's board member's impulse their leaders to use financial policy to manage the firm risk. Thus, these showers directors loss using short-term investments less risky and that require a low use of external financing modes. It refuse its leader to use equity financial mode. This implies a negative relationship between board members loss aversion and leader equity choice.

Nosic and Weber (2008) analyze the risk-taking determinants and note that perceptions of risk and expected returns, affect the behavior risk-taking. They show that the uncertainty regarding firm returns affects individual risk taking behavior. Indeed, an uncertain director productive capacity of his company's behavior is to respect the interests of the firm. It engages more in control of its leader and tries to minimize the total risk of the company. He is reticent regarding CEO equity choice. This implies a negative relationship between board members loss aversion and leader equity choice.

Gomes (2003) shows that loss-averse individuals will choose not to participate in the equity markets unless the equity-premium is sufficiently large. Loss aversion director are aware of the equity choice negative impact in its firma value. He refuses the new shares submission in order to minimize its firm's loss risk. This implies a negative relationship between board members loss aversion and leader equity choice.

Adams et al. (2009) also show that in firms where CEOs are powerful and dominate most major decisions, the risk of errors in judgment is not well diversified, leading to decisions more extreme and the variance of the performance of the enterprise. The presence of directors' loss aversion allows the company to hedge against risky decisions taken by the manager including equity choice. These Guidelines are committed to read more in control and refuse any decision affecting positively the risk of their companies with the choice new shares submission. This implies a negative relationship between board members loss aversion and leader equity choice.

Baker et al. (2007) document that loss aversion causes people to overestimate risk, be more uncertain about forecasts and opt for making it safer to limit the likelihood of his loss. Loss aversion director overestimates its firm loss risk and tend to be involved in the control of the leaders strategically choice. He tries to square against its reputation in the labor market. He refuses external financing choice with the capital increase. This implies a negative relationship between board members loss aversion and leader equity choice.

3. Board of Directors, Overconfidence and Capital Structure Choice

Overconfidence is a privileged subject of the psychology of judgment that was widely approved by the studies of Debondt and Thaler (1994). It means overestimating its personal abilities with regard to a given situation (Daniel and Titman, 1999; Camerer and Lovallo, 1999; Bessière, 2007; Camerer and Malmendier, 2006; Hirshleifer et al. 2010; Ben- David et al. 2010; ...). Odean (1999) extended this concept to the professional world and has established a map that goes all economic agents are affected by overconfidence. Thus, the beings Humans are too confident in their abilities, their knowledge and their prospects.

In this framework, finance research, both theoretical and empirical themselves focused on the psychology of leadership and its impact in the process of decision decisions. These studies have contributed to the understanding or even explaining some decisions by behavioral arguments.

As an illustration, recently, several studies emphasize the role of bias in explaining behavioral managerial decisions. In particular, the impact of overconfidence and optimism about investment and financing decisions have been reviewed since the early two miles (Heaton, 2002; Malmendier and Tate, 2005.2008, Malmendier et al. 2010; Bernardo and Welch, 2001; Gervais et al. 2003; And Backer al, 2004; Keiber, 2006 Hackbarth, 2004, 2009; Brabel and Meier, 2002; Robin and Yun, 2011 ...).

Through overconfidence is more strongly develops in the head. Indeed, the selection of the Director is supported on the criterion of trust and competition between leaders this phenomenon would increase (Goel and Thakor, 2000). At this point the leader will tend to overestimate his ability to control the outcome, thinking that the risk can be reduced by a good use of their skills.

On this basis, the aim of this part is to integrate behavioral dimension in analyzing CEO capital structure choice: our goal is to explain the effect of board members overconfidence on leader financial decision preference (debt, equity and resource internally generated).

3.1. Board of Directors, Overconfidence and Firm Internally Generated Resource Level

Goel and Thakor (2008), postulate that the investment cash flow sensitivity is significantly increased when leaders are overconfident when firms have financial constraints. These results justify the priority of the internally generated resource choice. In other words, board members overconfident administrations are aware that the market underestimates their businesses. They obligate the leaders to opt for internally generated resource.

Malmendier et al. (2010) add that overconfident executives have low reliance on external financing. The authors argue that these leaders opt for riskier investment projects (including the innovation investment). This risky investment choice requires him to prefer cash to escape the control exerts by the Board of Directors members. This implies the presence of a positive relationship between the internally generated resource level and CEO overconfidence level.

Heaton (2002), calls overconfident leaders who buy the securities of their own business and those who refuse to exercise repeatedly options. It shows that the characteristics of the leader and in particular overconfidence influence the investment policy by refusing to resort to external funding deemed too costly. In fact, being over-confident of his capacities and personal competences, the leader will be encouraged to undertake a rooting policy and

manipulate information in such a way as to preserve his investment in a certain specific capital (Lo et al. 2007). Thus CEO overconfident seeks to retain its shareholders and board of directors. It uses the funding policy to report the performance of its business and the quality of its management.

Bazerman (2006), says the overconfident leader to preserve his place at the head of the management team chooses long-term investments. It seeks to point out the convergence of its interests with those of shareholders. It uses the internal financing methods affair to limit his firm bankruptcy risk. A low level of bankruptcy risk allows him to escape exerts control through the mechanisms of governance which the Board of Directors.

Hackbarth (2009) adds that the existence of overconfident leaders can destroy the investment decisions either by underinvestment or overinvestment. Indeed, as the overconfident executives tend to overestimate the value of their project, they are reluctant to raise capital in the market believing that systematically assesses the value of securities. They are aware of the negative effects of the use of external financing method. They are seeking to report their performance to the Board of Directors members by the choice of internally generated resource.

Azouzi and Jarboui (2014) show that the overconfident leader spends huge investments in their own businesses. In fact, these overconfident leaders overestimate the expected yield of their projects. Therefore, they use internal sources of funding. Indeed these leaders aware of control exercised by the governance mechanisms (including board of directors) limit their use of risky external funding. They seek to prove the convergence of their interests with those of shareholders.

Ben-David et al. (2006) examine the relationship between overconfidence and leader financial policy of the company. Their result shows that with the excess of confidence, firm invested more and pay less dividend. This shows that excess confidence leading the impulse to avoid the use of markets to finance its projects investment. It overestimates the risk of its business. In other words, leader conscious of the importance of executive control exercised by the internal governance mechanisms (including board of directors) limits its use of external financing method to escape the control exercised by the financial market.

3.2. Board of Directors, Overconfidence and Firm Debt Level

Fairchild (2009) studies the relationship between overconfidence and the financing decision of the firm. He shows that overconfident managers tend to take on higher levels of debt and bankruptcy costs are positively related to the level of over-confidence. The aversion of overconfident board members to equity is strong enough to have a cumulative effect on firm leverage, controlling for firm and year fixed effects: Firms have significantly higher leverage ratios in years in which they employ overconfident board members.

Hackbarth (2004, 2009) tried to show the effect of excess optimism and confidence of the leader on the interaction between investment decisions and financing. He noted that a flawed leader (optimistic or overconfident) chooses a higher level of debt than a rational leader. In other words, a leader who believes overconfident control the outcome of those choices underestimates his company's bankruptcy risk. It uses leverage to obtain resources additional. However, the author adds that biased leaders can improve the bond-shareholder conflicts (eg, over-indebtedness, the substitution of assets ...). This implies that overconfident leader uses debt (discipline mechanism, Jensen 1986) to escape the control exercised by the internal

governance mechanisms, take root and report the performance of its business (Mayers and Majluf, 1984).

The relationship between overconfidence CEO and board independence has been recently studied (Azouzi and Jarboui 2013). The researchers show that when the CEO seems to be too confident, it is necessary that the Board is independent. Thus, the role of outside director is to evaluate the real context of decision and ask questions before key decisions are made perfect. This implies that an overconfident leader trend to realize risky decisions including debt choice. So the presence of outside directors on the Board is justified by their competence and which aims to improve the effectiveness of the board. This says that the presence of high levels of debt is explained by the dependence of the board and the presence of leaders overconfident.

Goel and Thakor (2008) added that internal governance mechanisms (board of directors) tends to promote overconfident manager to the CEO in relation to those who are less confident level. Thus, heading overconfident who overestimates his personal capacity, underestimates the risk of its activity (Hirshleifer et al. 2010). The with risk behavior affects financial policy of his undertaking whose decision to finance and investment. He sees many more opportunities investment. Funding for these growth opportunities requires the use of expensive external financing whose risky debt. This implies a positive correlation between overconfidence leader and the level of indebtedness of its business.

Galasso and Simcoe (2010), affirm the presence of a positive correlation between investment in innovation and overconfidence leader. To finance its Specific investment officer, in the absence of internal liquidity and opportunities investment, uses the risky debt.

Azouzi and Jarboui (2012) postulate the presence of a positive relationship between the company financial distress and CEO overconfidence level. The executive overconfidence overestimates its powers to reduce the risk of his business. Thus, overconfidence leads the manager to underestimate the company bankruptcy probability and, therefore, a higher debt.

Ben-David et al. (2010) have postulated that an extreme appeal to confidence mechanisms is likely to result in the loss of effectiveness. In fact, being over-confident of his capacities and personal competences, the leader will be encouraged to undertake a rooting policy and manipulate information in such a way as to preserve his investment in a certain specific capital (Lo et al. 2007). This information manipulation hinders the functioning of the governance mechanisms including that of the board of directors. The trust established between the leaders and partners (mainly with providers of capital) would act favorably on the creation of value reducing costs (agency costs, influences, rooting costs ...) and expanding the discretionary space leaders which would promote the implementation of a more profitable and risky financial policy (debt choice).

3.3. Board of Directors, Overconfidence and Firm Equity Level

Schrand and Zechman (2012) show that overconfidence is associated with a greater likelihood of earnings management and financial fraud. In other word, financial decisions result more than media overexposure of the leaders of the need to be first than a considered choice guided by the procedural logic or at least computationally in the interest of shareholders. Thus overconfident leader who overestimates his company's growth opportunities tendency to over-invest. To fund is over-investment, it uses the share issue without be concerned about its effects (undervaluation of its business, risk takeover ...). He believes that future cash flows cover the costs of a share issue.

Hirshleifer et al. (2012) find that overconfident CEOs are associated with better corporate innovation. The authors show that overconfidence decreases the level of risk perceived by the leader. This overconfident leader and less averse to risk tends to undertake risky investments whose investment innovation. It overestimates probability of success of these types of investments. To finance its specific investment leader, in the absence of internal liquidity and opportunities investment, uses the share issue. It underestimates the costs and effects of his company capital opening. This implies the presence of positive correlation overconfidence between the leader and the issuance of action.

Azouzi and jarboui (2014) also find that CEO overconfidence level is positively correlated with its motivation and involvement in their work. CEO overconfident chooses specific investments such as investment in research and development in order to increase its firm overconfident leader who believes in the market assesses the risk his company uses external financing modes (including share issue) to improve its corporate finance capabilities. He overestimates his personal and professional capacities. He believes control the risk of a takeover operation. It is therefore driven to select the equity choice.

Felton et al. (2003) and Gibson and Sanbonmatsu (2004) justify the financial policy the company by optimism and overconfidence prone leaders to seek information and their desire to resolve a given problem without concern for effects of his choices. So it overconfident leader who believes in the market assesses the risk his company uses external financing modes (including share issue) to improve its corporate finance capabilities. He overestimates his abilities personal and professional. He believes control the risk of taking operation control. It is therefore driven to select the action program. In other word, the presence of controller's optimistic leader pushes to materialize all firm possible investment opportunities. Thus, these controllers optimistic view that the market overestimates the risk of their business. They are consent their leaders can manage this risk. It motivates them to use all the funding opportunity which the capital increases.

According to Otto (2014), an optimistic leader tends to believe that the good results are highly likely to occur to overestimate the probability of success of the company and its future prospects. He therefore led to overestimate the value of incentives that will occur after the completion of good results. The presence of incentives remuneration reduces the disciplinary authority of the Board and encouraged him to use all his company's growth opportunities for the good result achieved. To finance this investment that confident leader authorizes the use of external financing options including equity.

SECTION 2. BOARD OF DIRECTORS,' *EMOTIONAL BIASES* AND FIRM INVESTMENT DECISION

Individual reasoning is cognitive shortcuts that influence the position, making irrational and suboptimal in terms of conventional financial theories. This reflects the fact that individuals have limited cognitive processing and information storage. Many researches identify a variety of heuristics and cognitive biases that can exert an adjudicator in the selection and interpretation of information to be considered by him as relevant. These biases have been identified and classified, and include the following: The representativeness bias, the analogical reasoning, conservatism bias and confirmation, but also emotions such as loss

aversion, optimism, and overconfidence. Despite their usefulness (Ghiglione and Richard, 1999), these heuristics and biases may be inaccurate and lead to cognitive strategies unreasonable, resulting in the development of deviant activities in the leader (Fredrickson and Mitchell, 1984).

While the current financial market behavior already provides a central place for individuals and not just tools. As for corporate finance, it examines the behavioral biases of the leaders in terms of optimism or overconfidence leaders and under the classical assumption of market efficiency and maximizing of shareholder wealth so that the problem becomes that of the traditional analysis of over or under investment. It says on or underinvestment by referring to the behavior and psychology of leadership. Thus, several studies have shown the effect of perceptions and preferences of managers on the investment efficiency (Fama, 1980).

Recently, Felton et al. (2003), and Gibson and Sanbonmatsu (2004) justify the investment choices sometimes risky optimistic leaders likely to seek information and their willingness to solve a given problem without worrying the success of previous projects and the like. Heaton (2002) and Hackbarth (2009) illuminate the underinvestment leaders by their overconfidence related to the overestimation of their business value.

Start of this finding the purpose of this section is to show the impact of controller's emotions on the firm investment decision.

1. Board of Directors, Optimism and Firm Investment Decision

Literature development devoted to the investment theory has focused on the impact that could exert restrictive phenomena of irreversibility and uncertainty. This phenomenon affects the irreversibility of investment decisions by the manager. Thus, with reference to the typology established by Julien and Machesney (1987) the objective of directing can be broken down between search security or sustainability and a commitment to growth and acceptance of the resulting risk.

In addition, the latest advances in psychology invite us to reconsider the decision mechanisms through emotions. Indeed, emotional processes are involved, one way or another, those who preside in the decision making.

Emotions we would then assess the desirability or otherwise of a decision. They would finally allow processes to focus on solving problems for which they are most effective. The emotional state of the leader affects his preferences and objectives also cannot remain without consequences for their behaviors investment. In this part we will explain the effect of director's board optimism on leader investment choice (assets specificity and investment horizon).

1.1. Board of Directors, Optimism and Firm Assets Specificity Level

The choice of strategic investments resulting sometimes not use well-defined criteria, but rather the perception of the leaders of the future profitability of a particular opportunity and their own success at the head of their company.

Finance research highlights recently the role of optimism and/or overconfident managers on the investment policy. This trend has its roots in psychological research that demonstrates that an individual is more optimistic that invested heavily and believes control the outcome of the decision (Weinstein, 1980).

Booth et al. (2001) argue that the investment decision is inseparable from the judgment of those who have been delegated the evaluation. In other words, an optimistic controller who seeks pioneering advantage for himself and his company encourages its leader to innovate and choose more specific investments. The choice of specific investments by the optimistic manager can erect barriers to entry to prevent the arrival of a new competitor. This investment is a key success factor that promotes the company and ensures its sustainability. This implies a positive relationship between board members optimism and CEO specific investment choice.

Gervais et al. (2002) emphasize that optimism is positively correlated with motivation and involvement in the work. Thus, optimistic controller is induced to better control his team leader. It encourages them to undertake investment projects enhancing its business including specific investments choice. This implies a positive relationship between board members optimism and CEO specific investment choice.

Bolton and Heath (2004) add that the concept of pioneering advantage is the most cited concept in strategic management because it refers to the mental patterns associated with success. Thus, investment decisions more result of overexposure to media leaders need to be the first choice as a reflection guided by procedural logic (Hawkins et al. 2001). Director's detention firm capital proportion is a way to align the interests of directors with those of shareholders and to exercise more effective control over decisions made by the leaders. These optimistic directors tend in this case to use the strategic control and therefore to encourage leaders to bear more risk and to undertake specific investments. This implies a positive relationship between board members optimism and CEO specific investment choice.

Malmendier and Tate (2005) show that an individual is optimistic and believes invested heavily control the outcome of the decision. Optimistic directors believe control the investment projects made by its leader. They encourage undertaking more risky projects whose specific investment choices. This implies a positive relationship between board members optimism and CEO specific investment choice.

Verlaine (2008) argues that cognitive abnormalities, fruits emotions and feelings opposed to a scientific and rational decision. In other words, decisions are affected by the individual's limited cognitive abilities (alternatives assessment, treatment and research information, emotional management ...). Optimistic directors underestimate the risk of the company. It tends to encourage its CEO to take more risk in their investment choices. They obliged him to undertake specific investment increasing the competitiveness of the company. This implies a positive relationship between board members optimism and CEO specific investment choice.

Mairesse and Mohnen (2005) added that investment in research and development (specific) plays a key strategic role for any innovative company. It provides the company with opportunities for innovation and gives them a competitive advantage. Optimistic director consent with the positive effect of specific investment encourages its leader to increase the firm assets specificity level. Thus, optimistic controller seeks to improve the competitiveness of his company by accepting the investments in research and development. This implies a positive relationship between board members optimism and CEO specific investment choice.

Mangot (2005) argues that the individual is by nature optimistic, and especially will tend to overestimate the expected performance of the assets held in the portfolio. This shows that optimistic managers overestimate the future returns on shares. This optimistic bias motivated him to engage more in control of his team leader. The objective of the control is to reduce conflicts between shareholders and manager (cognitive and agency) by aligning their interest.

It encourages its leaders to undertake investment projects long term with specific investment choices. This implies a positive relationship between board members optimism and CEO specific investment choice.

Barabel and Meir (2002), show that optimistic decision maker (controller) will tend to overestimate their ability to control outcomes. Director feels optimistic about its ability to control the decisions and choices of its leader. It tends to accept some risky decisions including specific investment choice. This implies a positive relationship between board members optimism and CEO specific investment choice.

Gervais et al. (2003), emphasize that optimistic affects the ability to assess alternatives to the decision maker. It leads to predictions in absolute and forces him to actually confirm. Where optimistic director is obliged to forecasts confirm its especially regarding the development of future returns. It encourages the leader to choose investment projects enhancing its enterprise in the specific investment choice. This implies a positive relationship between board members optimism and CEO specific investment choice.

1.2. Board of Directors, Optimism and Firm Investment Horizon Preference

Denzau and North (1993) posit that decisions under uncertainty should be illuminated in the light of mental models of leadership. Thus, the choice of the investment horizon does not only based on the characteristics of the business (financing capacity, technical capacity and human capital) but it is also affected by the attitudes and preferences of the decision maker. A chief optimistic with of his firm growth opportunity prefers long-term investment. It encourages the leader to choose investment projects in the long term. This choice allows the alignment of the interest of managers/shareholders minimizes conflict and ensures firm value creation. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Hilary and Menzly (2006), point out that past success lead analysts to become confident and optimistic about the end result was to lower their overall performance. Director accepts the optimistic choice of specific investment (risky and long term) of its leader. He believes that this investment will provide the same performance as the previous year. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Malmendier and Tate (2005) show that year is optimistic and individual Believes Invested heavily controls the outcome of the decision. Thus, optimistic director is consent of his personal capacity to control the investment decisions of its leaders. He accepts the presence of specific investment projects and long-term. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Fairchild (2009), find that optimism is an unrealistic overestimation of future events. Thus, optimistic director overestimates its firm future returns. It underestimates the risk of investment projects in the long term and believes control them. It encourages the leader to opt of long-term investment choice to achieve expected returns. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Backer et al. (2004), consider the company policies as appropriate responses to overvaluation and undervaluation of firms by market. Optimistic directors are consent that the market undervalued his company. It encourages its leader to undertake investment projects indicating the long-term performance of their firms. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Gibson and Sanbonmatsu (2004), argue that the director uses the optimistic decision to disclose its investment performance. The on investment is driven by a concern for reputation. The director insists on some projects (even those with negative NPV) to maintain a brand image (market of goods and services and market leaders) without worrying about the success of the project. It impulse its CEO to choose long-term investment to enhance firm reputation and performance. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Booth et al. (2001) argue that the investment decision is inseparable from the judgment of those who have been delegated the evaluation. Director optimistic requires the presence of long-term investment performance reporting and the durability of their business. Thus presence of investment in research and development (long-term and risky) improves its firm power concurrencies and ensure its development. This implies a positive relationship between board members optimism and CEO long-term investment choice.

Goel and Thakor (2008), attest presence of a negative correlation between individual optimism level and his attitude towards risk. Increased level of optimism controllers reduce the feeling of risk aversion and promotes the presence of risky decision. Director's loss aversion level decreased impulse to force their leader to undertake risky decisions in the long-term investment choice. Overestimates the capacity of its business to generate positive results covering the decisional risks. This implies a positive relationship between board members optimism and CEO long-term investment choice. The optimistic director is able to overstate its firm productive capacity. We believe that the market risk overestimate his business. Thus, if its optimism level pushes her underestimated his firm risk level. This understatement bias implies minimizing its loss aversion level and the impulse to undertake investment projects long-term risk.

2. Board of Directors, Loss Aversion and Firm Investment Decision

The firm's investment decision analysis is traditionally addressed by reference to financial concepts, especially through concepts such as net present value or payback on capital employed. Now, summarize the investment decision to a simple calculation of discounting or comparison between immediate disbursement and future returns may appear too simplistic a reality probably much more complex. Indeed, the business environment becomes increasingly complex (flexibility and competitiveness), thus altering firm forecast evolution and profitability.

Today, the individual (CEO and/or controller) plays a central role within the company. The role it plays in performance is at the heart of the debate in the business world. It is to him that finally back strategic decisions at risk. He would use shortcuts or heuristic reasoning called through that led him to make choices not conform to the classical theory. His psychological profile consideration and its emotional perception performance, as key factors in explaining its firm strategic choices.

Indeed, some important decisions for the survival of any company whose investment choices (nature and horizontal) or even the creation of an investment policy can be affected by controller's emotional biases such as loss aversion. The Board uses its disciplinary authority to adjust the investment policy in order to avoid loss probabilities. They take risks

(choice of modes of external financing costly and risky) and invest in long-term projects costly and risky to limit the risk of loss of reputation.

In this part we will explain the effect of director's board loss aversion on leader investment choice (assets specificity and investment horizon).

2.1. Board of Directors, Loss Aversion and Firm Assets Specificity Level

Information is an essential resource for organizations; his detention is therefore an important source of power for the actors. This power allows its holder (the controller) to adapt the strategies and firm policies of its preferences. Indeed, director loss aversion with its information quality (on growth opportunities, debt ratio, productive capacity, the overall level of risk now) sometimes foregoes positive NPV investments (including specific investment) if they have a negative impact on the value of the company. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Vernier (2004) shows that the individuals inability to take into account all available information in an increasingly complex, especially as new technologies of information and communication significantly increase the flow information and contribute greatly to muddy the waters and dive makers in different psychological states. These psychological and emotional states affect their choice. Loss aversion controller is aware of the negative effect of entrenching its leader. He refuses certain specific investments having a negative impact on its firm value. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Baker et al. (2007) document that loss aversion causes people to overestimate risk, be more uncertain about forecasts and opt for making it safer to limit the likelihood of his loss. Loss aversion director overestimate its firm total risk. It uses its disciplinary authority to minimize this risk. He opposes the risky investment decisions including assets specificity additional level choice. Consistent is that this choice allows the leader to take root. Or rejection of this investment nature can reduce CEO discretionary space and ensures the creation of value (reduced agency conflicts and those between cognitive business partners). This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Bessiere (2007) states that managerial decision characteristics (complexity, low repetition, feedback slow and difficult to interpret) and the policy environment (uncertainty, change) tend to favor the presence of behavioral biases in the head. This statement shows the existence of a correlation between director's board behavioral biases (including loss aversion) and decisions (including CEO investment decisions evaluation). Thus, director loss aversion is aware of specific investments effect on the increased its firm total risk. The realization of these expensive investments requires the use of the firm's financing capacity (cash flow, debt and capital increase). The use of this external financing mode increases its firm bankruptcy and it's often involves market assessment. This impulse to oppose the director with its CEO specific investments choice. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Nosic and Weber (2008) analyze the determinants of risk-taking and note that perceptions of risk and expected returns, affect the behavior of risk-taking. They show that the uncertainty regarding the expected returns of the company affects the risk taking behavior of the individual. Thus, directors loss aversion is reticent about its CEO risky decision including

specific investment choice. it obliges him to avoid the financing of such investment even if its NPV is positive. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Barberis and Huang (2007) show loss aversion negative effect of an investor's choice. This is a plausible description for institutional investors, who seek to minimize their loss risk over its managerial decisions control. As a board of director members, investors seeking to reduce their risk and that of their company. They use their disciplinary powers to oppose risky managerial decision that the specific investment choice. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Dimmock and Kouwenberg (2010) argue that investors with greater loss aversion are less likely to participate in the stock market. Of the same, loss aversion controller (a remuneration or social status) rejects its leader external financing choice. They forced him to abandon the financing of investment projects necessitating the use of external funds with specific investment. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Nosic and Weber (2008) note that risk perceptions and expected returns, affect the individual behavior risk-taking. Has an illustrative loss aversion directors (reputation and remuneration) undervalued its company's ability to generate positive future performance. It forces its leader in imitate his previous years choice. Is reluctant with the presence of a new specific investment. He is aware that increasing the level of asset specificity favors the presence of rooting strategy. Or level of loss aversion forced him to engage more in control in order to protect the interest of its shareholders. Reduced its involvement as the presence of roots whose firm asset specificity high level. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

Barberis et al. (2006) argue that loss aversion may lead individuals to reject some positive decisions. In other words, a director averse to loss overestimates the risk of his business. He refuses certain investment choices even risky positive NPV, the specific investments choice. He is aware of the positive effect of this choice on the risk of the company. it requires leadership to abandon its funding for this type of investment. This implies a negative relationship between board members loss aversion and CEO specific investment choice.

2.2. Board of Directors, Loss Aversion and Firm Investment Horizon Preference

Rabin (2000), explains the decision maker choice of such a decision and the refusal of the other by its loss aversion level. It only shows that aversion to risk (gain or loss) is insufficient to explain such a refusal and aversion to loss (risk of loss only) is needed to better explain the choice. Thus, a loss aversion director minimization always seeks the probability of losses through its leader strategic choices control which the investment decision horizon.

Mullins and Forlani (2005) argue that risk perception is a key factor in the decision. In other word, a controller with rain social status losing risk overestimates his firm total risk. This firm risk overvaluation increases its involvement level in the control of his team leader. The control objective is to align CEO interests with those of shareholders, minimize conflict and create value. Therefore it requires undertaking its leader choosing long-term investment. This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

Endsley (2000) defines decision maker's position perception and understanding of environmental elements within a volume of time and space. Thus, uncertainty about the quality of its like this increases decision maker's risk aversion level and affects their choice. As an illustration, a loss aversion director (reputation) uses its power and nary incentive to minimize the total risk of the company. In some cases it requires the leader to undertake investment projects in the short term less risky.

Broihanne et al. (2006) add that the degree of risk aversion (gains or losses) for the investor accounts for its investment choices. The same risk aversion loss compensation of the controller affects the investment horizon of the company. Thus, this controller downpour loss is aware the negative effect of interest conflicts between CEO and shareholder. It seeks to minimize the presence of these conflicts (agencies and cognitive) destructive values. He uses his control to ensure minimum convergence acting on the strategic choices of its leader. He impulse to opt for the choice of long-term investment and reduces the presence of short-term project. This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

Bohner and Weinerth (2001) argue that negative emotions (loss aversion) involve careful assessment information for the decision maker. Consequently, the loss aversion directors engages more in control of his team leader. it forces its leader choice to opt for positively affecting the value of its business including the choice of long-term projects. This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

Seo and Barrett (2007) show that the individual's capacities to identify and distinguish their emotions (including loss aversion) improve its decision performance. This implies that directors firm risk perception affects their choice. Thus, loss aversion directors overestimate the risk of his business. It seeks to reduce its risk of loss. It forces its leader to undertake profitable investment decision in the long term (including investment in research and development) to offset short-term losses (due to low competitiveness). This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

Lussier and Achua (2004) show that the turnover of American leadership is at the origin of their preference for projects of shorter life. This implies that the preference of leaders for the long term is related to its confidence to keep his place at the head of his company. Loss aversion controller averse to loss disciplinary uses his power and incentive to ensure its firm durability and competitiveness by the presence of long-term projects. It accepts specific investment projects in the long term. He realized that the project risk can be offset by gains in competitiveness. This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

Cliche (2000) finds that director's board member's impulse their leaders to use financial policy to manage the firm risk. Director rain loss is aware of the negative effect of the choice of short-term evaluation of its business. It impels its leader to undertake investment choices with long-term positive effect on the valuation of the company by the market. Thus, the choice of long-term investment even risky (including specific investment choice) allows the company against its main competitor square. This implies a positive relationship between board members loss aversion and CEO long-term investment choice.

3. Board of Directors, Overconfidence and Firm Investment Decision

Investment opportunities are an important feature of the firm and influence its image in terms of officers, owners, investors and creditors. They are a critical determinant of the risk of the company. The key to performance is better in the ability of the leader to imagine, perceive and exploit its opportunities. Indeed, several studies show the impact of Skills leaders and their ability to innovate on the perception and exploitation of opportunities growth of their firms (Perel 2002; Zingales, 2000; Nakara, 2007; ...).

In this context, the integration of behavioral dimension to understanding and to explain the choice of investment managers (specific asset level and investment horizon). Several contemporary researchers have developed models that allow to formalize intuitive approach through the consequences on behavioral leadership selection (Hawkins et al. 2001; Ho and Chang, 2009; Backer et al. 2004; Malmendier et al. 2010; Hackbarth, 2009; ...).

Individual reasoning with cognitive shortcuts that influence decision position, making irrational and not optimal in terms of traditional financial theories. These biases have been identified and classified and grouped as follows: The bias representativeness, analog reasoning biases conservatism and confirmation but also emotions such as overconfidence.

Through overconfidence is more strongly develops in the head. It is linked to characteristics of the managerial decision (complexity, low repeatability) and the decision-making environment (Goel and Thakor, 2000). At this point the leader will tend to overestimate their ability to control the results that affects his investment choices.

3.1. Board of Directors, Overconfidence and Firm Assets Specificity Level

Malmendier et al. (2010) also find that CEO overconfidence level is positively correlated with its motivation and involvement in their work. CEO overconfident chooses specific investments such as investment in research and development in order to increase its firm competitiveness and ensure value creation. These investments choice reported in more performance and leader reputation on the labor market. Rooting leader (via the selection of specific investments, or via diversification) allows it to deviate control mechanisms, to make decisions and specific investment maintain its place at the head of the management team (Azouzi and Jarboui, 2013). This implies the presence of a negative correlation between the effectiveness of governance mechanisms (board of directors) and the level of asset specificity.

Graham et al. (2009) point out those corporate executives is overconfident. They show that overconfidence leaders have a significant effect on policy investment. The authors demonstrate that overconfident executives prefer investment in innovation. In other words, these leaders overconfident of their ability personal and business tend to undertake investments in research and development. They overestimate the probability of success of their projects. They use these types of investments (specific and risky) to take root and improve their image in the labor market. This implies the presence of a correlation positive between overconfidence leader and specificities of investments.

Nakara (2007) adds that any officer manages the company's operations to conserve a certain "specificity" of assets in relation to its powers. It tends to invest in new assets when it can be the source of comparative advantage. He chooses therefore specific long-term investments and risky to counter revocation.

In other words, overconfidence leader of his personal capacity uses his power decision to enhance its human capital. It therefore tends to undertake Specific risky investments.

3.2. Board of Directors, Overconfidence and Firm Investment Horizon Preference

Denzau and North (1993) postulate that decisions under uncertainty must be illuminated in the light of mental models of leaders. Thus, the choice of the horizon investment does not happen only in terms of company characteristics (financing capacity, technical capacity and human capital) but is also affected by attitudes and preferences of decision maker. To illustrate the confident leader of preserving his place at the head of the management team's interest to invest long term.

Keiber (2006) adds that overconfidence reduces agency costs and increases demand leader for variable compensation in the presence of positive information about the project. Thus the overconfidence leader of his company's growth opportunities seeks to guarantee its status of leader. So he uses his leverage to minimize decision agency conflicts and ensure value creation. The choice of investment horizon so affected by this. The leader's interest to align with the investment horizon Shareholder interest (a long-term investment). This implies a correlation positive between overconfidence and investment horizon.

Ho and Chang (2009), postulate the presence of a positive correlation between the probability of financial distress of the company and the level of its leader overconfidence. Thus, the excess trusted leader leads him to underestimate his company's bankruptcy probability and thus to a higher debt. This easy recourse to external financing modes (no psychological constraints bankruptcy risks) allows the leader to reach its investment objectives. It uses external financing methods to fund projects of long-term investments. It overestimates the cash flows generated by these types' investments.

Galasso and Simcoe (2010), affirm the presence of a positive correlation between investment in innovation and overconfidence leader. Thus, the overconfident leader who overestimates his personal and professional capacities believed to keep his place the company's head. It therefore tends to choose long-term investments. This implies a positive correlation between overconfidence leader and the horizon of its investment.

SECTION 3. BOARD OF DIRECTORS,' EMOTIONAL BIASES AND FIRM DIVIDEND DISTRIBUTION POLICY

Dividend policy remains an area of finance where some still reigns controversial. Indeed, some theories have been advanced to try to explain the persistence of the distribution of dividends despite their drawbacks (taxation, cost financing ...) and/or their irrelevance (Modigliani and Miller, 1961).

First, the agency theory considered the dividend distribution as both a source of conflict that may exist between the various partners, and a means of resolution of these conflicts (Easterbrook, 1984; Rozeff, 1982; Lang and Litzenberger, 1989; Sedzro, 1992; Chkir and Adjaoud, 2004). The dividend increases need external funding from the company. This increases the frequency which the company addresses the market and at the same time subjected to a control continuously from investors, which is likely to discipline the officers and to reduce agency costs.

Furthermore, and according to the theory of informational content of dividends, managers would pay the dividend in order to inform investors about the future profitability (Ambarish et al. 1987; Bhattacharya, 1979; Miller and Rock, 1985; Ofer and Thakor, 1987, etc.).

Managers can convey information about the future profitability of their business investors in several ways, including the announcement of a change in the level of the dividend. Thus the announcement of an increase (decrease) the dividend would mean that managers are trying to make their inside information on public the future of the company, reducing the asymmetry of information with investors.

More recently, Fama and French (2001) explain dividend distribution the existence of a distribution premium paid by the investor. Albouy et al. (2010) confirm this idea and show that leaders are attentive to the demands of their shareholders and seeking to provide them with information on the future of the company through the dividend. A priori, they do not really wonder why their shareholders demanding dividends. They doubt that dividends really have an impact on equity valuations. In fact, they seek to satisfy their shareholders and give them what be they divine their request, even if it falls behavioral biases.

Consideration behavioral biases leaders (optimism, aversion to loss and overconfidence) opens new perspectives in corporate finance, notably through a renewal of the issues related to the mechanisms of governance and leadership selection, value creation associated with the ability to develop investment opportunities and, more generally, of apprehension risk.

The objective of this section is to show the impact of behavioral biases leaders (optimism, loss aversion and overconfidence) on the effectiveness of the board and the choices of firms on dividend distribution.

1. Board of Directors, Optimism and Firm Dividend Distribution Policy

For a dividend policy, the main objective is to signal that the company is still profitable (Jensen, 1986). The leader can be considered to have a goal reputation and loyalty. However, the leader optimistic can pay dividends even if the company is declining to hide the situation. Similarly, it may attempt to protect its reputation.

Optimism is an unrealistic overestimation of future events, unrelated to personal skills (Fairchild, 2009). A leader sees much more optimistic investment opportunities (Baker et al. 2004; Heaton, 2002 ...). It will therefore not tend to make dividend policies. However, this type of leader will consider it is only a small transient phase or because of pride will not admit his company's failure, either by habit or by the fear of losing investors, whereas the dividend payment will give a signal boosting activity the company.

In other words, the same optimistic heading perceives new opportunities distribute dividend growth. This distribution requires him to choose a mode external financing (debt /capital market) to finance the perceived opportunities. A generous dividend policy limits the self-financing of the firm, all things being equal, and in this way, it intensifies the need for financial market realization of investments (Easterbrook, 1984). According to this author, market access financial behavior creates a discipline in the executive because of the activity monitoring generated by the board of directors (the external investors). This allows the leader of loyalty major shareholders and maintains its position at the head of the management team.

The International Comparison of Denis and Osobovo (2008), show that companies that pay dividends are larger, more profitable, have accumulated more reserves and have lower opportunities compared to companies that do not pay dividend. Thus, an optimistic leader's interest to take action to maximizing shareholder wealth and the know-how to optimize the contributions of funds. He seeks to confirm its position at the head of his company

distributing dividends even if has not accumulated reserves. The dividend distribution is a way to escape the control exercised by the governance mechanisms including the Board of Directors.

Malmendier et al. (2005) show that an optimistic leader limiting recourse financing equity in order to escape an undervaluation of shares of their companies by market. He distributes the cash flows identified to benefit from informational content dividend and operates its debt capacity. In other words, an optimistic leader uses all the means at its disposal and allows it to report its performance whose dividend distribution. The dividend distribution is a tool available to the leader allowing it square against the control mechanisms (board of directors) and kept his place at the head of the management team.

2. Board of Directors, Loss Aversion and Firm Dividend Distribution Policy

Jensen (1986), suggested an additional source of conflict between managers and shareholders based on the existence of free cash flow. It defines free cash flow as the sum of funds available after funding all profitable projects. The appearance of a conflict between managers and shareholders is due to the completion of unprofitable projects with these funds, when they should be distributed to shareholders. It therefore observed that the distribution of a high dividend limits the free cash flow of the firm and eventually eliminates conflicts of interest between shareholder and officer. Indeed, officer averse to loss opts for a policy generous distribution to avoid an impairment loss related to the appearance of costs additional agents. This leader seeks to retain its shareholders the choice of a generous policy of dividend distribution. It uses the distribution policy dividends to hedge against the risk of takeover.

Barberis and Thaler (2002) adds that the loss aversion of directing the impulse to choose for a generous policy of dividend distribution. It seeks to retain its shareholders by increasing the level of the dividend paid. The purpose of the executive is to protect them against the risk of loss of reputation after a successful operation take over. This loss aversion leader using its decision-making authority (the dividend distribution policy) to protect against the risks related to success a takeover operation. This shows that management decisions are affected by psychological proven leader.

Helliar et al. (2005) show that leaders use the financial policy the company to avoid any possibility of loss (of a fee, a reputation, a social status). This loss aversion thus affects its funding options and investment which impacts on the distribution of the company's value (including dividend distribution).

Bertrand and Mullainathan (2003) stress that the reputation of the leaders can lead them prefer to imitate the decisions of their predecessors powerful, ignoring the return on investment. This mimicry appears depending on the risk aversion maker, age and the degree of uncertainty of its environment. Indeed this manager averse to loss of reputation or employment chooses dividends distribution policy more generous than that of his predecessors. It ignores certain investments cost effective to meet the expectations of its shareholders in terms of the evolution of rates the dividend distribution.

3. Board of Directors, Overconfidence and Firm Dividend Distribution Policy

Hackbarth (2004), models the choice of financial structure in the framework of the theory Trade-off decisions and compares a biased and unbiased leader. The optimism and overconfidence are distinguished here: the optimism produced an overestimation of the growth rate results, whereas overconfidence reduces the variance from expected results. Both effects lead to underestimate the probability of bankruptcy and higher leverage. This use of debt-driven over-confidence and optimism of the leader involves a generous distribution of cash flow unobstructed. Thus, the leader seeks to retain its shareholders by generous dividend payments. It uses dividend policy to report the performance of its business and the quality of its management.

Keiber (2006) shows that overconfidence leader is favorable for shareholders. It reduces the costs of agencies and increases the demand for variable compensation of the leader. This request for a variable remuneration (for stock option, salaries ...) this impulse leader to announce his company's performance to take advantage of market reactions. He uses his decision-making power in the choice of generous distribution policy dividends to signal the performance of its business and its correct assessment by the market.

Chakir and Adjaoud (2004), emphasize that managers can convey information on the future profitability of their business to investors in several ways, including the announcement a change in the level of the dividend. Indeed, the market would interpret a change the dividend to rise as good news, then causing rising stock prices. The leader who believes in trusting that his company is undervalued the market's interest to opt for generous dividends distribution policy.

Heaton (2002), calls overconfident leaders who buy securities their own business and those who refuse to exercise repeatedly options. It shows the characteristics of the leader, and in particular its overconfidence influence investment policy by refusing to resort judged too costly external financing. Thus, they invest more when they use internal funding. This underinvestment related to the lack of internal funding source is explained by setting place a generous policy of dividend distribution. Indeed, officer on confident and with a significant percentage of its business activities trying to increase its earnings and reputation. He opts for a generous policy distribution of dividends to enjoy a double pay and to report its business performance.

Felton et al. (2003) posit that optimistic and confident leaders are making forecasts and seek to confirm its strategic levers. The establishment or the absence of dividends distribution policy is affected by the level of confident leader seeking confirmation of its forecast.

CONCLUSION

Starting from the role of the introduction of behavioral dimension in enriching corporate finance-related analyzes this work has tried to achieve the following objectives:

- Studying the impact that behavioral biases would provide, directly or indirectly, financial policies companies and their efficiencies.
- Show the effect of emotional biases about the effectiveness of the Board of directors.

- Check for a complementary relationship or substitutability between organizational behavioral finance theory and financial theory.

For this we explored the different behavioral dimensions whose are the main cognitive and affective aspects and individual context of decision. Throughout this research, we tried to synthesize and articulate different concepts of behavioral finance company.

Indeed, the first section aims to show the impact of controller's emotions on the firm capital structure choice. The theoretical analysis presented highlights the role of leader emotional biases (optimism, loss aversion and overconfidence) in explaining its choice of financing. Thus, with slight role of information asymmetry between the market leaders and to benefit psychological biases, our assumptions argue that leaders (optimism, loss aversion and overconfidence...) are reluctant to apply for the market to avoid the risk of under evaluation. So they prefer to finance their projects primarily through equity then by internal debt and finally external equity. We affirm that the optimal capital structure is the one that cognitive minimizes costs. Thus, the empirical analysis of the financing decision integrating behavioral dimension is consistent with that of Pecking Order Theory; primarily the preferred financing method for the leader is self-financing. The leaders (optimism, loss aversion and overconfidence) therefore prefer to finance their projects primarily by internal capital then debt and finally external equity.

The purpose of the second section is to show the impact of controller's emotions on the firm investment decision. The integration of behavioral dimension conforms to the organizational financial theory (agency theory, transaction cost and rooting), the leader affected by behavioral biases (optimism, aversion to loss and overconfidence) adjusts its investment choices based on its ability alternative assessment (optimism and overconfidence) and its perception of risk (loss aversion) to create value for its shareholders and ensure its place at the head of the management team. The theoretical analysis presented highlights the role of leader emotional biases (optimism loss aversion and overconfidence) in explaining his investment choices. Thus, the study of choice of investments (investment type) in terms of optimism leaders beyond the managerial opportunism problem described by agency theory. The theoretical analysis presented highlights the role of leader emotional biases (optimism loss aversion and overconfidence) in explaining his investment choices. Thus, the study of choice of investments (investment type) in terms of optimism leaders beyond the managerial opportunism problem described by agency theory. These optimistic leaders opt for specific investments to hedge against the risk of loss due to a successful takeover operation. In addition, the choice of long-term investments is explained by optimism leader (overstates the capacity of its project), his overconfidence and its low level of loss aversion.

The third section analyzes the impact of behavioral biases leaders (optimism, loss aversion and overconfidence) on the effectiveness of the board and the choices of firms on dividend distribution. The introduction of emotional bias the analysis of the distribution policy enriches the explanations of financial theory organizational (target for the dividend to reduce the information asymmetry and limits agency costs between officer and shareholder: Bhattacharya, 1980; Miller and Rock, 1985; Albouy, 2007; Sedzro, 1992; Lang and Litzenberger, 1989; Easterbrook, 1984. The leader affected by behavioral biases (optimism, loss aversion and excess confidence) adjusts his company's distribution policy according to its capacity alternative assessment (optimism and overconfidence) and its perception of risk (loss

aversion) to create value for its shareholders and ensure its place at the head of the management team.

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Chapter 4

A THEORETICAL APPLICATION OF EXPERIENTIAL MARKETING: THE CASE OF FESTIVAL TOURISM

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ABSTRACT

The emergence of increasingly well-informed consumers demanding personalized, memorable and meaningful experiences has called into question the way today's businesses develop. New consumers are constantly looking for ways to satisfy psychological needs such as inspiration, authenticity and a feeling of belonging to a community. In the future, only firms that can provide a relevant consumer experience and that adapt to social demands will enjoy success. This idea is reflected in the recent literature, which defends the impending need to support the development of the value of emotions as a determining factor in purchasing and consumption processes. In this vein, the literature has shown a growing interest in recent years in what is known as experiential marketing and its application in specific sectors. In this context, the present study takes the tourism sector as its starting point to apply the general theory of experiential marketing to the particular case of festival tourism.

For many years, the Spanish tourism industry focused almost exclusively on promoting sun-and-beach holidays to attract foreign visitors. However the decline of this model has triggered the search for new alternatives to regenerate and boost one of the main driving forces of the Spanish economy. In this context, a new consumer has emerged who seeks an alternative form of tourism: another way of experiencing their holidays, enjoying different wine, cultural and musical experiences, among others. In this regard, the specialized tourism literature highlights the growing importance of events and festivals as tourism products that bring considerable benefits to the area where they are held. The explanation for this phenomenon is a direct consequence of the new tourism demands from a tourist/visitor who is looking for experiences charged with emotional meaning. Various authors have argued that tourism marketing needs to be refocused on

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the experience rather than the product/service. Indeed, festivals tend to take advantage of the personal to share values and strengthen interpersonal ties, creating a feeling of social identity from which to establish a space that embraces cultural, social and human relationships. In summary, the festival represents an experience associated with a series of activities that involve the consumer, and result from an interaction between the event (festival) and the person who enjoys it, whether this be at a physical, emotional or even spiritual level.

The present paper takes this changing perspective in marketing into account to develop a theoretical approach to the study of the tourism experience and consumer behavior at music festivals. It presents a theoretical model that incorporates the dimensions of the experience and their impact on the flow (satisfaction) and subsequent return visits to the festival.

1. INTRODUCTION

Spain is undoubtedly a major force in tourism and, despite the financial crisis, continues to be one of the world's leading tourist destinations. However, in recent years, many have begun to question the future of the Spanish tourism model, accusing it of being anachronistic because of the almost exclusive focus on sunshine and beaches (Gonzalo, 2005). Despite the stagnation in average expenditure per tourist, the industry has continued to grow. However, the fact that countries like Tunisia and Croatia based on a very similar model to the Spanish one have burst onto the scene, has revived the debate on the need to seek other tourism options. In parallel, there is a growing trend towards the search for new satisfactions in response to leisure and entertainment expectations, a combination of holidays, tourism and cultural enrichment, with more active and participative tourists (García and Alburquerque, 2003; Rodríguez et. al, 2013). We are seeing the rise of a new, more experienced tourist, with more income and time and who looks to tourism as a way of escaping from daily routine (Fandos and Puyuelo, 2012). This situation has brought the need to consider new strategies to keep the industry competitive, and in particular strategies that lead to the creation of new tourism products of the highest possible quality (Rodríguez et. al., 2013). Adapting to new tourist demands requires the availability of different resources (in addition to sunshine and beach) adding value to the catalogue of products and services and increasing the sector's competitiveness in a substantial and sustainable way (Zucco, 2013; Molina, 2003). The strategy of diversifying the tourism supply is essential for improving the productivity of a tourist destination by provoking an increase in the value of services provided offering a wide range of activities in order to attract new market segments (García and Alburquerque, 2003). In this regard, rural, cultural and festival tourism opportunities among others must be considered as a formula for enriching the traditional tourism offer by providing a singular alternative for enjoying the tourism experience. Major musical events attract tourists with a wide variety of musical tastes, with a common denominator of great willingness to spend large sums of money at the places they visit (Chierichetti, 2012). Visitors who enjoy infrastructures in these places which would be difficult to find in emerging tourist markets.

The economic and social magnitude of the festival phenomenon in Spain is shown by the annual celebration of 400 festivals of recognised cultural and artistic interest with widely varying audiences and themes (pop, flamenco, rock, etc.). Musical events, within the experiential tourism context act as a strategic factor in the local economy and can be a

determinant in the choice of destination, because, either due to the appeal of the festival itself, or because it serves to supplement the generic offer (cultural, gastronomic...) the conditions are present to satisfy tourist expectations (García and Alburquerque, 2003).

Achieving tourism success with festivals involves reviewing all the dimensions which determine what Graglia and Heinig (2002) call “experiencing” the product, that is, find out what makes the festival an experience that is worth going to and going back to (Gonzalo, 2005). In this regard, many authors maintain that the tourist industry should make a considerable effort to offer unforgettable consumption experiences, not just at the time of enjoyment but also in the post consumption (Hosany and Witman, 2010). This chapter provides an initial approach to this phenomenon, focusing on analysis of the dimensions in the festival experience construct in order to propose a model for the relations between that construct flow (satisfaction) and revisits to this type of event.

2. TOURIST EXPERIENCE

Currently consumers do not make choices solely based on the cost/benefit equation, but on other factors like experience and emotions which flow from the consumption of a product/service (Segura and Sabaté, 2008). There is no unanimous definition of experience, but it is above all a personal event, often loaded with significant emotional meaning, based on interaction with stimuli in the form of the products or services consumed (Holbrook and Hirschman, 1982). Experience occurs when consumers seek a product, when they buy it and receive a service and when they consume it (Brakus et al., 2009). We are seeing the emergence of an informed consumer (tourist) who demands enjoyment of personalised experiences that are memorable and loaded with meaning and this is calling into question the way the business is currently developed (Bellos and Kavadias, 2011). The new consumer is constantly seeking to cover psychological needs like inspiration, authenticity and the sense of belonging to a community (Binkhorst, 2008). In the future, only firms able to offer an appropriate consumption experience and which adapt to social demands will be successful (Srinivasan and Srivastava, 2010). Authors like Moral and Fernández (2012) among others, advocate the imminent need to demand the development of the value of emotions as a determinant in buying and consumption processes. In this regard, Harrison (2001) establishes the need to make the tourist experience significant, that is, for the tourist to become more involved than is normally expected.

In a brief historical overview, Holbrook and Hichman (1982) are attributed with the first work to question consumer rationality, considering the study of emotions as a key element in understanding consumption behaviour and thus tourist behaviour. According to Havlena and Holbrook (1986) for an experience to be successful, three factors must be present, pleasure, excitement and mastery. Subsequently, Csikszentmihalyi (1990) and Carlson (1997) stated that experience is the result of a set of thoughts and feelings that occur during moments of awareness. Csikszentmihalyi considers that an optimum experience requires happiness and a deep feeling of enjoyment so that it is remembered lifelong. Otto and Richie (1996) identify six fundamental dimensions in the experience construct: hedonist, social or interactive, novelty seeking or escape, comfort, safety and finally the challenge-seeking dimension. Tourist experiences should provide tourists with each of these dimensions to make them as

satisfactory as possible. Nevertheless, despite the previous contributions, it was not until Pine and Gilmore (1998) and their work *Experience Economy* and Schmitt (1999) with *Customer Experience* that experiential marketing really emerged. Schmitt (1999) defines the consumption experience as a set of interactions between the customer and a product/company which originate a pleasant reaction for the individual. According to the above author, it is a personal experience, implying the individual's participation, and the experience is evaluated by comparing customer expectations and the stimuli received (Walls et al., 2011). In parallel, Pine and Gilmore (1998) claim that when people buy experiences, they are paying to enjoy a series of memorable events. Experience is the event able to involve consumers personally, generating economic value for the firm. These authors distinguish four dimensions of experience, aesthetics, educational, entertainment and escapism. Subsequently, Schmitt (1999, 2003) considers that experience is not generated by the individual but is “of” or “about” something, and therefore there are no two identical ways of feeling the same experience, as it has both a rational and an emotional component. In the work *Strategic Experiential Modules* (2003) Schmitt identifies a series of factors (sensations, feelings, actions and relations) which contribute to the creation of five types of experiences that give rise to different types of marketing: sensations, feelings, thoughts, actions and relations. In this regard, Experience Providers or ExPros are tactical instruments used by the firm and aimed at creating experiences by using communications that are both internal and external to the company or event. More recently, Aho (2001) has distinguished four dimensions in the tourist experience: emotional, learning, practical experience and transformative experience. Contributions from these and other authors have been fundamental for the subsequent development of the literature on marketing experiential tourism and its application to different sectors like those of festivals. However, although this topic has been the object of study in recent years, there is still a long way to go for researchers as well as the other players in the sector (business owners, politicians, local community...). Dealing with the tourist offering continues in many cases, to be stuck solely in the study of the cognitive process to explain the festival buying and consumption process. In this regard, and without subtracting from the importance of the more cognitive dimension of the process of enjoying the festival experience, more affective and emotional dimensions must be pursued which will build tourist loyalty and the desire to revisit. It is important to analyse the dimensions of tourists' festival experience which they value and make the experience worth repeating. This is the main objective of the present chapter.

3. THE MUSICAL FESTIVAL AS A TOURIST EXPERIENCE AND ITS CONSEQUENCES

Festivals are an attraction with unique characteristics because they often interrelate with the physical surroundings (McKercher et al., 2006) acting as generators of demand, with the ability to extend the high season, even create new seasons, and renew community life (Zucco, 2013). This type of events strengthens the image of places, their products and institutions and attract flows of tourists, capital and domestic and foreign investment. Festivals are currently a significant segment in the tourist industry and just like any other tourist service, they are categorised as an experiential product (Grunwell and Inhyuck, 2008). It is an active cultural

process, in evolution, the combination of individual and collective experiences that mean that each festival has a differentiating, individual personality (Devesa and Sanz, 2009). Events which at personal level are often used to share values and strengthen interpersonal ties, creating a feeling of social identity (Wellman, 2001). Attendance at festivals does not only involve the consumption of a specific type of music but also involves the creation of a space that includes cultural, social and human relationships (Prat, 2014). In short, the major benefit of consuming this type of event is the experience at the festival itself (Seonjeong et. al, 2014).

According to Pine and Gilmore (1998, 1999) experience refers to a set of activities involving the individual, and is the result of interaction between the event (festival) and the individual who enjoys it, on a physical, emotional or even spiritual level. The authors identify four types of customer experiences determined by two dimensions (Moral and Fernández, 2012):

Customer Participation

Participation may be active (when the individual becomes a key element in the development and creation of their own experience of the festival). Or passive (when the individual's degree of participation in developing the festival experience is not a determining factor for its success or smooth running).

Customer Degree of Connection or Relationship with the Activity or Event Environment

In this regard, two degrees of connection are distinguished, absorption (the customer mentally evaluates the experience they are enjoying) and immersion (individuals participate directly, physically or virtually in the activity).

As shown in Figure 1 four different types of experience can be extrapolated from Pine and Gilmore's conceptual model: entertainment, educational, escape or aesthetic and all of them can be present at this type of event:

Entertainment

Entertainment occurs when there is passive absorption of experiences through the senses. This dimension has been widely documented by the festival literature. For example, Van Zyl and Botha (2003) investigate entertainment from the experience of listening to music at the festival and seeing famous people, among others.

Educational

This requires active participation from individuals who want to learn and broaden their knowledge with experience. A large part of festival goers hope the experience will be

educational, broaden their knowledge and enrich them intellectually (Mehmetoglu and Engen, 2012).

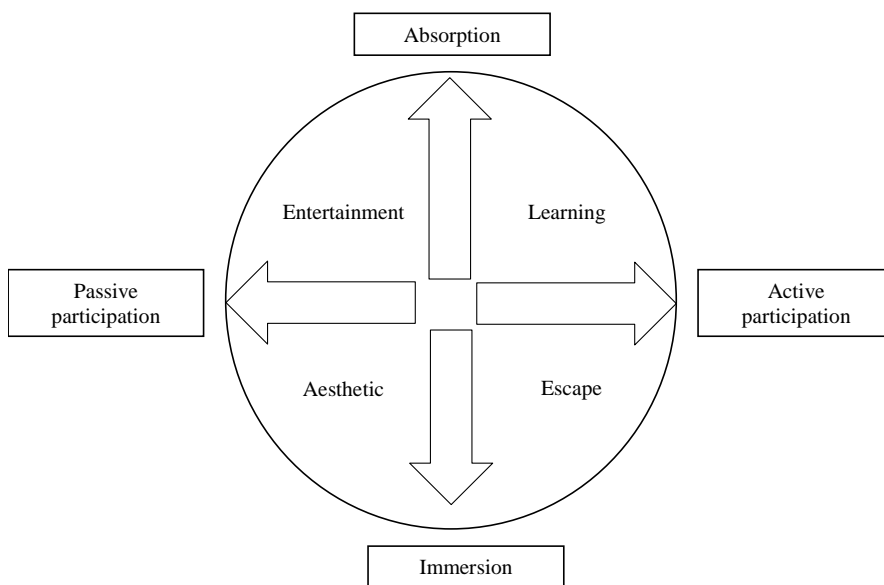
Escapism

Involves the need to change, to get out of the daily routine. Escapism is one of the main motivations for visitors to attend festivals (Kim et al., 2002).

Aesthetic

Enjoyment is caused by delight at the surroundings or physical atmosphere of the event. An optimum combination of staff, programme content, information souvenirs, food, etc., is fundamental for achieving visitor satisfaction and festival revisits (Seonjeong et al., 2014).

Experiences that combine aspects from these four types will increase their ability to enrich and attract visitors (Moral and Fernández, 2012) and will positively affect satisfaction and subsequent festival revisits (Cole and Illum, 2006). In the same vein, Pine and Gilmore propose including a series of memories or emotions in services that help consumers to remember the experience as unrepeatable, increasing the perceived value of the service and giving it a unique, differentiating character. If the experience is satisfactory and remains in the memory, it is remembered, and is an important motivation to repeat the visit (Seonjeong et al., 2014). The concept of satisfaction has been related in the literature to the flow construct and even been regarded as synonymous (Csikszentmihalyi, 1990) and this is the meaning considered in this present work.



Source: Pine and Gilmore (1998)

Figure 1. Model of Pine and Gilmore.

Flow

Flow refers to the optimum state of experience individuals experience when they are intensely involved in what they are doing and find it fun to do. The flow experience has been described as a holistic sensation a person feels when they are fully involved in doing something (Csikszentmihalyi, 1990). It refers to optimum experiences, to highly positive situations with the enjoyment of doing an activity which becomes the reason for carrying out the activity that generates flow (Csikszentmihalyi and Csikszentmihalyi, 1998). The main defining characteristics of a flow situation are: a) a challenge, b) attention focused on action, c) clear goals, d) a balance between opportunities for action (challenge) and ability to act (skill), e) exclusion of irrelevant content from consciousness, f) feedback on the action, g) feelings of control, h) a lack of concern about self, i) distorted sense of time (hours go by as though they were minutes) and j) a feeling that the activity is intrinsically gratifying (Csikszentmihalyi and Csikszentmihalyi, 1998). Flow is, in short, the psychological state arrived at when an unconfirmed emotion envelopes the individual together with the consumer's initial feelings about the experience (Oliver, 1981). Therefore, according to Jackson and Eklund (2004) an optimum experience involves achieving flow. In this regard, Seonjeong et al. (2014) note that the festival must provide a satisfactory experience to achieve long term success. Thus if it manages to satisfy visitors, their affective responses to the experiential service/product set will favourably affect their attitude and intention to repeat the visit (Yoon et al., 2010). This statement enables us to relate flow to the revisit concept.

Revisit

Together with word of mouth and recommendation of the festival, revisiting is a main indicator of the loyalty construct (Yoon et al., 2010). Satisfaction with the tourist destination, (in our case the festival) leads to tourist loyalty (Yoon and Uysal, 2005) and in turn this causes greater repurchase or revisit intention (Oliver and Burke, 1999). Tourists satisfied with a tourist experience wish to visit the destination (festival) again, giving rise to positive “word-of-mouth” recommendation (Hui et al., 2007). Loyalty is determined by satisfaction (flow), destination offering and the interpersonal link between personnel and other visitors, among others. In this context revisit is considered a positive indicator of visitor satisfaction (Kruger et al., 2010). Tung and Ritchie (2011) support these arguments by considering the experience has a positive impact on satisfaction and is a precursor of subsequent repeat visits to the festival. In this vein, Herrera (2012) consider that festivals have the particular characteristic of recurrent consumption, so it is quite likely that a given festival will be revisited, generally as part of a group, on several occasions (Herrera, 2012). Festivals have a great power to attract and build loyalty among consumers, taking into account that the main reasons for attending a festival and repeat visits to subsequent editions is summarised by the emotions experienced, hedonism (benefit that coincides with pleasure and happiness), social identification (degree to which a consumer perceives a feeling of connection with other consumers) and the emotional significance of that perception (Cherichetti, 2012; Grappi and Montani, 2011; Prat, 2013).

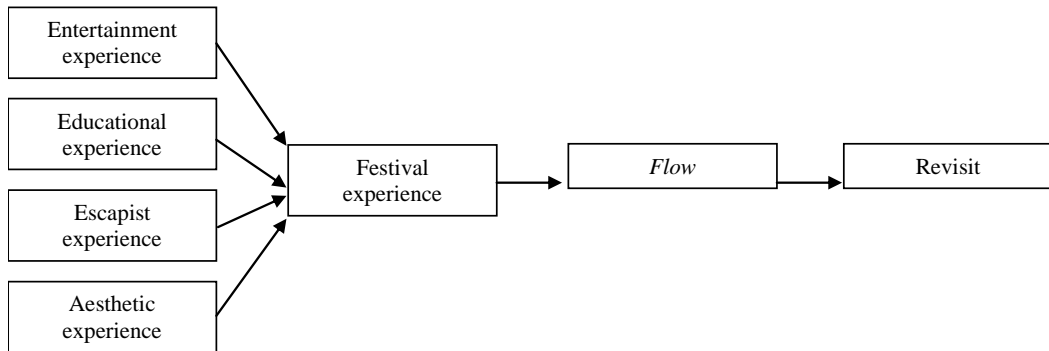


Figure 2. Model.

Having contextualised the study construct with support from the literature, we propose a model that defines the influence of the four types of experience (Pine and Gilmore, 1998) in the total festival experience and subsequent flow and revisit to the festival and we suggest future investigators go deeper into the validity of the proposed line of research (Figure 2).

CONCLUSION

Since the 1980s the tourist literature on the increasing importance of events and festivals as tourist products has not stopped growing. Festivals contribute significant benefits: they increase the numbers of tourists, have a major economic impact, improve customer satisfaction, attract new markets and limit de-seasonality, among others (Getz, 1997). These musical events play several significant roles like attracting tourists, building the image of the destination, encouraging communities and acting as a catalyst for the development of other attractions. Marchena and Repiso (1999) claim that the demand for events is evident for traditional tourist destinations and those which are still emerging. The explanation for this phenomenon is a direct consequence of the new tourist demands from tourists/visitors who seek experiences loaded with emotional meaning. In this regard, Holbrook and Hirschman (1982) argue for the need to redirect tourist marketing to focus mainly on the experience rather than on the product or service. The sector's antiquated strategies based on transactional marketing must give way to relationship and experiential marketing. This change of perspective will have a positive effect on emotions and subsequently on behavioural intention (Tsaor et al., 2006). This work analyses the concept and nature of the festival experience presenting a model that maintains the existence of a relationship between the festival experience, flow and subsequent repeat visits. Understanding the dimensions of this experience (entertainment, educational, escape or aesthetic) will contribute to flow, that is, the sensation of fun, a memory that people wish to repeat. Festivals must provide a satisfactory experience to achieve long term success. Deeper examination is needed of the particular features of this phenomenon, to understand the dimensions of the festival experience in order to find the keys that serve as a guide to maintaining and improving the model for economic and social agents. In this chapter we have made an initial venture into the study of the festival experience, proposing a conceptual model with the intention of obtaining empirical support in the near future.

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Chapter 5

DESIGNING “FRIENDSHIP” INTO EMOTIONAL BRANDING AND DESIGN

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ABSTRACT

“Emotion” plays an important role that will be a key product evaluation point in the brand and design fields. The use of the affective value of a product to confirm its market position can enhance its brand image and facilitate the identification of its product advantages. Designing “Emotion” into brands and products will be a design trend in the global market. “User-Friendliness” is essential in brands and products with embedded emotional design, and designing “friendship” into brands and products will become a core value in emotional design. Therefore, this chapter focuses on the analysis of brand emotion and product design by a case study. First, this chapter uses measuring scales to perform an analysis of the emotional features of brand and product. Then, a conceptual framework is established for brands and products that applies to evaluating models of designer and user that can be experienced in emotional design. Finally, based on a literature review and case study, it is demonstrated how “friendship” added value of design into a value-added brand and products by the emotional brand and product framework.

Keywords: friendship, emotional branding, product design, Qualia

1. INTRODUCTION

Product aesthetics give people a sense of beauty and impression and encourages them to consume and collect. Companies employ shapes that are both emotionally appealing and compatible with the brand’s image of aesthetics in generating favorable consumer responses. Consumers can base their evaluations of a brand extension on their subjective-affective

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reactions toward products. At present, few studies have offered specific guidance on how to design products with emotional appeal to link brands and to initiate consumer emotions. Using a recognized brand and products as an example, we argue that emotional product design strengthens brand emotion and is appealing to consumers.

1.1. Emotional Branding

Marketing research has been concerned with the attitude of consumers toward a brand such as liking or disliking. In this post-modern consumer democracy, people can't operate in a vacuum. Brands need to show their emotional side. Emotional branding is a consumer-centric, relational, and story-driven approach to forging deep and enduring affective bonds between consumers and brands. The development and communication of emotional-brand values might enhance the potential for value creation and be a means for developing a sustainable differential advantage (Roberts, 2004; Lynch and Chernetony, 2004). Emotional branding involves senses and emotions that form a deep, lasting, intimate, emotional connection to the brand that transcends material satisfaction; thus people enjoy products with matching brand labels more than those with mismatching brand labels (Morrison and Crane, 2007; Rahinel and Redden, 2013). Brand strengthens the consumer relationship and deepens it into a friendship to maintain consumer brand loyalty. Customer loyalty combines customers' favorable attitudes and repurchase behavior (Kim, Park and Jeong, 2004; Wang, Chen, Hu and Ye, 2008).

Roberts first proposed the concept of brand love in 2005, and this topic has been getting increased attention. Brand loyalty and active engagement are outcomes of brand love that combines customers' repurchase and recommend behaviors. Brand love is a positive brand emotion encompassing brand loyalty that includes passion for the brand, attachment to the brand, positive evaluation of the brand, positive emotions in response to the brand, and declarations of love for the brand as shown in Figure 1 (Park, Jaworski and MacInnis, 1986; Bergkvist and Bech-Larsen, 2010; Yen, Lin and Lin, 2014).

1.2. Emotional Support the Spirit of the Brand

Designing "culture" into modern products will be a design trend in the global market. The aesthetic experience achieved by connecting design and culture can be a new business model. The new model is called the "ABCDE Plan" which shows that to turn "Art" into "Business," we need "Creativity" and "Design," which allow the creative products to be transformed into "E-business" (Lin and Lin, 2010). The aesthetic economics business model of Qualia product of this study is based on the "ABCDE Plan" that means through "Culture" to fine "Art," "Creative" to support "Design" and "Industry" to create "Brand" as shown in Figure 2.

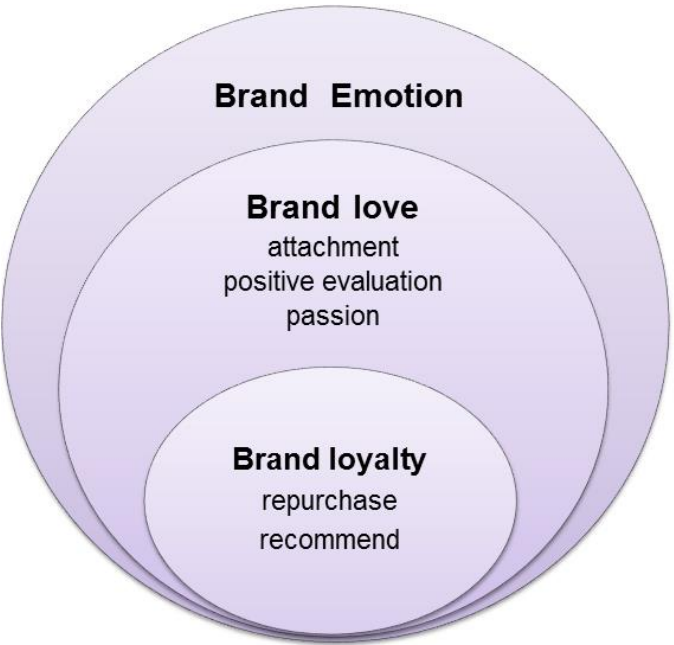


Figure 1. Features of brand emotion (Yen, Lin and Lin, 2014).

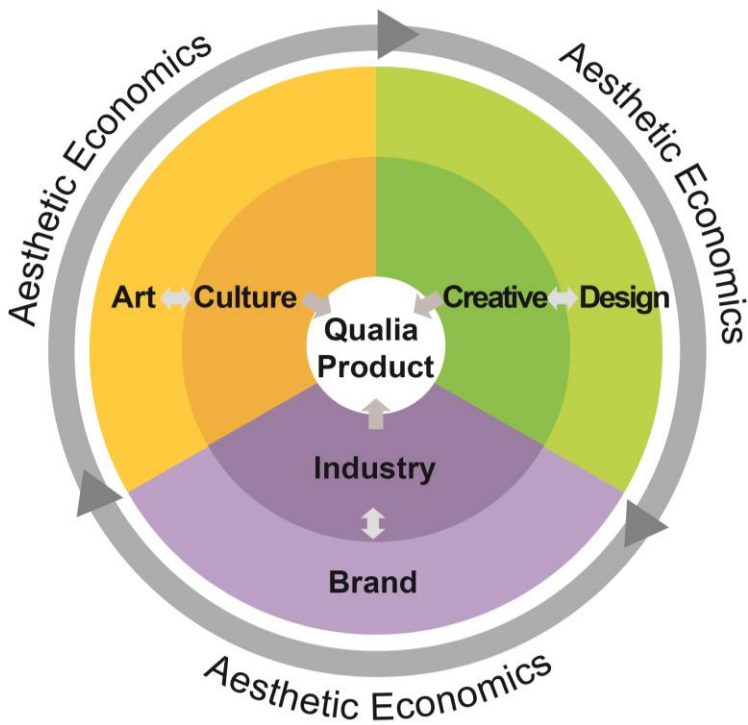


Figure 2. The aesthetic economics business model of Qualia product (Yen, Lin and Lin, 2013).

Since emotion can support the spirit of the brand, three features can be identified as follows: (1) Cultural style is really enough to affect the design of cultural-products; (2) To be successful, products should conform to the five features of Qualia: Attractiveness, Beauty, Creativity, Delicacy and Engineering; (3) The successful culture and creative industries should conform to the aesthetic economy business model (Yen, Lin and Lin, 2013).

The Executive Yuan “Challenge 2008 -National Development Plan” of Taiwan Government is the turning point for case studies of craft industries which are well-know. Those companies produce tableware having cultural commodity characteristics. From the companies’ establishment times, it was found that about every two years a company was established (shown in Figure 3). The emotive function is to communicate the designer’s emotions that are extracted from a cultural object by all those elements that make its meaning unique. Therefore, the main characteristics of works after 2002 are the use of a single material and minimal style. Cultural connotation and value-added are the important roles for recent works. As companies have increased after 2009 there have been more cultural connotations of mature technology and related policies. This has produced more and more local Taiwan works. It also appears that industries and consumers have a common perception of culture connotation (shown in Figure 4). It appears that cultural and creative products get attention gradually in the market, and the corporate philosophy of those companies is to pursue a spiritual level lifestyle and cultural style (Lin, 2009; Yen, Lin and Lin, 2013).

1.3. Emotional Product Design

Emotional qualia are the phenomenological representations of the end products of the appraisal processes. Consumers nowadays require a design that is not only functional and ergonomic but also able to stimulate emotional pleasure. Therefore, designing “feeling” into products to present the emotional communication of user experiences has become a design trend in the 21st century. As a result, “design for feeling” has become a key factor in innovative products (Bermond, 2008; lin 2009; Ko, Lin and Lin, 2009).

A favorable product is a craft object that exercises a discourse with people through its sensation-evoking image and affords them inspiration. According to American design expert Norman, affective/emotional factors are the ultimate determiners of the success or failure of product design. Qualia of product is a sense of difference in quality, which includes attractiveness, beauty, and creativity, these factors constitute the product connotation. Qualia pertains to the features or representations of objects that are not intentional or intentionally determined, and sensory experiences have certain similar characteristics. Qualia products are an expression of “humanity” and “story,” whereas general industrial products are an expression of “function” and “rationality.” For these reasons, emotion in products connotation typically has a moving story (Mandler, 2005; Lin, 2010; Yeh and Lin, 2011).

“Qualia” comprises five features: attractiveness, beauty, creativity, delicacy, and engineering (Yen, Lin and Lin, 2014). Attractiveness, beauty, and creativity belong to the emotional condition of the product “psychology”; delicacy and engineering belong to the rational conditions of the product “physiology.” The appearance attributes together provide the consumer with an overall impression of the product. Furthermore, they are more

actionable and informative than physical properties for designers to use in briefings or product evaluation studies, which can be conducted to assess whether consumers truly perceive the meanings that the designer intended to convey using appearance attributes (Blijlevens, Creusen and Schoormans, 2009; Lin, 2012; Yen, Lin and Lin, 2014). Therefore, qualia products have rational conditions for consumer use and do not neglect emotional appeals. Shown in Figure 5 (Ashby and Johnson, 2003; Yen, Lin and Lin, 2014). It is therefore proposed that enterprises add value to products by using qualia to make the consumer experience the products’ value.



Figure 3. The established chronology of craft industries in Taiwan.

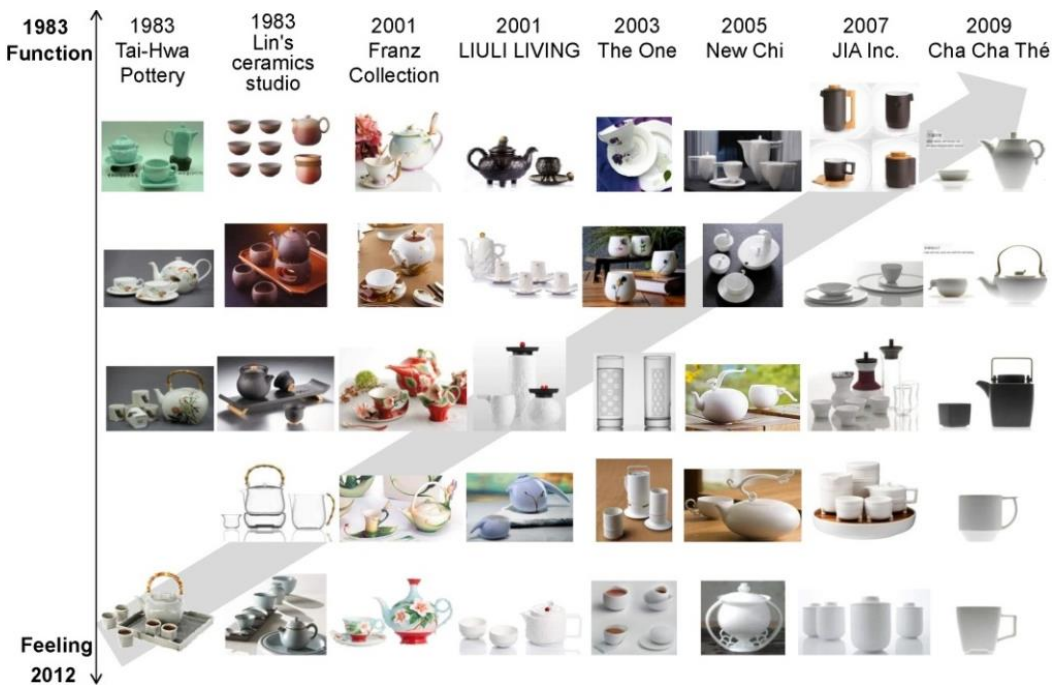


Figure 4. Representative works of craft industries in Taiwan.

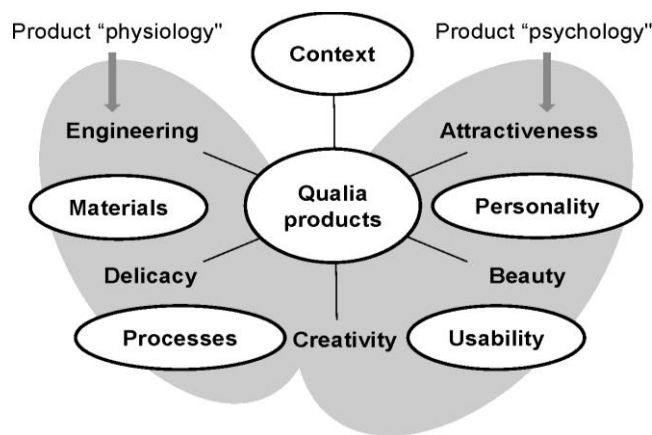


Figure 5. Product character of Qualia products.

Qualia products perform of “Human Nature” and demand of the “Emotional” which focuses on the “Story” to embellish our lives (Chang and Lin, 2013). Yen, Lin and Lin (2013) chose cultural-products of porcelain made after 2002 in Taiwan and analyzed them based on attractiveness and creativity of Qualia. The finding as shown in Figure 6 is that the cultural-products’ appearance presented cultural connotation more than cultural-products’ ideology presented cultural connotation.

Product aesthetics may stimulate positive and pleasant sensory responses, arouse emotional feelings/expression and create symbolic meanings (Rahman, 2012). Beauty of Qualia defines the spatial implications of color, texture, shape, lines, surface ornamentation, details of the handling and component composition. Yen, Lin and Lin (2013) chose cultural-products of porcelain made after 2002 in Taiwan and analyzed them based on beauty of Qualia. As shown in Figures 7 and 8, the findings are single materials are used more than composite materials, and the number of products designed in minimal style is about twice that of sophisticated style.



Figure 6. Analysis of the cultural-products of cultural connotations through Attractiveness and Creativity of Qualia.



Figure 7. Analysis of the cultural-products of material through Beauty of Qualia.








Figure 8. Analysis of the cultural-products of style through Beauty of Qualia.

2. CONCEPTUAL FRAMEWORK FOR EVALUATING BRANDS AND PRODUCTS

According to attractiveness; beauty, and creativity are intuitively emotional, and delicacy and engineering are rational and logical. Product design can be divided into two functions: the practical, and the emotional. The psychological process of consumers is related to their cultural backgrounds, life experiences, and innate curiosity. Qualia products that incorporate emotions and feelings for creating resonance, pleasure, and positive emotions in consumers can promote purchase behaviors. Therefore, branding also needs to create an emotional value which belongs to consumer awareness. Based on a literature review and using a recognized brand and products as an example, the authors argue that emotional product design strengthens brand emotion and is appealing to consumers. The Conceptual Framework for Evaluating Brands and Products is shown in Figure 9.

Table 1. Product samples used in the product emotional design characteristics questionnaire survey

Code	Product name	Product image	Code	Product name	Product image
P1	Wall Mounted CD Player		P4	Taxi Watch	
P2	Beech Alarm Clock		P5	Lightweight Folding Portable Speaker	
P3	Ultrasonic Fragrance Spray				

(Products from MUJI Ltd.,).

3. CASE STUDIES OF EMOTIONAL BRANDING AND DESIGN

3.1. Two Parts and Two Phases of the Case Study

The conceptual framework in figure 9 consists of two main parts: emotional brand and qualia product. The formation of a recognizable brand is a well established need. Previous studies showed that many factors can affect the brand, and product design has a significant positive effect on brand image but the effect is limited. Therefore, this study needs to discuss depth, a specific awareness of the brand needs to be chosen, and then choose products of the brand to analysis analyze the emotional factors of the brands and products. We carried out a two phase case study as follows:

(1) Phase 1/Selection of brands and products

This phase consisted of the selection and filtering of the products and brands under testing. There were four stages: (1) we referenced from 100 large companies in Taiwan as well as well-known international brands and selected 50 brands with manufacturing capabilities; (2) we invited expert groups to perform investigations on brand familiarity and selected 16 top brands; (3) of these 16 top brands, the 142 general consumers selected for the study ranked the top ten brands based on brand familiarity; (4) after selecting the top brand (the subject brand) ranked by the general consumers, we asked the expert group to select five products currently on the market from that brand (subject products). Target brand and target products are shown in Table 1.

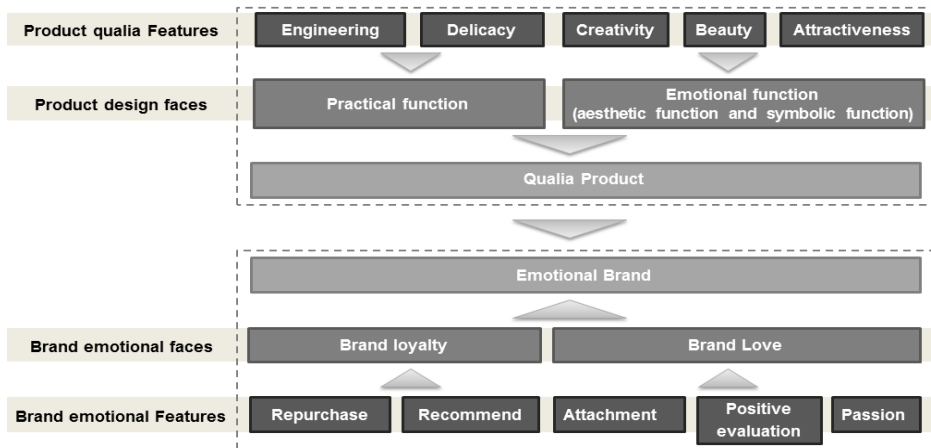


Figure 9. The Conceptual Framework.

(2) Phase 2/Emotional evaluation of the brand and products

We conducted a case study focused on the target brand and target products from phase 1. The product-emotion experiment and the brand form comprised two stages. Stage 1 consisted of a survey on the strength of emotion derived from product form. Stage 2 consisted of a survey on the strength of emotion derived from a brand. We invited 109 general consumers with a background in design to participate in this study. A 7-point Likert scale was used in the experiment in which 1 point indicated the sample did not have emotional appeal or did not feel good, 4 indicated the sample was moderate in emotional appeal or felt fairly comfortable, and 7 indicated the sample possessed strong emotional appeal or looked or felt extremely good.

Table 2. Attribute assessments of the product emotional design characteristics questionnaire survey

Attribute assessments	Code	Measurement question
Product attractiveness	PQ1	This product has a story.
	PQ2	This product can impress people.
	PQ3	This product has a fashion sense.
Product beauty	PQ4	This product looks perfect proportion.
	PQ5	This product has a sense of design.
	PQ6	This product has pleasing appearance.
Product creativity	PQ7	This product is a creative product.
	PQ8	This product can convey cultural meaning.
	PQ9	This product has a clever use of materials.
Product delicacy	PQ10	The production method is detailed.
	PQ11	This product has a fine structure.
	PQ12	This product is compact and neat.
Product engineering	PQ13	This product is made of sophisticated technology.
	PQ14	This product is durable.
	PQ15	This product is easy to operate.

(Adapted from Lin, D.-G., 2012).

Stage 1: Emotion Evaluation of Products

Directly measuring the psychological response in a person’s emotional interactions with product form is difficult. Therefore, in Stage 1, an experiment was conducted to determine how participants perceived emotion in product form. The emotional product design characteristics questionnaire was based on Qualia and adapted from Lin (2012). Participants were asked to evaluate whether the product images conveyed a feeling. The questions are listed in Table 2.

Stage 2: Emotional Evaluation of the Brand

In Stage 2 an experiment was conducted to determine how participants perceived emotion in the brand. The brand-emotion questionnaire was adapted from Kim, Park, and Jeong (2004) and Carroll and Ahuvia (2006). Participants were asked to evaluate whether the brand images conveyed a feeling. The choices are listed in Table 3.

The finding is that emotionally appealing brands benefit more strongly from user recommendation and repurchase. Overall brand emotion is significant in order to recommend more than repurchase, repurchase more than be passionate about it, passion greater than the attachment, and attachment greater than positive emotion.

3.2. Data Analysis

(1) Reliability and Factor Loadings

The attribute assessments of the Product emotional-design characteristics questionnaire are: attractiveness (PQ1, 2, 3), beauty (PQ4, 5, 6), creativity (PQ7, 8, 9), delicacy(PQ10, 11, 12) and engineering(PQ13, 14, 15). Each dimension and the overall scale achieved a substantial interrater reliability of 0.85 ($p < .001$), the matrix of factor loadings was greater than 0.85 and the variance in the variable explained was more than 75%, as shown in Table 4.

The attribute assessments of the brand-emotion questionnaire are: brand loyalty (BQ1, 2) and brand love (BQ3, 4, 5). Each dimension and the overall scale achieved a substantial interrater reliability of 0.90 ($p < .001$), the matrix of factor loadings was greater than 0.90, and the variance in the variable explained was more than 80%, as shown in Table 5.

Table 3. Attribute assessments of the brand emotion questionnaire survey

Attribute assessments		Code	Measurement question
Brand loyalty	Repurchase	BQ1	I will continue to buy the products of this brand.
	Recommend	BQ2	This is a good brand, and I would recommend it to other people.
Brand love	Attachment	BQ3	This brand is my first choice when buying related products.
	Positive evaluation	BQ4	My love for this brand is incomparable to the other brand.
	Passion	BQ5	This brand is very appealing to me.

(Kim, Park and Jeong, 2004; Carroll and Ahuvia, 2006).

Table 4. Reliability of product emotional design characteristics questionnaire

Product emotional-design	Code	Cronbach α	Factor	Variance
Product attractiveness	PQ1	0.90	0.87	83.10%
	PQ2		0.93	
	PQ3		0.93	
Product beauty	PQ4	0.97	0.97	94.61%
	PQ5		0.98	
	PQ6		0.97	
Product creativity	PQ7	0.89	0.91	81.90%
	PQ8		0.88	
	PQ9		0.92	
Product delicacy	PQ10	0.94	0.97	89.76%
	PQ11		0.97	
	PQ12		0.90	
Product engineering	PQ13	0.94	0.93	89.52%
	PQ14		0.96	
	PQ15		0.95	
Cronbach α		0.98		
Variance explained		78.71%		

Table 5. Reliability of the brand emotion questionnaire

Brand-emotion		Code	Cronbach α	Factor	Variance
Brand loyalty	Repurchase	BQ1	0.92	0.96	92.99%
	Recommend	BQ2		0.96	
Brand love	Attachment	BQ3	0.93	0.93	88.49%
	Positive evaluation	BQ4		0.96	
	Passion	BQ5		0.94	
Cronbach α			0.93		
Variance explained			82.32%		

(2) Correlation Coefficient Analysis

The Pearson product-moment correlation coefficients were computed to assess the relationship between each of the network variables and the interdimension correlations. The correlation coefficient between Product emotional-design and Brand-emotion is 0.336 ($p < .001$), as shown in Table 6.

3.3. Results and Discussion

3.3.1. Evaluation of Emotion of Product Design

In this study, because brand is an overall concept, we were unable to conduct a single-product comparison, so the emotional design specifications of all the products were studied.

Based on a 7-point scale measuring how the participants felt about the product samples, the average strengths of the emotional product design characteristics of the samples found from the questionnaire survey are listed in Table 7.

Table 6. The matrix of correlation coefficients (N=109)

		1	2
1	Product emotional-design	1.00	
2	Brand-emotion	0.336***	1.00

Table 7. Product samples of degrees of product design emotional characteristics questionnaire survey

Attribute assessments	Code	Avg		
Product attractiveness	PQ1	4.12	4.48	4.62
	PQ2	4.46		
	PQ3	4.86		
Product beauty	PQ4	4.85	4.88	
	PQ5	4.90		
	PQ6	4.89		
Product creativity	PQ7	4.65	4.48	
	PQ8	4.10		
	PQ9	4.70		
Product delicacy	PQ10	4.63	4.82	
	PQ11	4.69		
	PQ12	5.14		
Product engineering	PQ13	4.82	4.84	
	PQ14	4.77		
	PQ15	4.94		

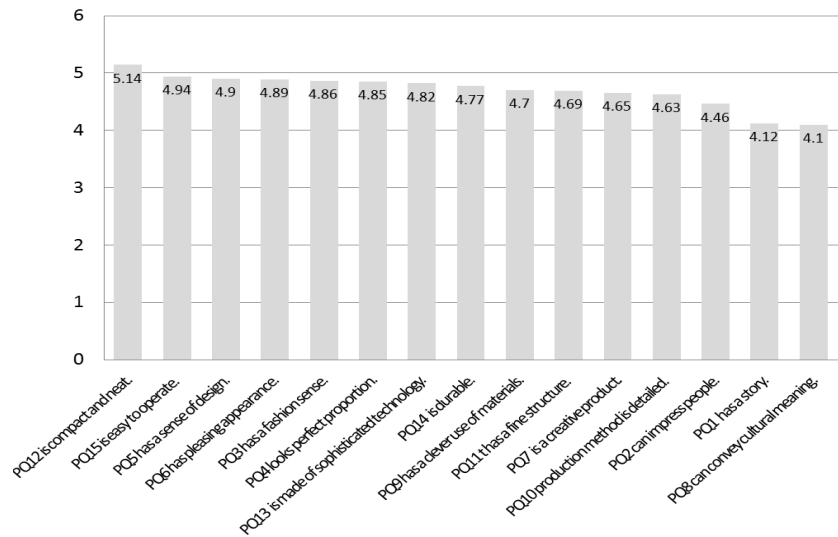


Figure 10. Sorted averages of product design emotional characteristics questionnaire survey.

The averages in Table 7 indicate the strength of a product-emotion property. The criteria of total design emotion, attractiveness, beauty, creativity, delicacy, and engineering dominated the evaluation of appreciation of emotional product design. Beauty is greater than the average of the other dimensions, and the participants believed that Muji products possess great beauty, engineering and delicacy characteristics.

We examined the effect of emotional product design characteristics. All products with emotional design scores exceeding 4.0 were considered as examples of strong emotional design. The top four emotional-design characteristics of a product were “This product is compact and neat.” (with an average score of 5.14), “This product is easy to operate.” (with an average score of 4.94), “This product has a sense of design.” (with an average score of 4.9), and “This product has pleasing appearance.” (with an average score of 4.89) shown in Figure 10.

3.3.2. Evaluation of Brand Emotion

The average results of the 7-point scale and the subjects’ evaluation of feelings regarding the Muji brand are listed in Table 8 and the averages sorted in Figure 11.

Table 8. The brand (MUJI) of degrees of the brand emotion questionnaire survey

	BQ1	BQ2	BQ3	BQ4	BQ5
MUJI	5.82	5.90	5.03	4.81	5.39
Avg	Brand emotion				
	5.39				

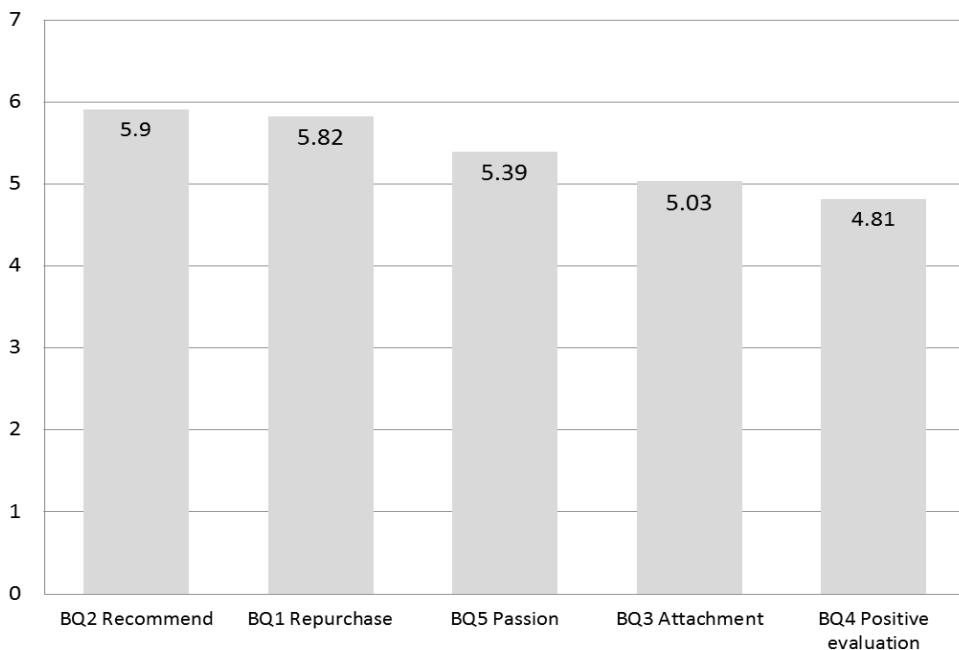


Figure 11. Sorted averages of brand emotional characteristics questionnaire survey.

The averages in Table 8 and Figure 11 indicate the strength of brand emotion. The criteria of total brand emotion, repurchase, willingness to recommend, attachment, positive emotion, and passion dominated the evaluation of emotion appreciation of a product design. All Muji products with emotional-brand scores exceeding 4.5 were considered examples of strong brand emotion. The top three brand emotion characteristics of Muji products were “will recommend” (with an average score of 5.90), “repurchase” (with an average score of 5.82), and “passion” (with an average score of 5.39).

Analysis of the questionnaire demonstrated a correlation between emotional product design and brand emotion. The data analysis indicated the importance that consumers place on beautiful product design. Consumers hold positive perceptions toward an emotional brand and take action toward the brand by repurchasing it. Kim, Park, and Jeong (2004) confirmed this finding by indicating that customer loyalty combines customers’ favorable attitude and repurchase behavior.

4. DESIGNING “FRIENDSHIPS” INTO EMOTIONAL BRANDING AND DESIGN

Price and Arnould (1999) gave preliminary attention to other forms of commercial relationships: for example, friendships. They proposed that people and brand are deepened by emotional attachment and empathy and maintained through shared commitment and personal loyalty. Sicilia and Palazón (2008) proposed that friendship and emotional support are social value of branding. Big brands such as Apple and Coca Cola have maintained emotional relationships with consumers through friendships from past research. Lin (2005) stated that product design bridges close peoples' relationships, and people can build relationships with friends through a product. Tonkinwise (2011) also proposed that designing is a current economic force when it is most explicitly designing via practical styles, as evidenced by brand-driven and persona-based design. Therefore, designing “friendships” into emotional branding and design is the current trend. Based on previous studies, we know that “friendships” of emotional branding is to meet consumers' attention and feeling, and establish a better relationship with consumers. Similarly, the “friendships” of design is the use of Qualia factors for product design.

CONCLUSION

Based on research results the subject participants believed that well-known brands’ products possess characteristics of great beauty, engineering and delicacy. This chapter indicates that the physiological and psychological sides are as important as the product surface. It also means that beauty is important, but it must be under the premise of good quality. This chapter also supplied proof of Fournier (2009) who proposed that strong brand relationships emerge as a byproduct of meeting functional needs, not as a drive to express identity through the brand. In addition, product emotional design significantly affects brand emotion. Product design of an emotional brand involves the emotional characteristics of

attractiveness, beauty, and creativity. These characteristics influence the brand emotion (repurchase, willingness to recommend, attachment, positive emotion, and passion) of consumers. This result is confirmed by Mi (2012), who proposed that products that elicit consistent consumer perceptions enhance consumer loyalty to the brand, determine shopping behaviors, and reveal how the product is perceived regarding brand-driven design (Abbing and Gessel, 2008). The products have simple shapes, pure colors, and natural textures, thus exuding a sense of design, fashion, and pleasing appearance of emotional product design. This result confirms the proposal by Hoegg and Alba (2011) that visual design communicates functional performance independent of attractiveness. Consumers infer functional performance based on product form, which was confirmed by Yen, Lin, and Lin (2013), who claimed that minimal style plays a crucial role in recent designs.

Qualia products design should be stressed in an emotional brand to trigger brand emotion that can continue to support the future development and growth of an aesthetic economy. In addition to recognized brands, future product design of new brands can implement these emotional design characteristics to highlight and enhance brand image and brand emotion. Although the emotional product design of an emotional brand has a high level of performance, it has certain limitations. Cause of story that convey the cultural meaning of product’s emotional design characteristics on recognized emotional brand’s products do not have a strong advantage; cultivating positive emotions and attachments in consumers toward the brand is difficult. Thus, further research on how to design new brands effectively is necessary.

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Chapter 6

**CONSTRUCTION WORKERS' PERSONALITY:
AS A KEY FOR IMPROVING THE OCCUPATIONAL
HEALTH AND SAFETY PERFORMANCE
IN CONSTRUCTION**

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ABSTRACT

Occupational health and safety performance of the construction industry remained poor despite of all precautions undertaken. This fact reveals the importance of innovative solutions so that accidents rates in construction can be reduced. This chapter introduces psychometric testing as a tool for improving occupational health and safety performance in construction. This chapter introduces to the literature enneagramme as a potential tool for enhancing occupational health and safety. The chapter includes the following topics: occupational health and safety performance of the construction industry; main causes of accidents; the relationship between personality, and safety as well as personality and job performance; effects of the workers' personalities on accidents rates; the psychometric tests (the Myers Briggs Type Indicator®, Eysenck Personality Questionnaire, the Belbin team-role self perception inventory, Enneagram tests) covering cases from the literature and their suggested usage for enhancing occupational health and safety performance in construction. Both the researchers and practitioners can get benefit from this chapter which is expected to contribute to the improvement of the occupational health and safety performance in construction industry.

Keywords: occupational health and safety, construction industry, construction project management, personality tests, occupational health and safety performance

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1. INTRODUCTION

Despite of all precautions undertaken (trainings, education, regulations, researches, etc.), both fatal and non-fatal accident rates and the cost of the accidents in construction industry have remained at higher level compared to accident rates and costs in other industries (European Agency for Safety and Health at Work 2004; Martin and Lewis, 2014; Rivara and Thompson 2000, Saloniemi and Oksanen 1998, Abdayyeh et al. 2006, Waehrer et al. 2007, Sorock et al. 1993, Jeong 1998, Chi et al. 2005, Mohamed 2002). There is need for innovative solutions and new approaches in order to enhance construction industry's occupational health and safety performance. As accidents in most cases occur due to individual's mistakes, and failure in obeying the safety rules, there is relationship between personality of the workers and accidents (Abdelhamid and Everett, 2010; Cellar et al., 2001; Clarke and Robertson, 2005; Heinrich, 1959; Kartam, 1997; Reason, 2002). Accidents can be prevented by assessing a person's personality traits and predisposition to commit unsafe acts and/or omissions (Christian et al., 2009; Ford, 2011). Furthermore, considering personality traits before recruitment can enhance occupational health and safety performance (Cavazza and Serpe 2010; Sing et al., 2014). Industries, other than construction, have long undertaken psychometric testing of team members in order to establish, and build upon, the particular strengths of the individuals (Sommerville and Dalziel, 1998: 165). The construction industry needs to benchmark from other industries as construction workers' personalities can influence the accidents rates. For this reason, this chapter introduces psychometric testing as a tool for improving occupational health and safety performance in construction. The chapter includes the following topics: occupational health and safety performance of the construction industry; main causes of accidents; the relationship between personality, and safety as well as personality and job performance; effects of the workers' personalities on accidents rates; the psychometric tests (the Myers Briggs Type Indicator®, Eysenck Personality Questionnaire, the Belbin team-role self perception inventory, Enneagram tests) covering cases from the literature and their suggested usage for enhancing occupational health and safety performance in construction.

This chapter introduces to the literature enneagramme as a potential tool for enhancing occupational health and safety.

2. OCCUPATIONAL HEALTH AND SAFETY PERFORMANCE OF THE CONSTRUCTION INDUSTRY

Construction industry contributes to the economy through its need for materials supporting material industry and through its labor intensive nature reducing unemployment rate. Despite of its important role in the economy, the health and safety performance of the construction industry is poor compared to other industries. According to the United States Department of Labor Occupational safety and health statistics (OSHA website), one in five worker deaths in 2013 were in construction and 58,7% of the construction worker deaths in 2013 were related with falls, followed by struck by object, electrocution, and caught-in/between. As safety performance of the construction industry is still poor despite of the precautions [i.e., researches on the improvement of health and safety performance,

employers' legal requirements under the OSH (2011) Act, legislation (Hinze, 1997; Choudhry et al., 2006), engineering failures (Cooper, 1994), safety awareness campaigns (Saarela et al., 1989), safety training (Cooper and Cotton, 2000; Hale, 1984), usage of BIM (Zhang et al., 2015), and unsafe acts (Duff et al., 1994; Choudhry, 2012)] undertaken (Choudhry, 2014: 16), there is still need for managing the construction safety risks and for improving its safety performance (Zou and Sunindijo, 2013: 92). The main reasons for the poor performance include but are not limited to the following factors: uniqueness of each construction project with respect to technical (i.e., site conditions) and managerial aspects (i.e., changing teams and subcontractors, dealing with local requirements); difficulty in identifying, controlling and managing hazards before the construction phase especially due to dynamic nature of the industry, and rapidly changing work environment (Carter and Smith, 2006; the Center for Disease Control and Prevention, 2012) as quoted from Albert et al.; contractors' approach to safety management (e.g., frequency of safety meeting, allocation of resources for safety) (Tam et al., 2004: 569); workers' attitudes (Hinze, 1981); economic pressure, safety policy and safety culture (Tam and Fung, 1998; Glendon and Stanton, 2000; Tam et al., 2001; Tam et al., 2004: 570); fatigue and tired construction workers due to heavy workload, production pressure and long work hours resulting in reduced performance (De Vries et al., 2003; Dong, 2005; Han et al., 2014; Hartmann and Fleischer, 2005; Swaen et al., 2003).

Unsafe behaviors cause 80% to 98% of accidents (Blackmon and Gramopadhye, 1995; Choudhry, 2014: 15; Heinrich, 1959; HSE, 2002). Dilley and Fleiner (1996) stated that the majority of injuries occurring at work are caused by employee's behavior rather than by faulty equipment (Martin and Lewis, 2014). As human-ware failure causes majority of the accidents (Nishigaki et al., 1994), minimisation and elimination of unsafe behaviors can enhance the site safety performance (Choudhry and Fang, 2008; Choudhry, 2012; Choudhry, 2014: 15). "Although everyone, including management, suffers in construction related accidents, it is the subordinate who faces with the physical consequences of accidents" (Martin and Lewis, 2014). As team members can influence each others' attitudes and behaviours (Fugas, et al., 2012; Torner and Pousette, 2009; Torner, 2011), social capital can support achievement of project organisational objectives (Nahapiet and Ghoshal, 1998; Coleman, 1988), including safety objectives (Koh and Rowlinson, 2014: 313). For this reason, management can take active and effective role in reducing the risk of construction accidents as their leadership can enhance occupational health and safety performance even in highly risky working environments (Brown and Holmes 1986; Cheyne et al. 1999; Cox et al. 1998; O'Dea 2002; Flin and Yule 2004; Guest et al. 1994; Griffin et al. 2000; Heinrich, 1959; Hofmann and Stetzer, 1996; Niskanen, 1994). Managerial level needs to establish safety culture within the organization. Safety culture has psychological dimension related with employees' perception towards safety; behavioural dimension related with employees safety related actions; and corporate dimension covering safety policy, and safety procedures (Health and safety executive, 2005; Zou and Sunindijo, 2013: 93; Koh and Rowlinson, 2014: 313). The degree of employees' adherence to safety culture is influenced by their personality as personality is "the dynamic and organised set of characteristics of a person that uniquely influences his/her cognitions, motivations, and behaviours" (Ryckman, 1997:5 as cited from Ineson, 2011). Personality traits of individuals cannot be changed easily by interventions such as behavioral training (Helmreich, 1984; Kichuk and Wiesner, 1997: 197). Personality traits have been researched with respect to different parameters, including: personnel selection (da Silva, 2013: 1318); teaching and learning styles (Fairhurst and Fairhurst, 1995; Navidnia,

2009); workers' absenteeism (Ahn et al., 2014); risky driving behavior (Schwebel et al., 2007; Classen et al., 2011); vulnerability (Nimbarte et al., 2012); and establishment of team (Yee, 2013). Personality of the workers can affect the safety performance of the construction works. There is significant relationship between safety climate and workers' personal characters (Fang et al., 2006). The relationship among the concepts of 'personality,' 'behavioral approach,' 'safety culture,' and 'change in behavior' can be explained as follows (Choudhry, 2014: 14-15):

“...behaviors are actions or reactions of persons or things in response to external or internal stimuli... Behavioral approach addresses how people behave on the job. When we have a group of people with similar habits and attitudes about safety, we begin to talk about people having a common safety culture; then we want to talk about changing the culture, we have to talk about changing people's behavior (McSween, 2003)... According to the accident pyramid, Heinrich (1959) proposed that for every 300 unsafe acts there are 29 minor injuries and 1 major injury...Widespread acceptance of Heinrich's theory of accident causation that unsafe acts lead to minor injuries and over time to a major injury...” (Choudhry, 2014: 14-15)

As personality traits can affect job performance (Barrick and Mount, 1991; Driskell et al., 1987; Lounbury, et al., 2004; Rothstein and Goffin, 2006; Ones, et al., 2007), which also includes safety performance, employers can use them in hiring and appointing staff (Dunn et al., 1995; Kichuk and Wiesner, 1997: 197-198) to specific job for which relevant personality traits required have been identified (Barrick and Mount, 1991; Borman et al., 1980; Day and Silverman, 1989; Kichuk and Wiesner, 1997: 197; Lord et al., 1986; Tett et al., 1991). Berens et al. (2005)'s study revealed that “... certain personality types lend themselves better to certain functions compared to others” (Dolfi and Andrews, 2007). Not only the personality traits of the individual employee but also interaction of employees within the team can contribute to the performance (Driskell et al., 1987; Kichuk and Wiesner, 1997: 197; Sommerville and Dalziel 1989). The employers can also get benefit from the personality type theories and psychometric tests in establishing teams based on personality characteristics of employees (e.g., Childs, 2004; De Fruit and Mervielde, 1997; Kirkcaldy, et al., 2002; Sutton, et al., 2013). Similarly, occupational health and safety performance of the construction industry can be enhanced considering employees' personality type and their interaction within the team with the help of the psychometric tests.

3. THE PSYCHOMETRIC TESTS AND THEIR POTENTIAL USAGE FOR IMPROVING HEALTH AND SAFETY PERFORMANCE IN CONSTRUCTION

Psychometric testing of team members have been widely used in various industries (i.e., petro-chemical, pharmaceuticals), other than in construction, to establish, and build upon, the particular strengths of the individuals (Sommerville and Dalziel, 1989). Personality variables are most often assessed through self-report (Classen et al., 2011) with the help of testing methods for classifying individuals (Dolfi and Andrews, 2007). The psychometric tests which are widely used in various industries and which can be applied to the construction industry for the improvement of the construction safety performance have been covered within the scope

of this chapter. The psychometric tests include: the Myers-Briggs type Indicator® (MBTI®); the Eysenck Personality Questionnaire; the Belbin Team-Role Self Perception Inventory; and Enneagram.

3.1. The Myers Briggs Type Indicator®

The Myers-Briggs classification of personality type (Myers and McCaulley, 1998) was developed by Katherine Briggs and Isabel Myers in the 1940's (Jung, 1971) (Dolfi and Andrews, 2007) "based on the type theory of Carl Jung with the aim of better understanding differences in individual preferences in the way they perceive and judge information (Myers et al., 1998) with respect to the four preferences, namely: their favorite world [Extraversion (E) versus Introversion (I)]; information taking [Sensing (S) versus Intuition (N)]; decision making [Thinking (T) versus Feeling (F)]; and orientation to the world [Judging (J) versus Perceiving (P)] (Martin, 1997; Classen et al., 2011). Interaction of these four preferences provide information on who the individual is and how he/she approaches to the world (Martin, 1997: 7). Based on the individual's preferences and judgements in these four preferences, individual's personality type can be understood as a four letter code among the 16 types, namely: ISTJ; ISFJ; INFJ; INTJ; ISTP; ISFP; INFP; INTP; ESTP; ESFP; ENFP; ENTP; ESTJ; ESFJ; ENFJ; ENTJ. Difference in people's perception and judgment leads to differences in their interests, reactions, values, motivations, and skills (Myerssbriggs website).

The MBTI® can be used as a training or personnel development aid, and functional job descriptors can be assigned to MBTI personality types (Dolfi and Andrews, 2007). "MBTI® (Myers, 1962) can support employees to realise their full potential and increase their effectiveness (Childs, 2004; Fitzgerald and Kirby, 1997)." (Sutton, et al. 2013). MBTI® can be also used for identification of learning preferences, teaching styles, and personality characteristics (Mamchur, 1996). Cases for the usage of the MBTI® and their possible implementation for improving the occupational health and safety in construction have been explained in the following paragraphs:

- **Risky driving behavior and personality:** Classen et al. (2011)'s study aimed at examining the role of psychological type in older driver performance. They have applied the MBTI® Step III™ instrument, a self-reported Safe Driving Behaviors Measure (SDBM), clinical tests and a standardized on-road driving evaluation yielding a fail/pass determination as well as the Sum of Maneuvers Score (SMS) to the convenience sample of 50 older adults. Classen et al. (2011)'s research revealed that the E and J type participants were better drivers than the I or P type participants, and that the S and N preferences rated themselves better on the SDBM whereas the I participants failed the on-road course (Classen et al., 2011).

Possible implementation for improving the occupational health and safety in construction:

Schwebel et al. (2007)'s and Classen et al. (2011)'s researches provide an indication of the possibility of the usage of personality in enhancing construction safety performance and in reducing the risk of emergence of construction equipment related accidents. As construction projects are highly mechanised (Shapira et al.,

2007), they “present new hazards to workers” (Neitzel et al., 2001). Beavers et al. (2005) stated that one of the major causes of fatalities during construction is the use of cranes or derricks during lifting operations and that human error is the cause of almost 60% of lifting operation related accidents (Sertyesilisik et al., 2010: 72). Considering the personalities of the drivers of the construction equipment while appointing them to the specific jobs can reduce the risk of construction accidents. For this reason, the MBTI® can be applied to the operators who applied to the job and their MBTI® personality type can be considered as one of the criteria in their appointment for reducing the risk of equipment accidents on site. Benchmarking from Classen et al. (2011)’s research, hiring operators having E and J types can reduce the risk of construction accidents.

- **Preferred teacher typology:** Knowing students’ personality types and their students’ learning styles is important for teachers so that they can increase the effectiveness of the training (Fairhurst and Fairhurst, 1995). Rushton et al. (2007: 432) applied the MBTI® and Beiderman Risk Taking scale to 58 teachers in the state of Florida. Their study found significant differences with the ENFP and the ENFJ combined profile types. Lawrence (1979)’s research on 5366 American teachers revealed that the most frequently “preferred typology” was the ESFJ teacher. Macdaid et al. (1986)’s research on 804 American teachers revealed that the most preferred typologies were: S and J followed by S and F. Sears et al. (1997)’s research on the pre-service teachers in the USA revealed that students preferred the –SFJ profile teachers at the elementary level whereas the students preferred the –NTJ profile teachers at the secondary level.

Possible implementation for improving the occupational health and safety performance in construction:

MBTI® can be used for enhancing the effectiveness of the construction safety training. MBTI® can be applied to construction workers to understand the most effective safety trainers typology.

- **Vulnerability level and personality:** Nimbarte et al. (2012) carried out a research on healthcare workers with regard to the influence of psychosocial stress and personality type on the biomechanical loading of neck and shoulder muscles. They have applied MBTI® to the sample. Their findings revealed that participants with feeling personality are more vulnerable than participants with thinking personality to increased muscle loading in response to mental stress during physically demanding tasks. Based on Nimbarte et al. (2012)’s research findings, appointment of construction workers whose personalities are durable towards mental stress can enhance the construction safety performance with the help of reduced vulnerability level.

Possible implementation for improving the occupational health and safety performance in construction:

- Hiring construction workers having thinking personality instead of feeling personality can contribute to the occupational health and safety performance in construction with the help of reducing construction workers’ vulnerability level.

Information on the possible implementation of the MBTI® for improving the occupational health and safety performance in construction have been provided in Tables 1 and 2. Table 1 provides information on the MBTI® and its suggested usage with respect to the criteria to be considered and the appropriate phase for its usage. Based on Myers-Briggs's studies, Table 2 lists The MBTI® types and extracts their characteristics having potential for contributing to the occupational health and safety performance in construction.

There are contradictory findings on the reliability of the MBTI® test. Anastasi (1990) criticised the MBTI® with respect to its reliability as Anastasi (1990)'s research demonstrated that target groups tend to obtain different results if they have taken the test more than once (Sing et al., 2014). On the other hand, Capraro and Capraro (2002) and Thompson and Borrello (1986)'s researches supported the reliability of the MBTI (Rushton et al., 2007).

Table 1. MBTI® and its suggested usage for enhancing occupational health and safety performance in construction

Function/Usage	Classification of personalities	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the MBTI® usage
MBTI® is a training or personnel development aid (Dolfi and Andrews, 2007).	Four main aspects as the basis for 16 types: <ul style="list-style-type: none"> • E versus I • S versus N • T versus F • J versus P 	Hiring operators who are E and J types [benchmarking from Classen et al. (2011)' s research]	<ul style="list-style-type: none"> • Hiring operators for reducing construction equipment related accidents on site [benchmarking from Classen et al. (2011)' s research]
<p>MBTI® supports employees to realise their potential (Childs, 2004; Fitzgerald and Kirby, 1997; Sutton, et al. 2013).</p> <p>MBTI® provides information on individuals' learning preferences, teaching styles, and personality characteristics (Mamchur, 1996).</p>		<p>Hiring construction workers having thinking personality [benchmarking from Nimbarte et al. (2012)' s research]</p>	<ul style="list-style-type: none"> • Hiring construction workers for reducing their vulnerability level [benchmarking from Nimbarte et al. (2012)' s research] • Appointing safety trainer [benchmarking from Rushton et al. (2007)' s research]

Table 2. The MBTI® types and their characteristics having potential for contributing to the occupational health and safety performance in construction (adapted and extracted from Briggs Myers)

MBTI® Types	Characteristics having potential for contributing to the occupational health and safety performance in construction
ISTJ	<ul style="list-style-type: none"> • Take pleasure in making everything orderly and organized - their work
ISFJ	<ul style="list-style-type: none"> • Strive to create an orderly and harmonious environment at work
INFJ	<ul style="list-style-type: none"> • Want to understand what motivates people and are insightful about others
INTJ	<ul style="list-style-type: none"> • Have...great drive for...achieving their goals
ISTP	<ul style="list-style-type: none"> • quiet observers until a problem appears, then act quickly to find workable solutions • interested in cause and effect
ISFP	<ul style="list-style-type: none"> • Dislike disagreements and conflicts
INFP	<ul style="list-style-type: none"> • Idealistic, • Curious, quick to see possibilities, can be catalysts for implementing ideas. • Adaptable, flexible, and accepting unless a value is threatened.
INTP	<ul style="list-style-type: none"> • Quiet, • contained, • flexible, • adaptable. • Have unusual ability to focus in depth to solve problems in their area of interest.
ESTP	<ul style="list-style-type: none"> • Flexible and tolerant, • they take a pragmatic approach focused on immediate results. • Focus on the here-and-now • Learn best through doing.
ESFP	<ul style="list-style-type: none"> • adapt readily to new people and environments
ENFP	<ul style="list-style-type: none"> • Make connections between events and information very quickly, and confidently proceed based on the patterns they see. • Spontaneous and flexible,
ENTP	<ul style="list-style-type: none"> • Quick, • Alert
ESTJ	<ul style="list-style-type: none"> • Practical • realistic • Take care of routine details. • Have a clear set of logical standards
ESFJ	<ul style="list-style-type: none"> • Want harmony in their environment, work with determination to establish it. • Notice what others need in their day-by-day lives and try to provide it.
ENFJ	<ul style="list-style-type: none"> • Responsible • May act as catalysts for individual and group growth. • Sociable, facilitate others in a group, and provide inspiring leadership.
ENTJ	<ul style="list-style-type: none"> • Frank, decisive, • assume leadership readily. • Quickly see illogical and inefficient procedures and policies, ..., • enjoy expanding their knowledge and passing it on to others. • Forceful in presenting their ideas.

3.2. Eysenck Personality Questionnaire

EPQ aims to explain individual difference in personality based on inherited predispositions and physiological processes (Burger 2011). Initially, the EPQ was developed by Eysenck and Eysenck (1975) to measure extraversion (tE); neuroticism/stability (tN); and psychoticism (tP). Furthermore, EPQ has been improved as the Lie scale has been added to assess the conformity (Eysenck et al. 1984; Francis et al. 1992). The tN, tE, and tP measures of the EPQ can be explained as follows (Beratis et al., 2011: 1267):

“tN is considered to reflect the tendency to experience negative emotions, low self-esteem, and emotional instability; tE expresses traits such as sociability, activeness, self-confidence and irresponsibility; tP is conceptualized as an umbrella term that includes traits such as antisocial behavior, emotional insensitivity, paranoid way of thinking, impulsiveness, and nonconformity (Eysenck and Eysenck, 1975, 1991).” (Beratis et al., 2011: 1267)

As tL measures conformity level on the respondents (Jackson and Francis 1998), individuals possessing a tL value tend to obey the rules and guidelines (Sing et al., 2014). Sutton et al. (2013) emphasize that the EPQ (Eysenck and Eysenck, 1975) has been well established in terms of its human resource and career counselling applications. Lajunena and Scherler (1999)’s concerns with respect to the universality of the EPQ due to specific nuances which might occur in translation have been defeated by Chin et al. (2000) who translated the EPQ into the Chinese language (Sing et al., 2014). Furthermore, EPQ has been translated into various languages [e.g., Spanish (Aluja et al., 2003); Greece (Alexopoulos and Kalaitzidis, 2004)]. The reliability of the EPQ scale has been supported in various researches (Barrett and Eysenck 1984; Eysenck et al. 1984; Lynn and Martin 1995; Sing et al., 2014). Beratis et al. (2011: 1267)’s research revealed the cases where EPQ has been used as in the following statements:

“Prominent areas of interest are: (a) the link between personality traits and psychopathology (Kendler et al., 1993; Roelofs et al., 2008); (b) the genetic influence on personality traits (Colzato et al., 2009; Lake et al., 2000); (c) the effect of sex on personality patterns (Faith et al., 2001; Nash et al., 2009); and (d) the link between personality traits and brain activation patterns (Hagemann et al., 2009; Kumari et al., 2004; Papageorgiou et al., 2010).” (Beratis et al., 2011: 1267)

EPQ related researches have focused mainly on clinical aspects (e.g., the relationship between personality and brain activation patterns. EPQ’s possible implementation for improving the occupational health and safety in construction lies its tL value. Hiring construction workers possessing a tL value can enhance the safety performance of the construction project due to their tendency of obeying the health and safety rules.

The possible implementation of the EPQ for improving the occupational health and safety performance in construction have been summarized in Table 3 with respect to the criteria to be considered and the appropriate phase for its usage.

Table 3. EPQ and its suggested usage for enhancing occupational health and safety performance in construction

Function/Usage	Classification of personalities	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the EPQ usage
EPQ explains individual difference in personality, based on inherited predispositions and physiological processes (Burger, 2011).	<ul style="list-style-type: none"> • Extraversion (tE) • Neuroticism (tN) • Psychoticism (tP) • Lie (tL) (Eysenck et al. 1984; Francis et al. 1992)	<p>Hiring construction workers possessing a tL value is expected to enhance the safety performance of the construction project due to their tendency of obeying the rules.</p> <p>Hiring construction workers having low level of neuroticism is expected to enhance the safety performance as neuroticism is related with depression, and inability to deal with stress.</p> <p>The construction workers are exposed to high levels of stress at construction sites especially due to hard working conditions and temporal pressure.</p> <p>Hiring construction workers having low level of psychoticism is expected to enhance the safety performance as psychoticism is related with recklessness, and anger. Reckless workers can increase the risk of accidents. Workers having high anger level can argue with their colleagues and effect the safety climate adversely.</p> <p>Hiring construction workers having low level of extraversion is expected to enhance safety performance as extraversion is related with irresponsibility.</p>	Hiring construction workers

3.3. The Belbin Team-Role Self Perception Inventory

The Belbin team-role self perception inventory (BTRSPI) examines team behavior and allows the identification of particular team roles as well as the individual's preponderance for the identified roles (Sommerville and Dalziel 1989). "BTRSPI was developed by Belbin at the Administrative Staff College, Henley, by the Industrial Training Research Unit from Cambridge to analyze the teams and it provides indicators of an individual's natural propensity toward filling each role." (Rajendran, 2005: 743-744). Belbin identified eight roles which need to be covered within the team for the team to be successful, namely: chairman; shaper; plant; monitor-evaluator; resource investigator; team worker; company worker; and completer-finisher. These eight roles have been briefly summarized as follows based on Belbin (1981) and Henry and Stevens (1999: 243):

Chairman acts as guiding and controlling leader who knows the team members' abilities. Chairman is calm, self-confident and controlled.

Shaper is demanding and confrontational leader. Shaper is highly strung.

Plant is innovator and problem solver. Plant provides ideas and is individualistic.

Resource investigator is contact person for external resources and brings external resources to the team. Resource investigator is extroverted and communicative.

Monitor-evaluator analyzes proposed solutions. Monitor-evaluator is sober and prudent.

Company worker implements the plans. Company worker is conservative and predictable.

Team worker facilitates team functions and mediates issues within the team. Team worker is social, mild and sensitive.

Completer-finisher pays attention to the details and deadlines. Completer-finisher is orderly and conscientious."

BTRSPI can be used in various fields. Case studies provided in Belbin (2010)'s book revealed the usage of BTRSPI for: changing a company's style, helping to bridge the culture gap, use of team roles in change strategy, linking the work of teams, creating productive working relationships, development of a research and development team, developing 'teaming' as a working model, developing team roles in a range of organizations, and personal transformation. Two cases for the usage of BTRSPI and their possible implementation for improving the occupational health and safety in construction have been provided in the following paragraphs:

- **Hiring the staff:** The right person for the job can be identified considering personality traits of the candidates for the specific job (da Silva et al., 2013: 1318). Rajendran (2005: 738) investigated the team effectiveness of software development teams by establishing the teams based on who can work effectively together. Rajendran (2005: 738)'s research revealed that "...the Belbin's roles and the Belbin self-perception inventory can be used to recognize important positive and negative features of a team."

Possible implementation for improving the occupational health and safety performance in construction:

Hiring workers based on BTRSPI can enhance the occupational health and safety performance in construction due to its possible contribution to the harmony among the team members.

- **Establishing team for fostering innovation in construction:** Sommerville and Dalziel (1989)'s research focused on securing innovation in construction project with the help of paying attention to the team establishment phase. They have applied BTRSPI to the student sample. Their research findings revealed the importance of the processes involved in team development and composition for innovative construction projects (Sommerville and Dalziel 1989).

Possible implementation for improving the occupational health and safety performance in construction:

Establishing the teams considering the BTRSPI results of the construction workers can enhance the safety performance due to possible increase in the harmony among the team members.

The possible implementation of the BTRSPI for improving the occupational health and safety performance in construction have been summarized in Table 4.

Table 4. BTRSPI and its suggested usage for enhancing occupational health and safety performance in construction

Function/Usage	Classification of personalities/team roles	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the BTRSPI usage
BTRSPI enables analysis of team effectiveness analysis and establishment of teams based on who can work effectively together (Rajendran, 2005: 738). BTRSPI enables recognition of positive and negative features of a team (Rajendran, 2005: 738).	<ul style="list-style-type: none"> • Chairman • Shaper • Plant • Resource investigator • Monitor-evaluator • Company worker • Team worker • Completer-finisher (based on Belbin (1981) and Henry and Stevens (1999: 243))	Each role can support the safety from different point of views. Each role's characteristics having potential for contributing to the safety has been summarized based on Belbin (1981) and Henry and Stevens (1999: 243): <ul style="list-style-type: none"> • "Chairman acts as guiding and controlling leader who knows the team members' abilities. • Shaper is demanding and confrontational leader. • Plant is innovator and problem solver. • Resource investigator is contact person for external resources and brings external resources to the team. 	Hiring construction workers, site managers, safety managers Establishing the teams

Function/Usage	Classification of personalities/team roles	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the BTRSPI usage
	•	<ul style="list-style-type: none"> • <i>Monitor-evaluator analyzes proposed solutions. Monitor-evaluator is sober and prudent.</i> • <i>Company worker implements the plans. Company worker is conservative and predictable.</i> • <i>Team worker facilitates team functions and mediates issues within the team.</i> • <i>Completer-finisher pay attention to the details and deadlines Completer-finisher is orderly and conscientious."</i> 	

3.4. Enneagram

Being related with human personality type and leadership style (Fowke and Fowke, 1997) Enneagram is a tool for analysing the project team formation and its effects on the performance (Yee, 2013). As Enneagram's main focus is on self-development and the identification of hidden potential of the individuals and as it provides insights on the individual's behaviour at work, the Enneagram typology can support the human resources development (Palmer, 1995; Sutton, et al., 2013). Fowke (1999) explained the importance of Enneagram as quoted in the following statements:

“.... Beyond being an indispensable consulting tool, the Enneagram has proven to be a powerful human resource technology for the companies, and personal development know-how for individual executives, managers and employees... Many companies use both, for example, relying on MBTI to understand conscious preferences and the Enneagram to understand unconscious motivation....” (Fowke, 1999)

The Enneagram typology has its roots from ancient times (Riso and Hudson, 1996; Dolfi and Andrews, 2007) in the old Babylonian period as a tool for spiritual guidance (Yee, 2013) as historically, self-actualisation and the development of human potential have been regarded as spiritual processes (Sutton et al., 2013). After 1970s Enneagram has been studied in psychology (Palmer, 1991; Riso and Hudson, 1996) and in other fields (Yee, 2013). Riso-Hudson Enneagram Type Indicator (RHETI), Wagner Enneagram Personality Style Scales (WEPSS) as well as Korean Enneagram Personality Type Indicator (KEPTI) which has been developed by Youn are examples for Enneagram tests (Yee, 2013).

Enneagram consists of two Greek words, namely: 'ennea' and 'grama' which respectively mean '9' and 'written' (Sutton et al., 2013). In Enneagram, there are nine personality types named after behavioral characteristics (Dolfi and Andrews, 2007). These 9 categories are (Riso and Hudson, 1996; Sutton et al., 2013: 236-237): type 1-the reformer or the perfectionist; type 2-the helper or the giver; type 3-the achiever or the performer; type 4-the individualist or the romantic; type 5-the investigator or the observer; type 6-the loyalist or the loyal skeptics; type 7-the enthusiast or the epicure; type 8-the challenger or the protector; and type 9-the peacemaker or the mediator. Each Enneagram category corresponds to a preferred or habitual way of dealing with the world (Riso and Hudson, 1999). Even if each individual possesses characteristics of all these 9 types, the characteristics of one of these 9 types dominates the others due to damaged integrity of the individual's character mainly as a result of individual's experiences in his/her life (Youn, 2001). Furthermore, an individual's character can be classified based on the triads of Enneagram, namely: gut, heart, and head, where the gut governs instinct desires and action, the heart governs emotion and feeling, and the head governs intellect and thought (Yee, 2013). The strength of the Enneagram lies in the fact that it can provide an insight on the changes in the personal characteristics under stress. Each of the 9 types acts like one of the others under stress (e.g., Type 2 acts like type 8 under stressful conditions). Enneagram has been used for different purposes including: conflict resolution (Yun-sung, 2007); influencing the team dynamics (McFadden and Hubbard, 1998) and team performance (Yee, 2013b); establishment of the team through identifying team members' personalities, their weaknesses and strengths (Lapid-Bogda, 2004); supporting and facilitating inter-professional nursing (Ball, 2009). Yee (2013)'s research is one of these cases for the usage of Enneagram. Yee (2013)'s research and its possible implementation for improving the occupational health and safety in construction have been provided in the following paragraphs:

- **Team performance and education's effectiveness:** Yee (2013)'s research aimed to maximize the team performance and education's effectiveness of a senior design class. Yee (2013) applied the Riso-Hudson QUEST Enneagram test to the sample students to identify their personality and analysed the relationship between their personality and their performance (class results). The research revealed that the combination of particular personality types has the potential for effecting the team performance (Yee, 2013).

Possible implementation for improving the occupational health and safety performance in construction:

Construction workers, safety managers and project managers can be hired considering their Enneagram and triad type as influential factors effecting their performance including their safety performance.

As Enneagram can provide an insight on changes in the personal characteristics under stress, it is a great asset for the construction industry due to the fact that construction workers, safety managers and project managers are working under heavy workload in highly stressful working environment. More detailed information on the possible implementation of the Enneagram for improving the occupational health and safety performance in construction have been provided in Tables 5 and 6. Table 5 focuses on the Enneagram types whereas Table 6 focuses on the triad of the Enneagram.

Table 5. Enneagram and its suggested usage for enhancing occupational health and safety performance in construction

Function/Usage	Classification of personalities	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the Enneagram usage
Enneagram is a powerful human resource technology for the companies, and personal development know-how for individual executives, managers and employees (Fowke, 1999).	<ul style="list-style-type: none"> • <i>Type 1 (Perfectionists)</i> • <i>Type 2 (Givers)</i> • <i>Type 3 (Performers)</i> • <i>Type 4 (Romantics)</i> • <i>Type 5 (Observers)</i> • <i>Type 6 (Loyal skeptics)</i> 	Each type can support the construction safety performance from different point of views. Each type's characteristics having potential for contributing to the safety has been summarized based on (Sutton et al., 2013: 236-237):	Hiring construction workers and safety related staff considering their Enneagram type and its possible strengths with respect to the safety performance.
	<ul style="list-style-type: none"> • <i>Type 7 (Epicures)</i> • <i>Type 8 (Protectors)</i> • <i>Type 9 (Mediators)</i> • (Sutton et al, 2013: 236-237) 	<p>Type 1</p> <ul style="list-style-type: none"> • <i>attention is directed towards identifying error.</i> • <i>do things by the book and focus on quality.</i> • <i>ensure that everyone knows precisely what he or she is responsible for...</i> • <i>often use quite a directive style of control.</i> <p>Type 2</p> <ul style="list-style-type: none"> • <i>attention is directed towards identifying the needs of others.</i> <p>Type 3</p> <ul style="list-style-type: none"> • <i>focus on tasks and things to accomplish...</i> • <i>focus on goals</i> <p>Type 4</p> <ul style="list-style-type: none"> • <i>attention is directed towards what is missing rather than what is present....</i> • <i>are effective leaders in high-risk situations...</i> <p>Type 5</p> <ul style="list-style-type: none"> • <i>are very focused on the job,</i> • <i>are able to adapt to new information to the core idea and be flexible in their approach.</i> <p>Type 6</p> <ul style="list-style-type: none"> • <i>perceive the world as hazardous and unpredictable. ...</i> • <i>attention is directed towards worst case scenarios.</i> 	

Table 5. (Continued)

Function/Usage	Classification of personalities	Criteria to be considered for enhancing the occupational health and safety performance in construction	Phase appropriate for the Enneagram usage
		<p>Type 7</p> <ul style="list-style-type: none"> • <i>can think and act quickly under pressure.</i> <p>Type 8</p> <ul style="list-style-type: none"> • <i>attention goes ... to what needs control.</i> • <i>good at leading in competitive situations or crises,</i> <p>Type 9</p> <ul style="list-style-type: none"> • <i>good at routine implementation (Sutton et al, 2013: 236-237)</i> 	

Table 6. Triads of enneagram and their possible impact on the occupational health and safety performance in construction (adapted from Yee, 2013)

Triads of Enneagram	Characteristics of the triad	Corresponding Enneagram categories in the triad	Criteria to be considered for enhancing the occupational health and safety performance in construction
Gut-centered	<ul style="list-style-type: none"> • react instinctively to the stimuli from the outer world • Self-defense and survival matters are primary issues to them. • perceive the world as having the structure of power confrontation • they are action oriented • they hate to be controlled by others 	types 1, 8, and 9.	Hiring gut-centered workers can support the safety performance due to their main focus on self-defense and survival which can result in careful operations. On the other hand, their motivation of not being controlled by others can harm the safety performance as they might be reluctant in obeying to the notices of their superiors with respect to safety.
Heart-centered	<ul style="list-style-type: none"> • mainly focus on their emotion and feeling • they need care and recognition from others • They would like to know others' desire and make efforts to meet them • They believe that the relationship grows by satisfying the others' needs 	types 2, 3, and 4	Heart-centered site manager/PM/safety manager can enhance the safety performance through establishment of peaceful working conditions due to their efforts to harmonize the team.

Triads of Enneagram	Characteristics of the triad	Corresponding Enneagram categories in the triad	Criteria to be considered for enhancing the occupational health and safety performance in construction
Head-centered	<p>give a great value to deliberate thought they are afraid of not knowing, they decide their position and behavior through close observation and analysis on a given situation</p> <p>Since they feel a closeness only with those they trust, they try to focus on a given subject rather than try to have a good relationship with others. They consider that it is more important to have a sense of reasonableness and sound logic than have a sense of relation.</p>	types 5, 6, and 7.	Hiring head-centered safety managers and site managers can enhance the safety performance analysing and elimination the causes of near-misses and accidents as they are motivated to learn the details. Furthermore, hiring head-centered construction workers can contribute to the safety performance as they tend to analyse the assigned tasks.

CONCLUSION

This chapter focused on the psychometric tests as a way for improving occupational health and safety performance of the construction industry. The chapter covered the following topics: occupational health and safety performance of the construction industry; main causes of accidents; the relationship between personality, and safety as well as personality and job performance; effects of the workers' personalities on accidents rates; the psychometric tests (the Myers Briggs Type Indicator[®], Eysenck Personality Questionnaire, the Belbin team-role self perception inventory, Enneagram tests) covering cases from the literature and their suggested usage for enhancing occupational health and safety performance in construction.

The frequency and magnitude of the accidents in construction industry are higher than other industries. Among the main causes of accidents, unsafe behaviors play the major role as they cause 80% to 98% of accidents (Blackmon and Gramopadhye, 1995; Heinrich, 1959; HSE, 2002; Choudhry, 2014: 15). For this reason, minimisation or elimination of unsafe behaviors (Choudhry and Fang, 2008; Choudhry, 2012; Choudhry, 2014: 15) considering employees' personality type and their interaction within the team with the help of the psychometric tests can enhance the site safety performance.

The MBTI[®] is used for better understanding differences in individual preferences in the way they perceive and judge information (Myers et al., 1998). Classen et al. (2011)'s research on the role of psychological type in older driver performance, Nimbarte et al. (2012)'s research on healthcare workers with regard to the influence of psychosocial stress and personality type on the biomechanical loading of neck and shoulder muscles, Rushton et al. (2007)'s research on students' personality types and their students' learning styles, as well as Lawrence (1979), Macdaid et al. (1986), and Sears et al. (1997) researches on preferred teacher typology are examples for the usage of the MBTI[®]. MBTI can potentially act as a tool

for enhancing occupational health and safety performance in construction in the following phases:

- Hiring operators for reducing construction equipment related accidents on site [benchmarking from Classen et al. (2011)' s research]
- Hiring construction workers for reducing their vulnerability level [benchmarking from Nimbarte et al. (2012)' s research]
- Appointing safety trainer [benchmarking from Rushton et al. (2007)' s research]

Hiring E and J type operators [benchmarking from Classen et al. (2011)' s research], and hiring construction workers having thinking personality [benchmarking from Nimbarte et al. (2012)' s research] have the potential for enhancing the safety performance.

EPQ explains individual difference in personality based on inherited predispositions and physiological processes (Burger 2011) based on tE; tN; tP, and tL. As individuals possessing a tL value tend to obey the rules and guidelines (Sing et al., 2014), hiring construction workers possessing a tL value is expected to have potential for enhancing the safety performance of the construction project due to their tendency of obeying the rules.

BTRSPI examines team behavior based on individual's role within the team (Sommerville and Dalziel 1989). Belbin identified eight roles which need to be covered within the team for the team to be successful, namely: chairman; shaper; plant; monitor-evaluator; resource investigator; team worker; company worker; and completer-finisher. BTRSPI has been used for various purposes including (Belbin, 2010): use of team roles in change strategy, creating productive working relationships, development of a research and development team, developing 'teaming' as a working model, developing team roles in a range of organizations, and personal transformation. Furthermore, BTRSPI has been used as a tool for enhancing the team effectiveness of software development teams by establishing the teams based on who can work effectively together (Rajendran, 2005: 738) and for establishing the team for fostering innovation in construction (Sommerville and Dalziel 1989). Hiring construction workers as well as project managers and safety managers based on BTRSPI is expected to have potential for enhancing the safety performance due to possible increase in the harmony among the team members. They can be appointed to the most appropriate team roles.

Enneagram focuses on self-development and the identification of hidden potential of the individuals (Palmer, 1995; Sutton, et al., 2013) based on the nine personality types named after behavioral characteristics (Dolfi and Andrews, 2007) and the triads of Enneagram. Enneagram has been used for different purposes including: conflict resolution (Yun-sung, 2007); influencing the team dynamics (McFadden and Hubbard, 1998) and team performance (Yee, 2013b); establishment of the team through identifying team members' personalities, their weaknesses and strengths (Lapid-Bogda, 2004); supporting and facilitating inter-professional nursing (Ball, 2009); maximization of the team performance and education's effectiveness of a senior design class (Yee, 2013). Construction workers, safety managers and project managers can be hired considering their Enneagram and triad type as well as their type under stress. Enneagram provides an insight on the individual's changes in the personal characteristics under stress. For this reason, it is a great asset for the construction industry due to the fact that construction workers, safety managers and project managers are working under heavy workload in highly stressful working environment.

The psychometric test and their suggested potential usage for enhancing occupational health and safety performance in construction have been summarized in Tables 1-6. This chapter contributes to the literature as it is the first attempt for introducing psychometric testing as well as enneagram as a potential tool for improving occupational health and safety performance in construction. Both the researchers and practitioners can get benefit from this chapter which is expected to contribute to the improvement of the occupational health and safety performance in construction industry.

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Chapter 7

COMPUTING EXPORT-IMPORT QUANTITIES AND PRICES OF AGRICULTURAL COMMODITIES FOR SELECTING THE PORTS OF A COUNTRY USING TRANSPORTATION MODEL

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ABSTRACT

The agricultural commodities are rarely produced in a country in exact accordance to the requirement of the country. Some regions produce excess whereas some produce less than needed. As a result, the commodities flow from surplus regions to shortage regions. It is not practical to assume that total demand and supply of an agricultural commodity in all areas of a country is in balance. There remain some surpluses or deficits which have to be exported or imported respectively. It is essential to import the deficiencies to meet the need of local people and export the excess to avoid wastage of country productions and to increase earnings. This paper specifically deals with the unbalanced supply demand situation for a single agricultural commodity in a country which eventually creates the need for export or import. Again, when a country knows how much to export or import, goods are delivered to different ports which have their own limitation to export or import to/from foreign countries. So, selection of ports is an important issue. On the other hand, pricing for the commodity is crucial while exporting or importing. It must be accomplished by calculating world equilibrium price assuming overall balance in total supply and total demand of the product. The government has the responsibility to determine the price for an exporting or importing goods. Three problems related to these issues discussed above are addressed in this paper. Firstly, a Modified Transportation Model with equal and mixed constraints is used to determine optimum quantity in Export/Import scenario (unbalanced situation of supply and demand). Secondly, selection of ports to ensure minimum transportation and production costs is done using the same

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model. Well known VAM method can be used to solve the problems. Finally, a Two-Country model is used for simplification of the complicated problem of calculating price of the commodity involved in export or import.

Keywords: total commodity cost, selling price of agricultural commodity, export/import of agricultural products, transportation model with mixed constraints, cost minimization problem, port selection, pricing of export and import commodity

INTRODUCTION

Agriculture is one of the most important sectors in a country's economy. It is imperative to ensure proper supply of products to the areas where they are required. As the total demand is generally not equal to total supply of an agricultural product in reality, there is almost always some shortage or excess. This shortage/abundance of any goods must be balanced by importing or exporting. Importing of an agricultural product is vital to meet the demand of that product in the time of scarcity. On the other hand, exporting helps to improve country economy. In an export/import situation, often the question is how much should be exported or imported and from which region. Once this question is answered, the next problem is finding the quantity to deliver to each port. Another problem is fixing the selling price of the product for export or import. The objective of these problems is to maintain cost as low as possible.

Transportation problem (TP) deals with the delivery of a specific product from different sources to different destinations to ensure minimum cost. The main goal is to minimize costs while transferring from different locations of specific capacity to different locations with needs (Khatun, 2012; Mandel, 2004; Reeb and Leavengood, 2002). The application of transportation model will increase cost savings and maximize company profit (Mandel, 2004). Hitchcock (1941) solved the basic transportation problem using constructive method of solutions and Koopmans (1949) described the problem in details. Dantzing (1963) presented the transportation problem as a linear programming problem and provided the solution. Some other models were also applied to solve the problem in different researches (Philips et al. 1987; Lapin, 1985). Most of the previous studies considered factories as sources and warehouses as destinations. Khatun (2012) used a modified transportation model to balance the demand and supply of agricultural products for different regions of a country and fixed selling prices. But the export/import scenario and its related problems such as optimum quantity to export/import, selection of ports and prices of export/import commodities in unbalanced condition of supply and demand of a country were not taken into account.

It is evident, transportation modeling is ideal for solving our highlighted problems. In this study, a modified transportation model is used several times. First, we found the quantity to export or import where regions are both origins and destinations. In a transportation model total demand is assumed to be equal to total supply. In case of export/import, dummy sources or destinations are considered for maintaining balance. Here, a practical situation is assumed where total demand of a product is not equal to total supply. The dummy demand or supply from the solution is measured as the export or import amount. Second, we again consider transportation model where regions are sources, ports are destinations for export. For import, it is vice versa. At last, we compute the world price for exporting or importing goods based on the Two-country Model.

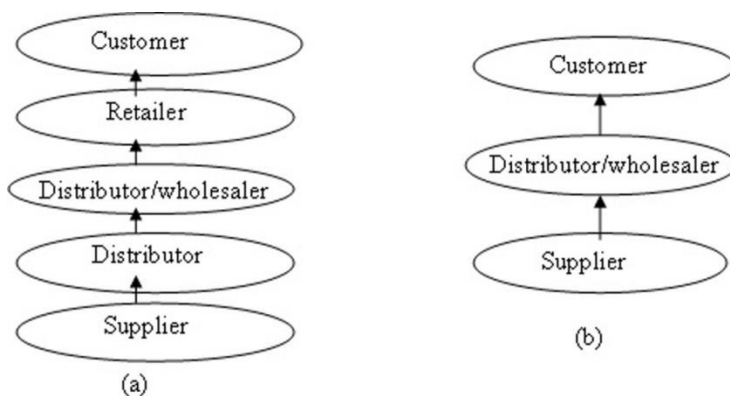


Figure 1. (a) Supply chain process for conventional model and (b) supply chain process for the proposed model.

In this paper, transportation model with mixed constraints is used too. In the basic transportation model, constraints are assumed to have equal signs for simplicity. Mondal et al. (2012) used computer aided solutions and a special algorithm to solve mixed constraints. We use the result from that study to solve our problems as constraints are mostly unequal in practical situations. Multiregional commodity flow is represented with network diagram and matrix form considering commodity cost and supply/demand requirements for each region. The well known VAM (Vogel's approximation method) can be applied for finding minimum total commodity cost to analyze this work.

According to Khatun (2012), a supply chain process is maintained from suppliers to manufacturers, manufactures to distributors, distributors to retailers, retailers to customers (Chopra and Meindl, 2007; Beamon, 1998). In conventional model, the supply chain process for agricultural commodity flow is followed the process as suppliers to distributors to wholesalers to retailers to customers. If the stages of the chain are reduced the commodity cost will be decreased. So in proposed model, for the sake of simplicity and to minimize the cost, the supply chain process is followed as suppliers (producers) to distributors/wholesalers to customers where retailers are not considered (Figure 1). If the retailer stage is considered, a percentage will be added with the calculated selling price in the proposed model.

The rest of this paper is organized as follows. In Section 2, the basic transportation model is included. In Section 3, our proposed model is described and divided into three subsections based on three addressed issues of the paper. In the first part, quantity and port selections in export/import situation with equal constraints are presented. In the second part, quantity and port selections in export/import situation with mixed constraints are presented. The third part shows the application of two country model to assess the price of export/import goods. Finally, the last section provides the conclusion of the paper.

BASIC TRANSPORTATION MODEL

Most of the previous researches of transportation problem are based on basic Transportation Modeling (Ghazali et al. 2012; Hlayel and Alia, 2012; Quddoos et al. 2012;

Gupta and Hira, 2001; Taha, 1999). Our proposed model is modified based on that too. In this section, basic transportation model is included.

Transportation problem deals with distribution of a product from several sources of supply to several destinations with demand. Suppose there are m origins such as A_1, A_2, \dots, A_m and n destinations such as B_1, B_2, \dots, B_n . The source $A_i (i = 1, 2, \dots, m)$ can supply a_i units, and the destination $B_j (j = 1, 2, \dots, n)$ requires b_j units (see Equation 1).

$$\sum_{i=1}^m a_i = \sum_{j=1}^n b_j \quad (1)$$

In this model, optimum solution (the quantity to be transported) is calculated to ensure minimum shipping cost. The requirements of the destinations $B_j, j = 1, 2, \dots, n$, must be satisfied by the supply of available units at the points of origins $A_i, i = 1, 2, \dots, m$. If the quantities that are shipped from A_i to B_j are properly distributed to the regions in balanced condition, then the values of the variables $x_{ij}, i = 1, 2, \dots, m$ and $j = 1, 2, \dots, n$ will minimize the total transportation cost as shown by Equation 2.

$$\text{Minimize } \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij} \quad (2)$$

while,

$$\begin{aligned} \sum_{j=1}^n x_{ij} &= a_i; \quad i = 1, 2, \dots, m, \\ \sum_{i=1}^m x_{ij} &= b_j; \quad j = 1, 2, \dots, n, \\ c_{ij} &= \text{the cost of transportation from } A_i \text{ to } B_j, \\ x_{ij} &\geq 0; \quad i = 1, 2, \dots, m; \text{ and } j = 1, 2, \dots, n. \end{aligned}$$

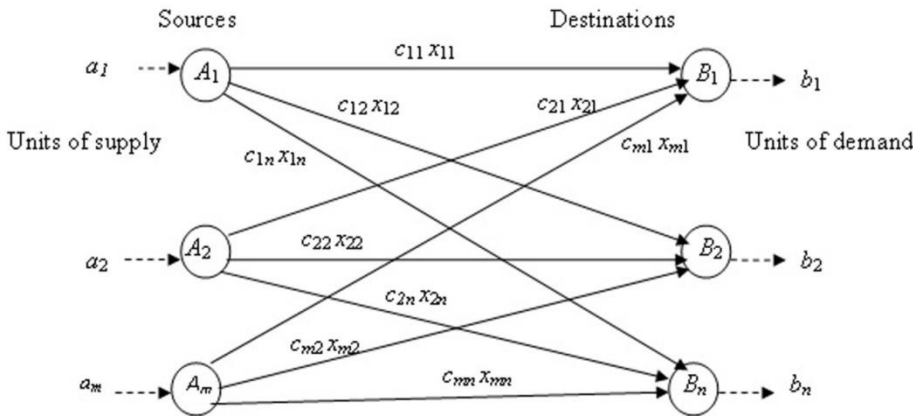


Figure 2. Network diagram of basic transportation model.

Mathematically, the transportation problem can be represented as a linear programming (LP) model. Since the objective function in this problem is to minimize, the total transportation cost as given by Equation 3.

$$Z = c_{11}x_{11} + c_{12}x_{12} + \dots + c_{mn}x_{mn} \quad (3)$$

However, there are several algorithms to solve transportation problems using the LP model (Taha 1999). Among these algorithms, a widely used algebraic procedure is the Simplex method, which may not be the best method to solve all transportation problems. Therefore, a more efficient and simpler procedure known as VAM method has been established to solve some transportation problems (Gupta and Hira, 2001). The general problem is represented by the network in Figure 2.

PROPOSED MODEL

In a country agricultural products are produced and delivered to different regions according to their capacities and needs. Regions with excess production supply to regions of deficiency. Usually total production of a product in a country is not exactly equal to the demand of that. Thus it is needed to export the excess and import the shortage. In the proposed model regions with supply instead of factories are considered as sources and regions with demand instead of warehouses are considered as destinations. The proposed transportation model is used assuming unequal total demand and supply in unbalanced condition. The export/import quantity is then determined with the help of dummy regions. In an export/import scenario, another transportation problem is involved. For exporting it is required to find the appropriate amount which has to be transported to different ports from regions with abundance keeping the cost at minimum. Here, the regions are sources and ports are destinations. On the other hand, import situation is just the opposite. In this case, ports are sources and destinations are the regions suffering scarcity.

The basic transportation model is modified to solve two problems of transportation in question. In the first network diagram (Figure 3), the quantity for export or import was calculated. It is assumed that transportation cost T_{12} from region 1 to region 2 is equal to transportation cost T_{21} from region 2 to region 1. In similar fashion, it is also assumed for other regions such as $T_{13} = T_{31}$, $T_{23} = T_{32}$. Transportation costs for the same regions such as T_{11} , T_{22} , T_{33} , T_{44} are considered zero.

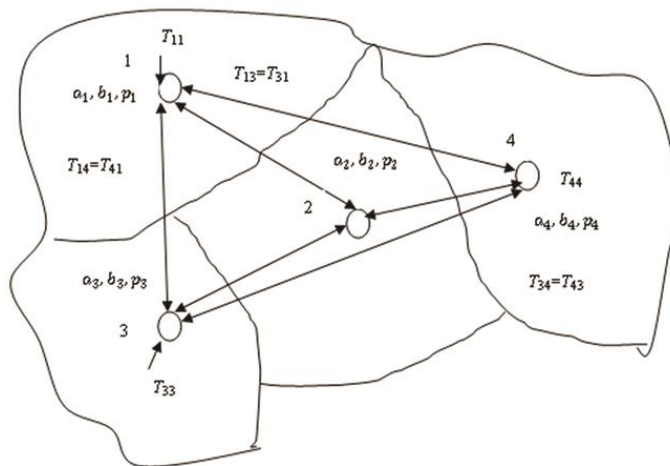


Figure 3. Network diagram to fix export/import quantity.

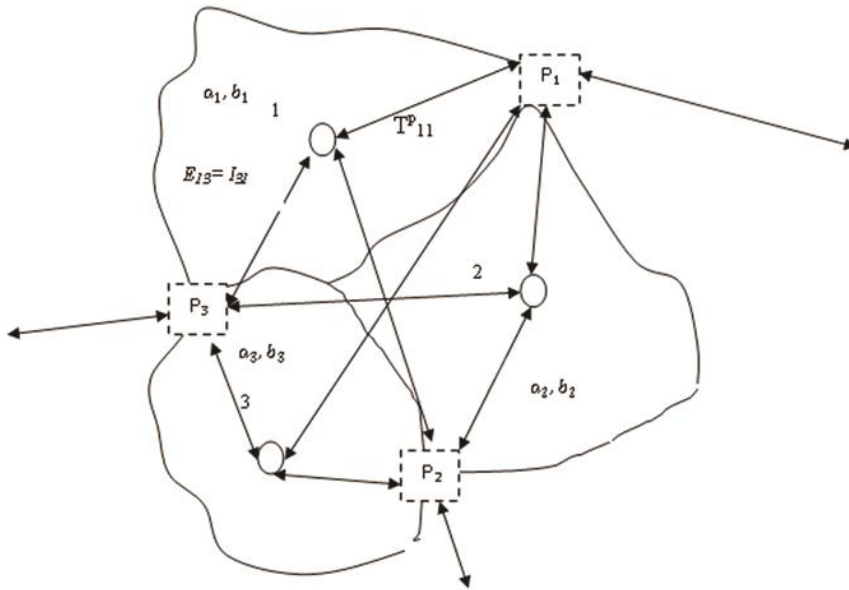


Figure 4. Network diagram for selection of ports.

The dummy (nonexistent) region 4 is used to identify the export or import quantity. Here, $T_{14} = T_{41} = T_{24} = T_{42} = T_{34} = T_{43} = 0$ as the transportation cost from/to different regions to/from dummy region is not real. The second network diagram (Figure 4) is used to determine quantity to transfer from/to different ports. The transportation cost between a region and a port is given by T_{ij}^p . It is assumed that the transportation cost between a region to a port (in case of exporting) and the cost between the same port to the same region (in case of importing) is the same and equal to T_{ij}^p . Here, number of sources are i ($= 1, 2, 3, \dots, m$) and number of destinations are j ($= 1, 2, 3, \dots, n$). Sources and destinations are either regions or ports depending upon export /import situation.

Finally, it is also assumed that for real life situation most of the transportation problems involve mixed constraints whereas in most of the literatures equal constraints are used to avoid complication (Mondal et al. 2012). In our research, we consider both the cases.

3.1. Determining Export/Import Quantity and Selection of Ports Using Equal Constraints

To illustrate modified transportation model, suppose that m regions supply certain amount of a commodity to n regions. As well as, let source i ($i = 1, 2, \dots, m$) produces a_i units and the destination j ($j = 1, 2, \dots, n$) requires b_j units. It is also assumed that the producer price of a commodity at surplus regions is same as the purchasing price of that commodity at deficiency regions. In a previous study by Khatun (2012) the commodity cost c_{ij} is considered as the total of producer cost and transportation cost. For the equal constraint case, we assume the supply and demand of any individual region is fixed. In an export scenario (Table 1), total amount of a commodity produced in a country is higher than actually needed $\sum a_i > \sum b_j$, the excess amount will flow to the dummy destination. The commodity costs for the dummy

regions are assumed zero as the amounts assigned to the dummy regions will actually not be transported rather will be kept in original regions for exporting. In this modified model also, the quantities of a commodity x_{ij} must be calculated to minimize the total commodity cost as shown in Equation 1, 2 and 3 previously. Here,

Sources, $i=1, 2, 3, \dots, m = \text{Destinations, } j= 1, 2, 3, \dots, n = \text{no. of regions,}$
 x_{ij} = quantity shipped from region i to region j ,
 x_{id} = quantity shipped from region i to dummy region d (for export),
 $T_{ij} = T_{ji}$ (assumed in this model),
 $c_{ij} = (T_{ij} + p_i)$ = commodity cost,
 T_{ij} = transportation cost to transport commodity from region i to region j ,
 T_{ji} = transportation cost to transport commodity from region j to region i ,
 p_i = producer price at region i ,
 p_j = purchasing price at region j ,
 $p_i = p_j$ (assumed in this model).

Here, x_{ij} and x_{id} will be determined using the VAM model from the transportation problem to find the appropriate quantity to ship to different regions in the country and to ship abroad for exporting.

The case of import ($\sum a_i < \sum b_j$) is just the opposite to exporting. Here the amount in dummy regions will indicate required import quantity and will be delivered from various ports to areas with shortage. For our second research question, to find the quantities to deliver to different ports we use the basic transportation model with few alterations.

For exporting, we consider i regions as sources and j ports as destinations. As the amounts in dummy (x_{id}) in Table 1 are excess, these must be exported. So, we assume the capacities of the source regions are equal to the assigned amounts (x_{id}) in dummy regions. We assume the commodity cost c_{ij} here to be sum of producer price p_i and transportation cost from region to port T_{ij}^p . The transportation problem is shown in a matrix of Table 2.

Same objective function and constraints are used here, where for Exporting

i = no. of surplus regions (sources),
 j = no. of ports (destinations)
 x_{ij} = quantity shipped from region i to port j ,
 x_{id} = export quantity to supply from region i to port j ,
 $c_{ij} = (T_{ij}^p + p_i)$ = commodity cost of export goods,
 T_{ij}^p = transportation cost to transport commodity between region i to port j ,
 p_i = producer price at region i .

For importing, we assume regions as destinations (j) and ports as sources (i). As the amounts in dummy, x_{dj} are shortage, these must be imported. So, we assume the capacities of the sources (ports) are equal the assigned amounts (x_{dj}) in dummy region. In this model, the commodity cost c_{ij} is the sum of producer price p_j , transportation cost between a port and a region T_{ij}^p and overseas transportation cost T^{AB} . Overseas transportation cost is considered

additionally for import scenario. Again, VAM method can be applied for the transportation problem of importing.

Here, For Importing

- i = no. of ports (sources),
- j = no. of shortage regions (destinations),
- x_{ij} = quantity shipped from port i to region j ,
- x_{dj} = import quantity to supply from port i to region j ,
- $c_{ij} = (T^p_{ij} + p_j + T^{AB})$ = commodity cost of import goods,
- T^{AB} = overseas transportation cost between country A and country B ,
- p_j = producer price at region j .

3.2. Determining Export/Import Quantity and Selection of Ports Using Mixed Constraints

We also analyze the export/import for mixed constraints situation. Here it is possible for the sources to supply more or less and the destinations to receive more or less. According to Mondal et al. (2012), this situation is more realistic or natural than the situation where sources can produce exact amount of goods and targets can receive exact amounts. They used a modified VAM method to solve a transportation problem with mixed constraints. For the transportation problems of our study, when we consider mixed constraints, all the variables remain same with only variation in supply and demand in the matrix. The export situation is showed in the Table 3. The transportation problem of ports (in case of export) with mixed constraints is shown in Table 4.

For the transportation problems with mixed constraints, the appropriate objective function and constraints were developed in previous studies (Adlakha, Kowalski and Lev, 2006; Pandian and Nataranjan, 2010).

The objective function is same as that of basic transportation modeling as presented in Equation 1, 2 and 3. However, the constraints are different than the previous ones.

In this case, for mixed constraints, the objective function, Z is Subject to

$$\begin{aligned} \sum_{j=1}^n x_{ij} &\leq/\geq a_i; \quad i = 1, 2, \dots, m, \\ \sum_{i=1}^m x_{ij} &\leq/\geq b_j; \quad j = 1, 2, \dots, n, \\ x_{ij} &\geq 0; \quad i = 1, 2, \dots, m; \text{ and } j = 1, 2, \dots, n. \end{aligned}$$

The result of the algorithm for mixed constraints as shown by Mondal et al. (2012) can be used for the transportation situations of our case. They identified the optimum quantity which should be assigned in transportation matrix with mixed constraints. The assignable units for solution are shown in below Table of 5.

Table 1. Matrix for export situation (Equal constraints)

Sources (Regions)	Destinations (Regions)					Supply	Producer price
	1	2	...	n	Dummy (d)		
1	$c_{11} = T_{11} + p_1$	$c_{12} = T_{12} + p_1$	...	$c_{1n} = T_{1n} + p_1$	0	$= a_1$	p_1
2	$c_{21} = T_{21} + p_2$	$c_{22} = T_{22} + p_2$	...	$c_{2n} = T_{2n} + p_2$	0	$= a_2$	p_2
....	...	...	...	...	0	....	....
m	$c_{m1} = T_{m1} + p_m$	$c_{m2} = T_{m2} + p_m$	...	$c_{mn} = T_{mn} + p_m$	0	$= a_m$	p_m
Demand	$= b_1$	$= b_2$	...	$= b_n$	$x_{id} = \sum a_i - \sum b_j$		

Table 2. Matrix to determine optimum quantity for selection of ports (Equal Constraints)

Sources (Regions)	Destinations (Ports)				Supply	Producer price
	1	2	...	n		
1	$c_{11} = T_{11}^p + p_1$	$c_{12} = T_{12}^p + p_1$	...	$c_{1n} = T_{1n}^p + p_1$	x_{1d}	p_1
2	$c_{21} = T_{21}^p + p_2$	$c_{22} = T_{22}^p + p_2$...	$c_{2n} = T_{2n}^p + p_2$	x_{2d}	p_2
....
m	$c_{m1} = T_{m1}^p + p_3$	$c_{m2} = T_{m2}^p + p_3$...	$c_{mn} = T_{mn}^p + p_m$	x_{md}	p_m
Demand	$= d_1$	$= d_2$...	$= d_n$		

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Table 3. Matrix for export situation (Mixed constraints)

Sources (Regions)	Destinations (Regions)					Supply	Producer price
	1	2	...	n	Dummy		
1	$c_{11} = T_{11} + p_1$	$c_{12} = T_{12} + p_1$	...	$c_{1n} = T_{1n} + p_1$	0	$\leq/\geq a_1$	p_1
2	$c_{21} = T_{21} + p_2$	$c_{22} = T_{22} + p_2$	...	$c_{2n} = T_{2n} + p_2$	0	$\leq/\geq a_2$	p_2
....	...	...	...	...	0	....	....
m	$c_{m1} = T_{m1} + p_m$	$c_{m2} = T_{m2} + p_m$	...	$c_{mn} = T_{mn} + p_m$	0	$\leq/\geq a_m$	p_m
Demand	$\leq/\geq b_1$	$\leq/\geq b_2$	...	$\leq/\geq b_n$	$\leq/\geq \sum a_i - \sum b_j$		

Table 4. Matrix to determine optimum quantity for selection of ports (Mixed Constraints)

Sources (Regions)	Destinations (Ports)					Supply	Producer price
	1	2	...	n			
1	$c_{11} = T_{11}^p + p_1$	$c_{12} = T_{12}^p + p_1$	...	$c_{1n} = T_{1n}^p + p_1$	$\leq/\geq x_{1d}$	p_1
2	$c_{21} = T_{21}^p + p_2$	$c_{22} = T_{22}^p + p_2$...	$c_{2n} = T_{21}^p + p_2$	$\leq/\geq x_{2d}$	p_2	
....	
m	$c_{m1} = T_{m1}^p + p_3$	$c_{m2} = T_{m2}^p + p_3$...	$c_{mn} = T_{mn}^p + p_m$	$\leq/\geq x_{md}$	p_m	
Demand	$\leq/\geq d_1$	$\leq/\geq d_2$...	$\leq/\geq d_n$			

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Table 5. Assignable units for Transportation Problem with Mixed constraint

Supply a_i	Demand b_j	Assignable Units
=	=	Min (a_i, b_j)
=	\leq	Min (a_i, b_j)
=	\geq	a_i
\leq	\leq	0
\leq	=	Min (a_i, b_j)
\leq	\geq	a_i
\geq	\geq	Min (a_i, b_j)
\geq	=	b_j
\geq	\leq	b_j

3.3. Export/Import Price Using Two-Country Model

After meeting the local demands in agricultural sector, a country exports the excess production or imports the shortage amount at World Equilibrium Price. The world equilibrium price considers no shortage or surplus in total in global scale. It is the price for which total world exports are equal to total world import for a specific commodity. To calculate the world equilibrium price, two countries are considered as A and B where A is any particular country and B is actually the rest of the world. We assume A has excess and B has shortage in a specific agricultural product. Obviously, from country A , the surplus will be exported to country B as import at the equilibrium world price. The total supplies of an agricultural product for both the countries are given below:

$$TS^A = TDD^A + E^A \text{ and}$$

$$TS^B = TDD^B - I^B.$$

Here,

$$TS^A = \text{total supply of country } A,$$

$$TDD^A = \text{total domestic demand of country } A,$$

$$E^A = \text{total export (excess supply) in country } A,$$

$$TS^B = \text{total supply of country } B,$$

$$TDD^B = \text{total domestic demand of country } B,$$

$$I^B = \text{total import (excess demand) in country } B.$$

So, for country A , total export is the difference between total supply and total domestic demand.

$$TS^A - TDD^A = E^A$$

$$P_D^A \sum_{i=1}^m x_{ij}^A + x_D^A P_D^A - \sum_{i=1}^m x_{ij}^A c_{ij}^A = E^A; j = 1, 2, 3, \dots, n \quad (4)$$

For country B , total import is the difference between total domestic demand and total supply.

$$TDD^B - TS^B = I^B$$

$$\sum_{i=1}^m x_{ij}^B c_{ij}^B + x_D^B P_D^B - P_D^B \sum_{i=1}^m x_{ij}^B = I^B; j = 1, 2, 3, \dots, n \quad (5)$$

where,

$$x_D^A = \sum_{i=1}^m x_{id}^A = \text{Excess quantities in dummy regions waiting for export,}$$

$$x_D^B = \sum_{j=1}^n x_{dj}^B = \text{Deficient quantities in dummy regions need to be imported,}$$

$$c_{ij}^A = P_i^A + T_{ij}^A,$$

$$c_{ij}^B = P_i^B + T_{ij}^B,$$

$$P_i^A \text{ and } P_i^B = \text{producer prices in country A and B,}$$

$$T_{ij}^A \text{ and } T_{ij}^B = \text{Internal transportation costs within the countries.}$$

The value of each of the Equations 4 and 5 will be zero to calculate the domestic prices P_D^A and P_D^B for two countries at equilibrium condition. For calculating the world price, P_W , it will be assumed $P_W = P_D^A = P_D^B$ in Equations 4 and 5. Then excess supply of exporting country and excess demand of importing country will be equal at world equilibrium condition which is shown in Equations 4 and 5. Finally, we can get the world equilibrium price. The export price for country A will be greater than the domestic price P_D^A and the import price for country B will be less than the domestic price P_D^B . Total export and import will be calculated from Equations 4 and 5 by using the value of world price.

CONCLUSION

In a country the government has to determine the excess and shortage quantities of agricultural products produced in the country. It is also required to select the ports and the respective quantities to be exported or imported through different ports. Another crucial decision is to determine the export or import price which keeps world supply and demand of a commodity in balanced condition. In this paper, we have used transportation model and two-country model to solve these vital problems.

In the proposed model, the multiregional agricultural commodity flow and export/import system through different ports have been represented by network diagrams. In the first part, two transportation matrices have been portrayed to find the quantities and to select the ports when the supply and demand have equal constraints. The VAM method has been suggested to find the solution of this particular problem. Again, in the second part, the supply and demand have been assumed to have mixed constraints and the quantities and ports have been chosen again using transportation models. The solution offered by the study of Mondal et al. has been followed here. In our study, we only described export situation in detail. Although, import situation is opposite in nature, it can be formulated using same modeling. In the last part, two-country model has been considered to find the export and import prices of two countries in exchange.

This study has dealt with the applications of transportation models and solution of different critical issues of export and import of an agricultural product. In our research, a single agricultural commodity has been considered for export and import. However, often in

real life, multiple commodities are needed to be considered while exporting and importing in agricultural sector.

The same modeling and concepts presented in our paper can be applied for multiple commodities with fewer alterations in the proposed modeling. Since our study has not considered some subjective issues like tax, trade regulations, exchange rates etc., more research works are required to get comprehensive solution for the problems in agricultural export/import.

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INDEX

#

20th century, 70
21st century, 35, 88

A

abuse, 8, 9, 10
access, 10, 45
accident prevention, 126
accountability, 19
accounting, vii, 1, 5, 13, 30, 32, 37
acquisitions, 69
adaptation, 38, 40
adhesion, 25
administrators, 23, 24, 40
adults, 107
advancements, 127
aesthetic(s), 76, 77, 78, 80, 85, 86, 87, 88, 90, 99, 124
affective reactions, 86
Africa, 2, 3, 4
age, 6, 62
agencies, 18, 40, 45, 58, 63
agricultural sector, 143, 145
algorithm, 135, 140
allocative efficiency, 38
anger, 112
antisocial behavior, 111
anxiety, 129
Argentina, 81, 101
arousal, 125
assessment, 35, 53, 56, 58, 63, 64, 122, 127, 128
assets, 15, 16, 17, 20, 21, 22, 28, 33, 34, 36, 39, 41, 42, 44, 46, 49, 52, 53, 56, 59, 67, 145
asymmetric information, 41, 42, 46

asymmetry, 39, 43, 61, 64
atmosphere, 21, 78
attachment, 86, 94, 98, 99
attitudes, 16, 17, 22, 28, 33, 54, 60, 86, 105, 106
authenticity, viii, 73, 75
authorities, vii, 1, 14, 16, 19
authority, 3, 40, 51, 55, 56, 62
Automated Fare Collection (AFC), vii, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 68
aversion, 37, 39, 40, 44, 45, 46, 47, 49, 52, 55, 56, 57, 58, 61, 62, 64
avoidance, 46
awareness, viii, 6, 7, 14, 25, 40, 67, 75, 91, 92, 105

B

Bangladesh, 133
bankruptcy, 45, 46, 49, 50, 56, 60, 63
banks, 2, 16, 18, 20
barriers, 6, 7, 53
barriers to entry, 53
base, viii, 13, 17, 27, 85
basic education, 9
behavioral dimension, viii, 37, 38, 39, 48, 59, 63, 64
behavioral intentions, 81
behaviors, 15, 21, 28, 40, 52, 81, 86, 91, 99, 105, 106, 119, 127
Beijing, 123
benchmarking, 32, 109, 120
benefits, vii, ix, 1, 5, 6, 7, 9, 11, 20, 22, 28, 29, 39, 73, 80
bias, 40, 41, 42, 43, 48, 51, 53, 55, 59
biomechanics, 124
board members, viii, 37, 39, 40, 41, 44, 45, 46, 47, 48, 49, 53, 54, 55, 56, 57, 58
boat, 69
body weight, 124
bonds, 67, 86

bonuses, 10
 bottom-up, 27
 brain, 111, 127
 brand emotion, vii, ix, 85, 86, 87, 91, 94, 95, 97, 98, 99
 brand image, ix, 55, 85, 92, 94, 99
 brand loyalty, 86, 94
 Brazil, vii, 1, 4
 burnout, 122, 128
 bus transit, vii, 1, 5
 business environment, 20, 29, 55
 business ethics, 22
 business model, 86, 87, 88
 business partners, 56
 business strategy, 44
 businesses, viii, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 31, 41, 42, 48, 49, 73
 buttons, 11

C

CAD, 122
 campaigns, 7, 105
 candidates, 9, 113, 145
 capital employed, 55
 career development, 127
 case studies, 88
 case study, viii, ix, 13, 15, 22, 23, 24, 26, 32, 67, 85, 92, 93, 100, 101, 123, 125
 cash, vii, 1, 2, 3, 4, 5, 6, 7, 8, 9, 41, 42, 45, 46, 48, 50, 56, 60, 62, 63, 68
 cash flow, 41, 42, 45, 46, 48, 50, 56, 60, 62, 63
 catalyst, 29, 80
 cation, 124
 causation, 106
 CBS, 34
 ceramics, 100
 certification, 20, 27
 challenges, vii, viii, 1, 2, 6, 11, 31, 32, 81
 Chamber of Commerce, 18, 19, 23
 chemical, 106
 Chicago, 3, 31, 70
 China, 3, 15, 123, 130
 circulation, 9
 cities, vii, 1, 3, 4, 5, 11
 citizens, 22
 citizenship, 14
 civil society, 14, 18, 29, 33
 classification, 14, 107
 classroom, 124
 climate, 16, 106, 112, 123, 125, 126, 128, 131
 clusters, 19, 21
 codes of conduct, 26

cognitive abilities, 53
 cognitive biases, 51
 cognitive dimension, 31, 76
 cognitive models, 38
 cognitive process, 21, 40, 51, 76
 cognitive processing, 51
 cognitive theory, 38
 coherence, 68, 71
 collaboration, 2, 14, 16, 18, 19
 collusion, 40
 color, 90
 commerce, 16, 18
 commercial, 98
 commodity, x, 88, 133, 134, 135, 138, 139, 140, 143, 144
 common rule, 28
 communication, 11, 13, 27, 56, 86, 88, 100
 communication technologies, 11
 communities, 31, 80, 101
 community, viii, 14, 15, 16, 19, 22, 29, 36, 73, 75, 76, 101
 comparative advantage, 59
 compensation, 8, 9, 40, 58, 60, 63, 70
 competition, 22, 28, 35, 48
 competitive advantage, 31, 34, 35, 53
 competitiveness, vii, viii, 13, 15, 22, 23, 30, 32, 53, 55, 58, 59, 74
 complement, 22, 41
 complexity, 11, 56, 59
 composition, 90, 114
 comprehension, 23
 computer, 135
 computing, vii
 conceptual model, 77, 80
 conductor(s), vii, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11
 conference, 101
 conflict, 54, 57, 60, 62, 116, 120
 conflict resolution, 116, 120
 conformity, 111
 confrontation, 39, 118
 consciousness, 79, 100
 construction, viii, ix, 13, 18, 20, 29, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131
 consulting, 115
 consumer education, 6
 consumer loyalty, 99
 consumers, vii, viii, 1, 5, 73, 75, 76, 78, 79, 86, 88, 89, 91, 92, 93, 98, 99, 100
 consumption, viii, 73, 75, 77, 79, 82
 controversial, 60
 convergence, 39, 49, 58

conversations, 23, 24
 cooperation, 19, 21, 26, 30, 38
 coordination, 38
 corporate finance, viii, 37, 39, 51, 52, 61, 63, 65, 68, 70, 71
 corporate governance, 31, 40, 65, 68, 69, 70, 71
 Corporate Social Responsibility (CSR), 14, 15, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35
 correlation, 41, 42, 43, 55, 56, 59, 60, 95, 96, 98
 correlation coefficient, 95, 96
 corruption, 5
 cost, 5, 6, 7, 8, 10, 11, 45, 60, 62, 64, 75, 104, 134, 135, 136, 137, 138, 139, 140, 145
 cost minimization, 134
 cost saving, 134
 covering, x, 55, 103, 104, 105, 119
 creativity, 88, 90, 91, 93, 94, 95, 96, 97, 99, 100
 credit rating, 45
 creditors, 59
 crises, 118
 Croatia, 74
 culture, 16, 17, 18, 20, 21, 25, 26, 27, 28, 29, 86, 88, 101, 105, 106, 113, 124, 125, 126, 129
 customer loyalty, 98, 100
 customer service, 2, 7, 9
 customers, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 86, 98, 135

D

data analysis, 98
 database, 25
 deaths, 104, 126
 decentralization, 15, 31
 decision control, 46
 decision makers, 33, 44
 decision-making process, vii, viii, 37
 deficiencies, x, 133
 deficiency, 137, 138
 democracy, 35, 86
 Denmark, 14
 Department of Labor, 104
 deployments, 11
 depression, 112, 129
 depth, 23, 92, 110
 designers, 89
 detention, 53, 56
 developing countries, 33, 123
 dialogues, 32
 diffusion, 20, 21, 26, 28, 31
 digital communication, 21
 dimensionality, 14

directors, viii, 37, 39, 40, 41, 42, 43, 45, 46, 47, 49, 50, 53, 54, 56, 57, 58, 59, 61, 62, 63, 65
 disbursement, 55
 disposition, 70
 distribution, 38, 42, 60, 61, 62, 63, 64, 136, 145
 divergence, 33
 diversification, 59
 diversity, 21, 31
 domestic demand, 143
 dopaminergic, 123
 drawing, 15
 durability, 55, 58

E

earnings, x, 50, 63, 133
 East Asia, 3
 economic development, 15, 16, 29, 36
 economic growth, 20, 33
 economic performance, 15, 30, 35
 economic policy, 15
 economic well-being, 18
 economics, 35, 86, 87
 ecosystem, 6
 education, vii, 1, 9, 11, 20, 31, 104, 116, 120
 educational, 77, 131
 EEG, 125
 electricity, 7
 electronic ticketing, vii, 1, 2
 elementary school, 9
 emerging markets, vii, 1, 2
 emotion, vii, ix, 66, 79, 82, 85, 86, 87, 88, 91, 93, 94, 95, 96, 97, 98, 99, 100, 116, 118
 emotional bias, viii, 37, 55, 63, 64
 emotional intelligence, viii, 37
 emotional processes, 52
 emotional state, 52, 56
 empathy, 98
 employees, 105, 106, 107, 109, 115, 117, 119, 125
 employers, 105, 106
 employment, 9, 17, 19, 44, 62
 empowerment, 125
 energy, 20
 engineering, 88, 91, 93, 94, 95, 96, 97, 98, 105
 England, 36
 English Language, 128
 Enneagramme, vii
 entertainment, 77
 entrepreneurs, 16, 23
 entrepreneurship, 13
 environment, 11, 16, 18, 29, 38, 43, 56, 59, 62, 110, 116, 120
 environmental factors, 28

environmental sustainability, 19
 environments, 29, 105, 110, 128, 129
 equilibrium price, x, 133, 143, 144
 equipment, 44, 105, 107, 130
 equity, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 61, 62, 64
 equity market, 47
 Escapism, 78
 ethics, 15, 28
 Europe, 17, 30, 31, 32, 34
 European Commission, 15, 17, 32
 European Parliament, 26, 32
 European Social Fund, 26
 European Union, 15, 32
 everyday life, 40, 81
 evidence, 39, 67, 71, 125
 evolution, 15, 28, 39, 55, 62, 77
 examinations, 83
 excess demand, 143, 144
 excess supply, 143, 144
 exchange rate, 145
 exclusion, 79
 exercise(s), 9, 48, 53, 63, 88
 experiential marketing, vii, viii, 73, 76, 80, 83
 expertise, 20, 28
 explicit knowledge, 28
 exploitation, 43, 59
 exports, 143
 exposure, 126
 external financing, 41, 42, 44, 45, 46, 47, 48, 49, 50, 51, 56, 57, 60, 61, 63
 external relations, 17
 extracts, 109
 extraversion, 111, 112

F

Facebook, 81
 factories, 134, 137
 fantasy, 82
 fear(s), 7, 9, 61
 feelings, 45, 53, 75, 79, 82, 90, 91, 97
 festival tourism, vii, ix, 73, 74
 financial, 9, 11, 13, 18, 29, 33, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 74
 financial crisis, 74
 financial development, 70
 financial distress, 45, 50, 60
 financial institutions, 11, 33
 financial planning, 9
 financial sector, 29
 financial system, 18

financial policies, 63, 69
 firm value, 54, 56
 five-factor model, 123
 flexibility, 7, 41, 43, 55
 flow, 69, 70, 79, 82
 fluctuant, 6
 food, 78
 footwear, 24
 force, 5, 44, 46, 55, 74, 98
 Ford, 104, 125
 foreign investment, 76
 formation, 82, 92, 115, 131
 formula, 74
 foundations, 20, 33
 France, 14, 32, 65
 fraud, 50
 free will, 100
 freedom, 39
 friendship, ix, 85, 86, 98, 100
 fruits, 45, 53
 funding, 43, 45, 48, 49, 51, 57, 60, 62, 63
 funds, 3, 5, 7, 8, 9, 17, 46, 57, 61, 62

G

Georgia, 81
 Germany, 14, 15, 32, 36
 global scale, 143
 global village, 30
 globalization, 31
 goal setting, 127
 goods and services, 55
 Google, 1, 2
 governance, viii, 13, 14, 15, 18, 19, 25, 30, 33, 37, 38, 39, 40, 49, 50, 59, 61, 62, 66, 70
 governments, viii, 5, 11, 14, 30, 37
 graph, 22
 Great Britain, 32
 Greece, 33, 111, 121
 group characteristics, 123
 growth, 9, 14, 15, 17, 20, 30, 42, 50, 51, 52, 54, 56, 59, 60, 61, 63, 69, 99, 110, 128
 growth rate, 15, 63
 Guangdong, 130
 guidance, 86, 115
 guidelines, 24, 25, 29, 111, 120

H

happiness, 75, 79
 harmful effects, 46
 harmonization, 40

harmony, 110, 114, 120
 harvesting, 45
 hazards, 105, 108
 health, ix, 17, 29, 35, 44, 103, 104, 109, 111, 119, 121, 126, 127
 hedonism, 79, 81
 high school, 9, 131
 hiring, 106, 108, 119, 120
 historical overview, 75
 historical reason, 17
 history, 16
 Honduras, 126
 Hong Kong, vii, 1, 3, 123, 125, 127, 130
 human, ix, 20, 22, 28, 31, 39, 54, 59, 60, 66, 74, 77, 105, 108, 111, 115, 117, 125
 human brain, 66
 human capital, 20, 28, 31, 39, 54, 59, 60
 Human Resource Management, 129
 human resources, 115
 Hunter, 81
 hypothesis, 28, 29, 66, 125

I

ICE, 100
 ideal, 14, 134
 identification, ix, 79, 81, 85, 99, 107, 113, 115, 120, 131
 identity, 16, 21, 38, 98
 ideology, 90
 image(s), 59, 76, 80, 85, 88, 92, 94, 100
 immersion, 77
 impact assessment, 33
 import prices, 144
 imports, 143
 impulses, 46
 impulsiveness, 111
 income, vii, 1, 6, 7, 8, 9, 42, 69, 74
 independence, 50
 India, vii, 1, 2, 3, 4, 15, 146
 individual differences, 131
 individual perception, 41
 individual personality, 77
 individualism, 83
 individuals, viii, 16, 21, 37, 41, 45, 47, 51, 52, 56, 57, 77, 79, 104, 105, 106, 109, 111, 115, 120
 Indonesia, vii, 1, 2, 4
 industrial policy, 29
 industrial revolution, 68
 industries, 6, 25, 88, 89, 104, 106, 119
 industry, ix, 5, 6, 20, 73, 74, 75, 76, 103, 104, 106, 116, 119, 120, 121, 123, 125, 126, 127, 128, 129, 130, 131

information communication technology, 21
 information technology, vii
 infrastructure, 7, 16, 21, 28, 33
 injuries, 105, 106, 124, 126, 130
 injury, 106, 125
 innovator, 113, 114
 instinct, 116
 institutions, 16, 17, 18, 22, 23, 24, 30, 67, 76
 integration, 39, 59, 64
 integrity, 116
 intellect, 116
 intellectual capital, 33, 34, 35, 128
 intelligence, 40, 65
 internal financing, 49
 international relations, 18
 international standards, 19
 intervention, 26, 33, 125
 investment(s), viii, 29, 33, 37, 39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 67
 investors, 42, 57, 59, 60, 61, 63, 70
 Islam, 42, 45, 68
 islands, 35
 Israel, 34
 issues, x, 17, 46, 61, 113, 115, 118, 133, 135, 144, 145
 Italy, 13, 14, 15, 16, 17, 29, 30, 31, 32, 33, 34, 35

J

job performance, ix, 40, 103, 104, 106, 119, 122
 job satisfaction, 126

K

Kenya, vii, 1, 2, 5, 9, 11
 kill, 28
 knowledge economy, viii, 14
 knowledge-based economy, 20
 Korea, 131

L

labor market, 23, 42, 47, 59
 landscape, 18
 languages, 111
 Latin America, 3
 laws, 14, 17, 22
 LEA, 67
 leadership, 40, 44, 48, 52, 54, 57, 58, 59, 61, 105, 110, 115, 125, 126
 leadership style, 115

learning, viii, 21, 27, 37, 68, 76, 105, 107, 108, 109, 119, 121, 124, 125
 learning process, 21
 learning styles, 105, 108, 119, 121
 left-handers, 122
 legality, 15, 19, 28
 legislation, 10, 105
 leisure, 74
 lens, 33
 license fee, 8
 LIFE, 19
 life cycle, 67
 life experiences, 91
 life satisfaction, 127
 light, 3, 4, 15, 22, 24, 26, 54, 60
 light rail, 3
 Likert scale, 93
 linear programming, 134, 136, 145, 146
 liquidity, vii, 1, 6, 40, 50, 51
 literacy, 6, 11
 loans, 67
 local authorities, 26
 local community, 76
 local government, viii, 2, 14, 15, 29, 33
 longevity, 6
 love, 86, 94, 95, 99, 100
 loyalty, 6, 43, 61, 76, 79, 81, 82, 83, 86, 94, 95, 98
 LTD, 100
 lumbar spine, 127
 Luxemburg, 32

M

magnitude, 44, 74, 119
 major decisions, 47
 major depression, 127
 majority, 3, 5, 6, 105
 Malaysia, 131
 management, vii, 9, 13, 20, 21, 22, 27, 28, 30, 31, 33, 39, 40, 42, 44, 45, 49, 50, 53, 59, 60, 61, 62, 63, 64, 65, 81, 83, 100, 103, 105, 121, 122, 123, 124, 125, 126, 127, 130, 131
 managerial aspects, 105
 manipulation, 11, 50
 manufacturing, 92
 mapping, 33
 marches, 71
 market access, 61
 market position, ix, 85
 market segment, 74
 marketing, vii, viii, ix, 2, 6, 7, 73, 74, 76, 80, 81, 82, 83, 86, 100
 Mars, 71

materials, 90, 93, 99, 104, 129
 matrix, 94, 96, 135, 139, 140
 matter, 30, 35
 MBTI, 107, 108, 109, 110, 115, 119, 122, 128
 measurement, 67, 125
 media, 7, 50, 53
 memory, 78, 80, 83
 mental model, 54, 60, 67
 meta-analysis, 122, 123
 methodology, viii, 13, 15, 23
 Mexico, vii, 1, 2, 4
 Middle East, 3
 mimicry, 62
 mission, 39
 mixing, 30
 mobile device, 2
 mobile phone, 7
 mobile telecommunication, 100
 models, ix, 14, 27, 34, 35, 38, 59, 63, 85, 129, 134, 144
 Moon, 14, 33
 moral hazard, 67
 motivation, 51, 53, 59, 78, 82, 83, 115, 118, 131
 MRI, 125
 multistakhelodper, 20
 muscles, 108, 119, 128
 music, ix, 74, 77

N

national strategy, 17
 Near Field Communication (NFC), 2, 7, 11
 negative consequences, 45
 negative effects, 49
 negative emotions, 58, 111
 negative relation, 43, 45, 46, 47, 56, 57
 neglect, 89
 networking, 13, 18, 21
 neuropsychology, 40
 Nigeria, vii, 1, 2, 5
 Norway, 14
 novelty seeking, 75
 nursing, 116, 120, 122

O

occupational health, vii, ix, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 130
 officials, 2, 11
 operations, 5, 8, 26, 59, 108, 118, 126, 130, 145
 operations research, 145

opportunism, 64
 opportunities, 25, 32, 35, 42, 43, 47, 50, 51, 53, 56,
 59, 60, 61, 74, 79
 optimism, 37, 39, 40, 41, 42, 43, 48, 49, 51, 52, 53,
 54, 55, 61, 63, 64, 66, 67, 68, 69, 70, 124, 129
 organisation, 18
 organism, 27
 organizational behavior, 64
 organizational learning, 21
 OSHA, 104, 128
 ownership structure, 46, 68

P

Pacific, 69
 pacing, 124
 parallel, 4, 74, 76
 Pareto, 38
 participants, 27, 94, 96, 97, 98, 107, 108
 pathway(s), viii, 13, 21, 22, 25, 27, 30
 payment, 2, 4
 permission, 11, 23
 personal development, 115, 117
 personality, ix, 103, 104, 105, 106, 107, 108, 109,
 111, 112, 113, 115, 116, 119, 120, 121, 122, 123,
 124, 125, 126, 127, 128, 129, 131
 personality characteristics, 106, 107, 109
 personality dimensions, 122, 124
 personality factors, 122, 123, 128
 personality test, 103
 personality traits, 104, 106, 111, 113, 128, 129, 131
 personality type, 106, 107, 108, 115, 116, 119, 120,
 125, 126, 127, 128, 131
 petroleum, 122
 pharmaceuticals, 106
 Philippines, vii, 1, 2, 4
 physical properties, 89
 physiology, 88
 playing, 38
 pleasure, 75, 79, 88, 91, 110
 policy, viii, 10, 14, 15, 21, 22, 28, 37, 38, 46, 47, 48,
 49, 50, 51, 52, 55, 56, 58, 59, 60, 61, 62, 63, 64,
 65, 67, 69, 100, 105
 policy makers, 28
 politics, 26, 70
 poor performance, 105
 population, vii, 1
 portfolio, 41, 42, 45, 53
 positive correlation, 41, 42, 50, 51, 60
 positive emotions, 86, 91, 99
 positive feedback, 122
 positive relationship, 41, 43, 44, 45, 46, 47, 48, 50,
 53, 54, 55, 57, 58

poverty, 14
 praxis, 30
 present value, 55
 prevention, 9, 123, 124, 125, 131
 primary data, 24
 principles, 30, 122, 145
 probability, 45, 50, 51, 57, 59, 60, 63
 producers, 18, 135
 product design, vii, ix, 85, 86, 88, 91, 92, 94, 96, 97,
 98, 99, 100
 production costs, x, 133
 productive capacity, 38, 47, 55, 56
 productive efficiency, 38
 professionals, 23
 profit, viii, 13, 16, 18, 19, 20, 21, 29, 30, 38, 71, 134
 profitability, 52, 55, 60, 63
 programming, 145
 project, 18, 19, 20, 23, 24, 25, 27, 28, 30, 33, 38, 45,
 49, 55, 58, 60, 64, 99, 103, 105, 111, 112, 114,
 115, 116, 120, 121, 123, 124, 128, 129, 131
 proposition, 22
 protection, viii, 37, 39, 69, 122
 psychological states, 56
 psychology, 40, 44, 48, 52, 88, 115, 122
 psychopathology, 111
 psychosocial stress, 108, 119, 127, 128
 psychoticism, 111, 112, 123, 129
 public administration, 24
 public officials, 23
 public policy, viii, 14, 30

Q

qualitative research, viii, 13
 quality control, 29
 quality of life, 16, 19, 22, 24
 questioning, 40
 questionnaire, 92, 93, 94, 95, 96, 97, 98, 124

R

radiation, 129
 radio, 7
 rationality, 75, 88
 reactions, 63, 86, 106, 107
 reading, 28
 real income, 8
 real time, 9
 reality, 55, 123, 134
 reasoning, 51, 55, 59
 recognition, 27, 118
 reconciliation, 38

recovery, 45
 regenerate, ix, 73
 regional economies, 15
 regionalism, 36
 regulations, 27, 40, 104, 125, 145
 rejection, 46, 56
 relevance, 44, 45
 reliability, 11, 94, 109, 111
 relief, 27
 rent, 39
 representativeness, 51, 59
 reputation, 39, 42, 44, 45, 46, 47, 55, 56, 57, 58, 59, 61, 62, 63
 requirement(s), x, 105, 133, 135, 136
 researchers, x, 21, 40, 50, 59, 76, 103, 121
 reserves, 61
 resistance, vii, 1, 6, 8, 9
 resolution, 38, 60
 resources, 15, 17, 20, 22, 25, 38, 39, 40, 41, 44, 45, 46, 49, 74, 105, 113, 114
 response, 30, 40, 74, 86, 94, 106, 108
 retail, 82, 83
 revenue, 9
 revisit, 79
 rewards, 27
 risk(s), 2, 5, 6, 8, 11, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 67, 105, 107, 112, 117, 124, 125, 129, 130, 131
 risk aversion, 6, 43, 44, 45, 55, 58, 62
 risk management, 47, 125, 129
 risk perception, 44, 45, 57, 58
 risk-taking, 47, 56, 57
 root(s), 50, 52, 56, 57, 59, 115, 121
 routes, viii, 2, 5, 10, 16
 routines, 21
 rule of law, 10
 rules, 15, 38, 104, 111, 112, 120, 123
 Russia, 3

S

safety, vii, ix, 1, 5, 17, 75, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131
 scarcity, 134, 137
 school, 11, 22, 28, 99
 science, 68, 129
 scope, 24, 106
 seasonality, 80
 secondary data, 24
 securities, 43, 46, 47, 48, 49, 63

security, 2, 7, 9, 11, 19, 39, 46, 52
 self-confidence, 111
 self-discovery, 129
 self-esteem, 44, 111
 self-regulation, 17
 semi-structured interviews, 23
 sensation(s), 76, 79, 80, 88
 senses, 77, 86
 sensitivity, 41, 48, 67, 124
 sensory experience, 88
 service provider, 21
 service quality, 81
 services, 4, 7, 26, 74, 75, 78, 81, 100, 145
 sex, 111
 shape, 90
 shareholders, viii, 37, 39, 40, 41, 49, 50, 53, 54, 57, 61, 62, 63, 64, 65
 shortage, x, 133, 134, 137, 139, 140, 143, 144
 signs, 135
 Singapore, 124
 SIRM, 19
 small business(es), viii, 13, 15, 33
 SMS, 9, 107
 sociability, 111
 social capital, 14, 16, 21, 22, 28, 29, 30, 31, 35, 36, 105, 122, 127, 128
 social identity, ix, 74, 77
 social integration, 31
 social norms, 125
 social quality, 19
 social relationships, 17
 social responsibility, vii, viii, 13, 14, 15, 17, 18, 19, 20, 22, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35
 social sciences, 14
 social status, 57, 62
 socially, 19, 24, 25, 27
 society, viii, 5, 11, 20, 24, 25, 35, 37
 sociology, 30, 31
 software, 113, 120, 124, 129, 130
 solution, 4, 9, 10, 11, 134, 136, 140, 144, 145, 146
 South Africa, vii, 1, 2, 4
 Spain, 14, 73, 74, 83
 specialists, 25
 specifications, 95
 spending, 5
 spine, 124
 stability, 111
 stakeholders, 17, 21, 22, 24, 27, 28, 31, 38, 40, 45
 state(s), 14, 15, 26, 29, 31, 34, 38, 42, 44, 56, 79, 108
 statistics, 104
 stimulus, 29
 stock, 39, 41, 57, 63
 stock price, 63

storage, 51
 strategic management, 53
 stress, 62, 108, 112, 116, 120, 127
 structural funds, 14
 structure, 14, 30, 36, 37, 40, 42, 48, 63, 64, 66, 68, 70, 93, 118, 122
 style(s), 88, 90, 91, 98, 99, 101, 107, 109, 113, 117, 129, 131
 substitution, 49
 supervision, 130
 supervisor(s), 8, 29, 130
 suppliers, 135
 supply chain, 25, 135
 surplus, x, 133, 138, 139, 143
 survival, 55, 118
 susceptibility, 129
 sustainability, 13, 14, 17, 18, 20, 22, 23, 25, 26, 27, 28, 29, 30, 31, 34, 52, 53
 sustainable development, viii, 13, 14, 15, 16, 17, 18, 19, 23, 26, 30, 32, 35
 sustainable growth, 15, 17, 22, 29, 34
 Swahili, 2
 swarm intelligence, vii
 Sweden, 14, 101
 Switzerland, 1, 31
 symbolic meanings, 90
 synergistic effect, 27

T

Taiwan, 85, 88, 89, 90, 92, 101
 takeover, 45, 50, 51, 62, 64
 target, 8, 42, 64, 92, 93, 109
 tax breaks, 20, 27
 taxation, 60
 taxis, 3, 4
 teacher performance, 122
 teachers, 108, 124, 130, 131
 team members, 104, 105, 106, 113, 114, 116, 120
 teams, 39, 105, 106, 113, 114, 120, 123, 125, 129
 techniques, 10, 129
 technologies, 56
 technology, 2, 88, 93, 115, 117
 tensions, 27
 tenure, 67
 terminals, 3
 territorial, vii, viii, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 29, 31
 territory, viii, 13, 14, 15, 16, 17, 19, 20, 24, 27
 testing, ix, 92, 103, 104, 106, 121, 122, 131
 textiles, 18
 texture, 90
 theatre, 82

theft, 8
 theoretical approach, ix, 74
 thoughts, 75
 top-down, 31
 total product, 137
 tourism, vii, viii, ix, 28, 73, 74, 75, 76, 81, 82
 trade, 16, 17, 18, 19, 20, 21, 23, 24, 70, 145
 trade union, 18, 19, 23, 24
 traditions, 16, 17, 22, 26, 27
 training, viii, 9, 10, 11, 18, 20, 28, 37, 105, 107, 108, 109, 122, 124, 125, 126
 training programs, viii, 37, 122
 trait anxiety, 129
 traits, 68, 104, 105, 106, 111
 transaction costs, 39, 45
 transactions, 2, 3, 4, 5, 6, 8, 39
 transcription, 24
 transfer pricing, 69
 transformation, 113, 120
 transit, 1, 3, 4, 5, 10
 transit ridership, 4, 5
 translation, 111
 transparency, vii, 1, 5, 22, 36
 transport, 3, 139
 transportation, vii, x, 6, 133, 134, 135, 136, 137, 138, 139, 140, 144, 145, 146
 treatment, 53
 triangulation, 24
 Trinidad and Tobago, 127
 trustworthiness, 6
 Turkey, 103
 turnover, 58, 66

U

unemployment rate, 104
 unions, 20
 United Kingdom, 14
 United Nations, 31
 United States (USA), 15, 32, 35, 104, 108, 124, 127, 128, 129, 145
 universality, 111
 universe, 15
 universities, 16, 21, 22, 29
 urban, vii, 1, 11, 16, 130
 urban areas, vii, 1, 11
 urbanization, 11

V

vacuum, 86
 validation, 126, 131

valuation, 42, 58, 69
variables, 95, 106, 122, 136, 140
varieties, 82
vehicles, 4, 5, 6, 7, 8, 10
vein, viii, 73, 78, 79
victims, 42
vision(s), 30, 38, 39
volatility, 46
vulnerability, 106, 108

W

Washington, 30
water, 145
wealth, 20, 38, 44, 52, 61
websites, 24

welfare state, 14, 34
well-being, viii, 20, 22, 37, 44, 46
Western Europe, 34
work environment, 105, 124
workers, ix, 17, 103, 104, 105, 106, 108, 109, 111,
112, 114, 116, 117, 118, 119, 120, 121, 122, 124,
130
working conditions, 112, 118
working groups, 18
workload, 116, 120
workplace, 123, 124
worst case scenarios, 117

Y

yield, 49