

For Money's sake!

Introducing Redefinition Design – a method to break out of the ubiquitous monetary paradigm; in the hope of finding genuine alternatives.

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Abstract

Redefinition design is a special case of speculative and critical design; it is intended to be used by designers in facing otherwise recalcitrant or refractory design situations. One subject that generates more refractory design situations than most is money. Thus, money will be the vehicle used to derive, articulate and apply the redefinition design methods.

The future of money is heavily informed by ideas from its past. In this regard, the services and systems based around money, including industries focused on design, often embody a conservative culture that perpetuates old paradigms onto new technology.

In this dissertation, I propose two research questions:

RQ1: Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

In the context of investigating the new methods associated with Redefinition Design, we firstly begin to examine and interrogate underlying and often tacit assumptions, taking the specific case of money. Through this question I elucidate the fundamental principles of money, which lie at the core of the longstanding mainstream monetary paradigm. The totality of money is broken down into four main constituents: monetary artefacts, currency systems, monetary mentifacts and finally the functional axioms of money. Revealing these core principles, and analysing them within specific cultural contexts, will inform the methods used in the development of the practical work.

RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step

beyond the underlying assumptions informing the development of money?

This research has yielded strategies that allow the radical re-conception and design of currency systems and monetary artefacts, through the application of a redefinition design approach.

The Redefinition Design methods developed in this research enable the designer to identify suitable alternative cultural contexts, such as historic or literary contexts. The methods prompt us to deconstruct these contexts, then reconstruct them with a design proposal that resonates with all cultural levels of the given context. Hence, in the case of entrenched social technologies like money, the resulting Redefinition Design proposals are harmonious with the alternative culture, but incongruous in the context of contemporary culture. These methods do not instigate a paradigm shift but rather a paradigm breakout.

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Author's declaration

During the period of registered study in which this thesis was prepared the author has not been registered for any other academic award or qualification.

The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Signature _____ Date _____

Definitions:

Redefinition Design – the new design approach to which this thesis builds.

Paradigm Paralysis – The inability or refusal to see beyond the current models of thinking.

Paradigm Breakout – To step beyond a paradigm paralysis to a design alternative (but not necessary to cause a paradigm shift).

Monetary Paradigm – A general monetary pattern that includes all aspects of money within a culture that are known and unknown.

Functions of money – The economic definition of money that constitutes the three main functions: ‘medium of exchange’, ‘store of value’ and ‘unit of account’.

Axiom – A statement that is taken to be self-evidently true.

Functional axioms of money – A term that acknowledges that the economic functions of money constitute just one type of money from an infinite number of monetary possibilities.

Monetisation – The process of converting or establishing something into legal tender.

Prescribed Culture – This term is from anthropologist David Bidney (see section 1.3)

Counterfactual – The use of social science fiction novels as a framework for design.

Incongruous Design – Designs that do not resonate with the cultural context in which they exist.

Refractory Design Situation – A subject matter resistant to change in relation to current design approaches and processes.

Coeval Culture – Aspects of society that are of the same age.

Contemporary Culture – Aspects of society from the present time.

Artefacts – Objects/devices/stuff

Sociofacts – Institutions/organisations/companies

Mentifacts – Ideas/Ideals/beliefs/assumptions

The General Method:

This is the method I am working towards throughout this thesis:

Axiom Identification (current state of culture):

1) a) Identify underlying and foundational Axioms, Assumptions, Beliefs

b) Altering Axioms

Alter the core axioms of money to create generalised cases by using a Lobachevsky-inspired method (see section 4.42). Often good candidates for change have historical inconsistencies. Operations include remove, oppose, extend, diminish and transform.

Context Identification:

2) Select sympathetic cultural context

Cultural recontextualisation. In my case I use a Counterfactual method (see section 4.43b), utilising social science fiction as an alternative cultural context, though in a more general case non-fictional cultural contexts can be used.

3) Analyse cultural levels within selected cultural context

Unpack cultural levels between Artefact, Sociofact and Mentifact, using Bidney's definition of culture (see section 4.44). Find pivotal interactions that provide potential opportunity for rich expression of altered axioms within the cultural context.

Generative Phase:

4) Iteratively design artefact and interaction with altered axioms in the selected cultural context.

Chapter 1 – INTRODUCTION

Redefining money and culture

The aim of this thesis by practice is the creation of methods associated with a new design approach called Redefinition Design. The aim of Redefinition Design is to unshackle understanding from our prescriptive cultural system¹ and give our imagination a new cultural context in which to design.

Throughout this thesis, money² is used as the vehicle to develop the Redefinition Design methods.³

1.1 Why Money

Outline the need for alternative monetary concepts

1.2 Formulating RQ1: Paradigm Paralysis (preliminary design work)

My preliminary work 'Crime Pays' and 'Electric Money', which elucidated RQ1 and the problem with designing money.

1.3 Formulating RQ2: Paradigm Breakout (Redefinition Design)

I formulate RQ2 and the need for a new design approach.

1.4 Introducing the Bidney Framework.

1.5 Summary of chapter.

¹ When referring to a 'prescriptive cultural system,' I am referring to David Bidney's definition, which can be found in section 1.3, page 23.

² When referring to money, I include monetary artefacts (objects and devices), currency system (financial institutions) and monetary mentifacts (the notions surrounding money).

³ Although money is the vehicle I use in the development of Redefinition Design, it is not the only subject matter to which this approach can be applied. Any old, entrenched social technology, where assumptions have been ingrained in the fabric of understanding, is where the methods are applicable.

1.1 Why Money

'Money is like an iron ring we've put through our noses. We've forgotten that we designed it, and it's now leading us around. I think it's time to figure out where we want to go – in my opinion toward sustainability and community – and then design a money system that gets us there.' (Lietaer, 1997)

As Bernard Lietaer suggests, our inherited currency systems appear to heavily inform the way a society operates, hence if we do not like the direction in which the system is leading us, why don't we simply design a new currency system? Regarding this suggestion, the practical barriers to undertaking this task are immense⁴. Designing currency systems is a relatively new possibility, for up until relatively recently, most developments in money have been evolutionary rather than designed (see section 2.5). However, with the design of the Bretton Woods System, and more recently cryptocurrencies like Bitcoin. The idea that a currency system can be designed has become a reality. Yet the first hurdle is not linked to practical obstacles; it is one linked to the creative process. It is our ability to imagine, to envisage new currency systems by stepping beyond the contemporary monetary paradigm.

'...Mainstream economics lives constantly with the fear of insanity, of heresy, of a sudden strange untrained messiah arising to challenge the way the system works. It is a potent fear, especially, for some reason, amongst the British.

The trouble is, this is also a fear that stifles debate about fundamentals. It undermines imagination and reform and throttles big ideas at birth.' (Boyle, 2002, p.1)

Here, Boyle highlights the aspects of money and motivation that the usual dealers in money do not

⁴ The barriers to bringing new currency systems into reality include the massive scale of such systems, the vast technical knowledge involved in their implementation and the payment habits that billions of people already have.

address. Following on from Lietaer's suggestion to Boyle's, it might be that we can redesign money, but we are afraid to challenge the fundamentals. In fact, we have lost our vision and imagination when it comes to money. Redefinition Design is an attempt to restore this.

Through this thesis, I tackle fundamentals surrounding money head on. This is needed because the mainstream ubiquitous currency system operates one type of money. This is problematic, as I believe money is partisan; the currency system gels with certain cultural values and not others. When and where money is applied, certain biases are manifested that are often disconnected from the context in which it is being implemented. Certain situations elucidate this conflict: for instance, when a person attributes the failings of a company to 'the accountants making the decisions', they are blaming fiscal principles, but such principles are bound by the constraints of money; hence is the monetary paradigm not the true cause?

The overriding of other values with those of monetary ones can be witnessed in more specific contexts. For instance, tuition fees in the UK were introduced back in 1998 and since then they have steadily risen from £1,000 to £9,000 per year (Bolton, 2016). Healthcare is another area that has oscillated from private to public ownership back to private, where currently the biases of money and market outweigh other diminishing principles. Yet against the backdrop of this monetisation drive, the current financial system is still recovering from one of the worst financial crashes since the Great Depression (Fund, 2009). Thus, the current concept of money not only encourages certain values, it is actively encouraging values that have, at least in part, almost led to an economic hara-kiri. Yet in the shadow of the 2008 market crash, the current paradigm of money still lives on: should it?

1.2 Formulating RQ1 (preliminary design work)

In this section I will talk about three aspects of my preliminary work that helped formulate RQ1:

Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

The invisible glass wall that constitutes the contemporary monetary paradigm revealed itself to me at the start of this doctoral research project. The catalyst for my awakening was a design project I created called Crime Pays⁵, commissioned by a research group called Visualisation and Other Methods of Expression, in 2012.⁶ The project's intention was to radically reimagine money and bring some much-

⁵ The Crime Pay's project envisaged a completely electronic payment system that gave the customer two methods of payment on purchase (see Figs. 3 and 4).

⁶ EPSRC. 2012. Visualisation and Other Methods of Expression. [Online] Available: <http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/G00255X/1>

needed interest to this traditionally dry subject matter. However, during this project, I was dismayed to find my design proposal was unoriginal. My understanding of money relied on deeply held assumptions, which I had taken for granted. Crime Pays highlighted to me that design proposals often overlook fundamental notions surrounding old entrenched technologies.

While developing Crime Pays⁷, I became aware that the design of the monetary artefacts was conspicuously constrained and showed little creativity. I desperately attempted to imagine some alternative monetary artefact, but reluctantly opted to represent the concept with two credit card artefacts (Figs. 1 and 2). My imagination was bound by aspects of contemporary culture, including the inherent notions in my mind of how a monetary artefact ought to look and operate.

The unoriginal design came about because every time I attempted to design an alternative payment device, a thought would occur: ‘but who will recognise this as a payment device? No one will associate this odd-looking thing with money.’



Fig.1: Crime Pays scenario depiction #1

Photo depicting the Crime Pays payment system in use; note the generic payment card design.

⁷ The initial motivation behind ‘Crime Pays’ was to highlight and rebalance the opposing arguments for and against a completely tracked electronic currency system. For: proponents of electronic currency systems and monetary artefacts often argue that cash is simply the harbourer of criminality (Marlowe, 2013), often also citing its ‘float cost,’ while opponents of electronic systems suggest cash offers the citizen freedom and liberty (Anon, 2016). The ‘Crime Pays’ proposal was intended to act as the synthesis of these two positions.



Fig.2: Crime Pays scenario depiction #2

Photo depicting the Crime Pays payment system in use. Note the generic payment card design. The constraining role of culturally derived assumptions was also highlighted by Dave Birch⁸;

'...the alternative, and you can choose, you can choose on your phone, is the dark exchange'
(Houldsworth, 2013)

The above text is spoken by Dave in the Crime Pays video. He refers to the payment artefact as a 'phone', even when the images projected on the screen are card-based transactions (Figs. 3 and 4). Dave Birch did not make a mistake; he deliberately says 'phone' as this is a technology that is ubiquitous but not yet fully exploited for payments.

In a talk Birch gave at the Prague Conference Centre, for the European Bitcoin Conference 2011, he suggests why he thinks phones will become the next monetary artefact:

'So, why phones? Because people are using phones in shops anyway, so when you go into a shop now you've got your phone in your hand, because if you're not scanning the barcode to see if it's cheaper on Amazon, you're texting your mates or talking to your mum. You have your phone in your hand anyway.' (Bourne, 2011)

Hence, Dave Birch within the Crime Pays video said 'phone' to maintain consistency in the advice he

⁸ Dave Birch presented the Crime Pay's proposal as 'Don Rogers', during a digital payments conference at the British Computer Society in 2012.

gives to industry, but also to propagate the idea of the phone as a new payment artefact. Thus, Birch is aware of the difficulty in changing payment habits. Such change is also constrained by the same culturally derived assumptions that limited the design outcomes within Crime Pays.

Light Exchange

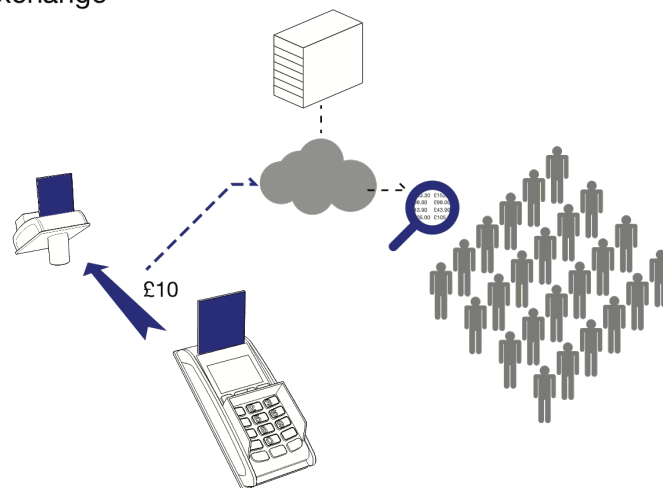


Fig.3: Crime Pays 'light exchange'.⁹

⁹ The first payment option is completely free at the point of sale; however, all the transaction details were instantly recorded online for everyone to see.

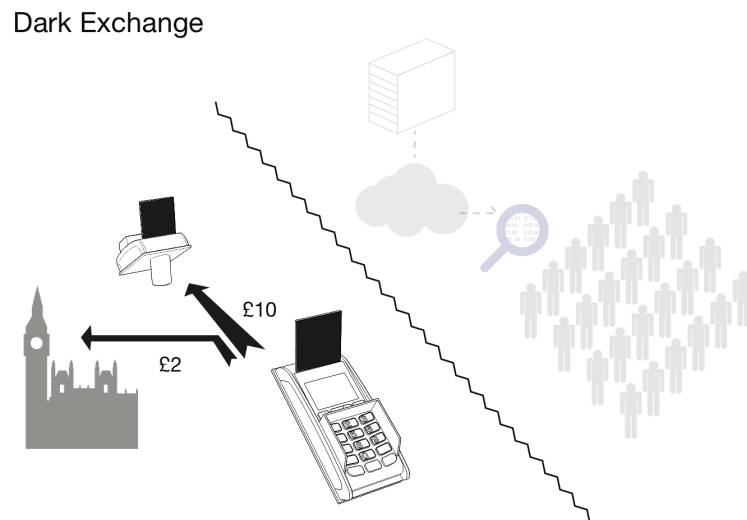
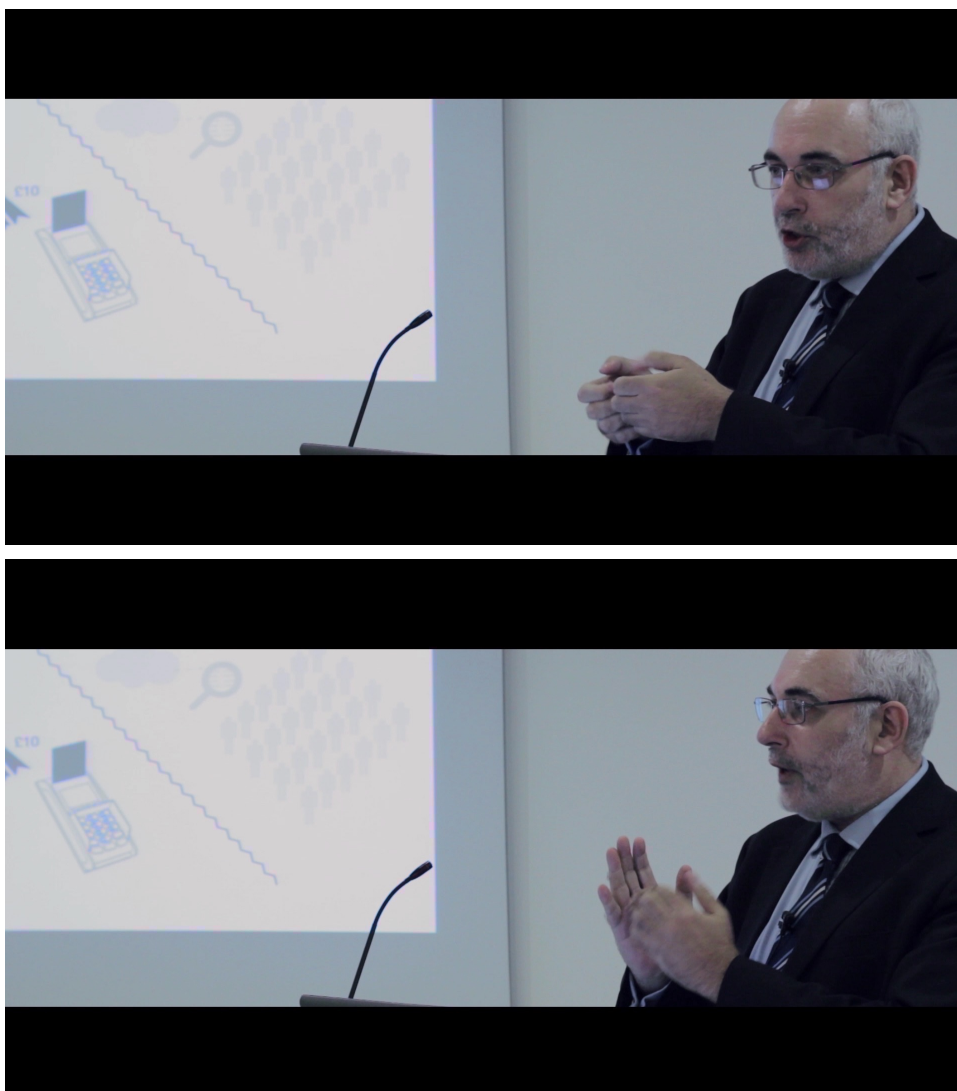


Fig.4: Crime Pays 'dark exchange'.¹⁰



¹⁰ The second payment option anonymises the payment details so there is no record of the transaction at the exchange; however, to pay for the unquantifiable problems associated with a completely anonymous transaction, a levy of 20% would go to a government department of the payer's choosing.



Figs.5, 6, 7: Screen shot from Crime Pays video

Here Dave Birch describes light and dark exchanges. Note the illustrations from Figs.3–4 are projected on the screen (depicting card payment) while Birch explains paying via smartphone.

Another money project that I developed in 2008, called Electric Money, also highlighted the difficulties of designing alternative currency systems while being unaware of underlying assumptions. Electric Money took the form of a short fictional documentary that presented a future where the global fiat currency system had been hacked, leading to hyperinflation (Houldsworth, 2008). To overcome economic collapse, a new currency system was created that used electricity as a form of exchange, thus combining efficiency of transport with intrinsic value. However, the artefactual and systematic design in the project were evasive. The scenario was very general; no details or processes behind the currency system were never mentioned.¹¹

¹¹ The approach took in this early project is like the approach taken by many science fiction writers; either avoiding money altogether, like many utopias, or using generic terms to describe money, like many popular works of science fiction (see section 4.43b).

The Crime Pays project and the review of the Electric Money project were a turning point within the development of this investigation. These projects highlighted the deeply held assumptions in my understanding of money; the same assumptions that limited the design output of the Crime Pays project. The same assumptions that limit the alternative currency systems within social science fiction (see section 4.43b). And the same assumptions that limit the development of alternative currency systems and monetary artefacts, as John Maynard Keynes states:

'The difficulty lies, not in the new ideas, but in escaping the old ones, which ramify, for those of us brought up as most of us have been, into every corner of our minds.' (Keynes, 1936, p.4)

These realisations made me wonder if there were monetary assumptions that were cultural in origin, hence this preliminary work helped formulate the first research question: 1. Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

1.3 Formulating RQ2 (Redefinition Design)

Understanding the assumptions that limit monetary development was the first aim in this doctoral research. The second question is focused on mitigating these assumptions. This led to the formulation of RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

In response to this question this thesis proposes and develops a new design approach called Redefinition Design, which can be understood as a special case to the more general cases of speculative and critical design. Over the course of this thesis, I show how Redefinition Design is derived and articulated and its possible applications, but also limitations. The general aim of Redefinition Design is to mitigate the influence of coeval culture.¹² To reveal, to sever and rebuild all levels of culture that inform the design and operation of an artefact or service. A position that resonates with anthropologist David Bidney's description of culture:

'Every culture is a prescriptive system which prescribes the sphere and mode in which instinctive and acquired human potentialities are to be exercised. All cultural freedom is bought at the price of cultural authority and restraint.' (Bidney, 1968, p.11)

The aim of Redefinition Design is to unshackle understanding from our inherited prescribed culture and give our imagination a new cultural context to design within.¹³ The manifestation of this approach is a direct response to the hurdles in designing genuinely alternative currency systems and monetary artefacts (outlined in section 1.2). The refractory design situation surrounding the subject matter of money has thus helped manifest Redefinition Design.

Redefinition Design is particularly useful in the context of money, because the scope of our present notion of money is increasing and its values are seeping into areas that were governed by other principles. Monetisation would not be such a problem to other principles if money behaved in a more amenable manner, or if at least certain types of money acted in ways that resonated with the culture in which they operated, rather than acting as a bulldozer to hard-fought principles and ideals. For I believe money is partisan; it gels with certain aspects of culture but undermines other culturally derived values, for instance the work of thinkers like John Ruskin¹⁴ and the social-based reforms instigated by Clement Attlee's¹⁵ Labour government jar with the unfettered notions attributed to money (see sections 2.5 and 2.6). In part, the reason why the mainstream monetary paradigm appears discordant to many aspects of life is that the values and principles we hold alter as we travel through different parts of society; our motivation changes, from the gifts we give to family or friends to the unpaid extra time a NHS nurse or doctor puts in solely for the benefit of the patient. Whereas the fundamental functions of money (see

¹² Designers often profess to 'push boundaries'; however, change is often incremental and most design aligns imagination within mainstream culture, to gain leverage surrounding new technologies' or trends. Even those creative disciplines which challenge the status quo, like critical design, need to acknowledge, at least to some degree, the notion they are critiquing, and in doing so the needle can move only so far.

¹³ For this reason the designed outputs of Redefinition Design will always be incongruous scenarios that jar with the mainstream cultural perspectives.

¹⁴ John Ruskin's highly influential book *Unto This Last*, published in 1860, was critical of capitalist economies of the 18th and 19th centuries and was a precursor to the social economy. Famously Ruskin states 'There is no wealth but life.'

¹⁵ Attlee's 1945 Labour government founded the welfare state, including the National Health Service, the Town and Country Planning Act and the Children Act 1948. Much of the responsibility for these pieces of legislation has now shifted to private industry and thus financial and monetary policies.

section 2.2) stay static and are often not sympathetic to cultural context or human behaviour.¹⁶ Is it too much to think that fundamental technologies like money can be designed to work in harmony with diverse parts of coeval culture? This challenge within the context of money is complex; because money is ubiquitous, so critical to day-to-day living that any genuinely alternative monetary concepts will always appear incongruous to the entrenched notions of our present monetary system, the ideas cemented in our heads and used within the established economic system.

Although money is the vehicle I use in the development of Redefinition Design and its methods, it is not the only subject matter to which this field can be applied. The methods are applicable to any old entrenched social technology, where assumptions have been ingrained in the fabric of understanding. Hence, subjects like communications, transport, voting systems and legal systems would make an appropriate study. However, for now, I begin with money.

¹⁶ This issue is part of a larger, general case, where aspects of fundamental technologies act discordantly with coeval culture, often overpowering significant and useful aspects of culture, which have taken years and years to develop and ultimately enrich many people's lives.

1.4 The Bidney definition of culture

Acknowledging that money operates within a paradigm makes a difficult subject more complex and elusive, as this approach refutes a general notion of money and suggests its characteristics are not intrinsic but predominantly cultural in origin. Hence, I initially struggled to know how to define money. Given the scale and multifactorial aspects of money,¹⁷ I sought a framework to deconstruct it within a cultural context. Hence, prior to defining money, it is helpful to have a basic definition of culture.

After much studious wandering, my approach to understanding culture and subsequently money turned a corner after reading a book called *Theoretical Anthropology* by David Bidney.¹⁸ Bidney's writing helped me clarify that any definition of human culture will always be imperfect, but this is not to say an abstract imperfect definition cannot also help in devising a framework to further understanding.¹⁹ The definition of culture that will inform the approach I take throughout this thesis:

'Abstract, or ideal, culture is an impersonal, super organic aggregate and configuration of forms of experience transmitted by human society and embodied in the sum total of human artefacts, sociofacts (institution), and mentifacts (ideas and ideals) produced by human effort.' (Bidney, 1968, p.328)

Bidney's abstract definition of culture will help me unpack a cultural context, allowing me to deconstruct and reconstruct various cultural contexts throughout this thesis:

Artefacts – the stuff that constitutes the materiality of a given culture like objects, devices and hardware. For example; coins, paper notes and electrical communication devices.

Sociofacts – institutions and social structures, everything that constitutes the organisation of a society. For example; companies, co-operatives, government etc.

Mentifacts – ideas, concepts, notions, values, beliefs and assumptions that people collectively hold in their minds. For example: money is valuable, money is coins, banks hold my money etc.

Each cultural level is interlinked with the next²⁰.

¹⁷ For instance: coins, precious metal, financial services, electronics, communications, economic theory, ancient history (to name but a few).

¹⁸ Originally published in 1953, *Theoretical Anthropology* by David Bidney collates a multitude of theories surrounding many aspects of culture, often presenting the opposing arguments and then stepping back to the middle ground.

¹⁹ Bidney's definition of culture will be developed to include other notions that act upon our understanding of money in the methodology chapter.

²⁰ For instance: coins or banknotes are dependent on financial services to create and distribute them, likewise financial services and coins are dependent on people's notions of the previous two.

1.5 Summary of chapter

Against the backdrop of the 2008 financial crash, the reasons to redesign money are evident (section 1.1). However, the prescriptive cultural system into which we are born often limits imagination when it comes to monetary design (section 1.2), to a set of entrenched culturally derived assumptions. In the next chapter I will elucidate these assumptions by answering RQ1: Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

After answering this question the thesis turns to design, and the challenge of mitigating these assumptions by answering RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

Chapter 2 –

LITERATURE REVIEW.

The paradigm paralysis of money

This chapter will be situated in the literature, in relation to the development of Redefinition Design methods. In the chapter I firstly determine and elucidate the deeply held assumptions surrounding money, thus addressing RQ1: Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

Through this chapter I show that monetary assumptions have kept its development in a holding pattern, but when elucidated, they can be accounted and mitigated through the development of Redefinition Design methods (Developed in Chapters 3, 4 and 5).

Throughout the chapter Bidney's definition of culture is used to unpack the various aspects of money within each given cultural context. Doing this serves to highlight the disparity between cultural values and monetary values and the need for the Redefinition Design approach: RQ2 Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

2.1 What is money? Ever-changing assumptions

Why we should not assume we know what money is!

2.2 The specific assumption (The functional axioms of money)

Those closest to monetary policy do assume what money is!

2.3 The axioms as longstanding assumptions.

Many people have assumed what money is for a very long time.

2.4 Paradigm paralysis: the axioms maintained through inheritance not choice.

One reason for the long-held assumption is the reinforcing feedback loop.

2.5 A brief history of monetary paradigm paralysis, encompassing the functional axioms.

Four case studies that unpack the development of the monetary paradigm paralysis.

2.6 Culture resonating with money, due to the paradigm paralysis.

A consequence of the paralysis is culture has been forced to change, not money.

2.7. Limitations of complementary currency systems.

The complementary currencies that have begun to overcome the paradigm paralysis.

2.8 Summary of chapter.

2.1 What is money? Ever-changing assumptions

Bidney's definition of culture will be used and developed throughout this thesis. Let us recall, there are three aspects to Bidney's definition: artefacts, sociofacts and mentifacts. I will now derive the specific elements of this initial framework within the subject matter of money, while attempting to answer the question:

What is Money?

Common monetary explanations usually state that money is simply 'notes and coins' that we use to buy and sell goods and services. That money is the lifeblood of our economy and without it, our nation would fail and we would all be thrown back to the dark ages or forced to live in caves. For money is simply an artefact that is used for economic purposes.

Placing this argument in a historical context, in 1755, Samuel Johnson created what could be called the first modern dictionary. In it he defined money:

'Money: Metal coined for the purposes of commerce. (Johnson, 1768, p.474)

In contemporary Britain, this definition of money is still often presented; the Oxford Online Dictionary states:

'... coins and banknotes collectively'²¹

Here the contemporary definition states that money is a type of artefact, coins made from metal or banknotes from paper. Both these monetary definitions, along with my embellished common-sense description of money, are unsuitably narrow, reductive and overly simplistic. It is not that these definitions are incorrect. Rather they describe the surface of a currency system; they relate only to the top cultural layer of Bidney's definition – the artefacts.

Monetary artefacts constitute the top layer of culture. Coins and banknotes are the most common definition attributed to this layer, but this overlooks a plethora of other monetary artefacts. For instance, are credit cards or debit cards, and cheques not money, or are these objects simply a proxy for the transfer of real money that surely occurs between the banks data centres? Regarding this line of questioning, the word 'money' is being used in conjunction with an artefact.²² From bearer instrument money (like cash or types of money token) to ledger money (like credit cards or types of money system), they all require the creation of some type of monetary artefact that facilitates the functionality. Hence, it is true to say that money has been many things; however, is its materiality the only attribute that is required to determine if an object needs the label 'money'? In terms of materiality, there is little difference between a metal disc and a coin of the realm, but the details that are pressed on a coin signal that this object is part of a larger system, exposing the connection linking a society and its institutions with a certain monetary artefact. As we make these observations we move to the second layer in Bidney's definition of culture, the sociofacts.

Currency systems constitute this second layer of culture. A shift in perspective, from defining monetary artefacts as solely material entities to a holistic approach that acknowledges a system and how the monetary artefacts operate together within a given social context. This perspective reframes the challenge of defining money by bringing into play different specialisms that focus on the role of institutions. Social scientists and ethnographers have traditionally defined money from the sociofactual perspective, suggesting money is a '*social and sacred marker*' (Zelizer, 1994, p.22) and a '*measure of social interaction*' (Hart, 2000, p.245). These explanations shift the scale of the definition, from the physical/material monetary artefact that individuals hold, to the dispersed and active form that operates within a given society. Essentially these definitions of money are referring to the currency system and

²¹ The definition of money found on online: Oxford University Press.

²² This approach to defining money is one often taken by popular culture within dictionaries and specialisms interested in the materiality of money; for instance, historians who collate artefacts from history observe that money has been coin, shells and metal ingots.

how it intersects with and helps organise society. Yet, is money only bound within the physical sphere, made up of monetary artefacts like coins operating within a currency system through institutions like banks or the workplace? A quick thought experiment might help address this question: imagine if suddenly all financial services collapsed and all monetary artefacts were destroyed; would money cease to be? For me the answer would be no, because money is also a notion. Thus, we move to the third layer in the Bidney Framework, the mentifacts.

Monetary mentifacts are the ideas, values and beliefs that are collectively held within our minds. Philosophers have often dealt with money from this perspective, defining money as *'a universal agent of separation'* (Marx, 1959, p.61), as *'the most abstract impersonal element that exists in human life'* (Max Weber, 1946, p.331) and saying *'Money in its psychological form... possesses a significant relationship to the notion of God'* (Simmel, [1900] 2011, p.254). Mentifacts surrounding money appear to be the foundation that underpins the sociofacts and artefacts – they are at the core of any functioning currency system – but as they exist within our heads, mentifacts are the most difficult element of money to fathom. Even rationally minded economists acknowledge that some aspects of money are not always obvious and can only be described by the term 'belief'. Even the father of economics, Adam Smith, resorted to using this label:

'...the facts and arguments which have been alleged above dispose me to believe, or more properly to suspect and conjecture; for the best opinion which I can form upon this subject scarce, perhaps, deserves the name of belief.' (Smith, [1776] 1981, p.233)

Another influential economist, Milton Friedman, suggests how important unquestioned belief is in monetary matters:

'What both examples – and numerous additional ones that could be listed – illustrate is how important "myth", unquestioned belief, is in monetary matters. Our own money, the money we have grown up with, the system under which it is controlled, these appear "real" and "rational" to us.' (Friedman, 1994, p.7)

Belief and myth surrounding currency systems within a given culture could be understood as a collective delusion, a barrier to understanding. However, belief is essential in maintaining a functioning currency system. Individuals harbour many diverse and unique notions surrounding money. However, the collectively held notions that relate directly to the functioning currency system are the bedrock that ties the individuals to the institutions. This social agreement, Bernard Lietaer suggests, is a collective belief:

'You have a deeply held belief and there is the key – not that the 20 is valuable, but that everyone else will accept it as valuable... You believe that everyone else believes that the money is valuable. What we are talking about here is belief about a belief.' (Lietaer, 2013, p.44)

The position taken throughout this thesis is, given the numerous artefacts, the vast monetary institutions and the subjective nature of monetary concepts, one that suggests there is not and probably will never be a timeless universal definition of money, as our understanding of money is intertwined with our ever-changing culture. This perspective builds on the observations social scientist Viviana Zelizer outlines in her 1994 book, *The Social Meaning of Money*:

'While money does serve as a key rational tool of the modern economic market, it also exists outside the sphere of the market and is profoundly influenced by cultural and social structures.' (Zelizer, 1994, p.18)

As Zelizer suggests, money is influenced by culture. However, I go further and suggest that monetary artefacts can only truly be understood within a given culture, partly due to the beliefs and values required for operation that are manifested while living within a given society and culture. A perspective that echoes George Simmel's observations regarding money:

'Money is thus one of the great cultural elements whose function it is to assemble great forces at a single point and so to overcome the passive and active opposition to our purposes by this concentration of energies.' (Simmel, [1900] 2011, p.210)

Perhaps then, the extensive use of the word 'money' over the past 700 years is the misleading element;²³ that the many monetary definitions are referring to distinct artefacts, sociofacts or mentifacts within different cultural contexts in time and space, and that the progression of culture through time continually alters what money is, while the name by which we refer to this object, idea or theory often stays static.

Adopting a plural approach to the problem of defining money might appear counterintuitive. How can money be discussed without a working definition of what it is? Regarding this point, throughout this thesis I intend to prioritise communication and exploration rather than a certain type of economic or monetary dogma. Hence, as this thesis unfolds I will use Bidney's definition of culture to both facilitate the analysis and contextualise historic perspectives, ideas and theories surrounding money.

Although within this thesis I take a plural approach to the definition of money, as artefacts, sociofacts and mentifacts have changed over time, there is one aspect of money that resides in the mentifactual level and which has not changed. This is the economic assumption that the functions of money always

²³ The vast number of monetary definitions suggests that an ostensive approach to defining money confuses our understanding, as the disparate monetary theories and artefacts expand rather than limit what money is. Succinct monetary definitions usually focus on a certain aspect of money, a characteristic that describes an artefact, sociofact or mentifact without contextualising it within a given culture.

include a 'medium of exchange', 'store of value' and 'unit of account'. These functions heavily limit monetary development, as the definition of money is fenced into a set of entrenched ideas and principles. They are at the centre of Bernard Lietaer's iron ring analogy of money: '*...We've forgotten that we designed it, and it's now leading us around...*' (Lietaer, 1997). The next section will focus on this unchanging aspect of money, but as we move through the thesis, I will show that these constitute assumptions.

2.2 The specific assumption (The functional axioms of money)

Having established that I will take a plural approach to the definition of money, it is important to note that most economists do not take this approach. Rather, most economics textbooks explain that the best way to define money is through its three main functions, which are given as ‘medium of exchange’, ‘store of value’ and ‘unit of account’. These functions heavily inform future monetary developments: A 2002 publication titled *The Future of Money* by the Organisation for Economic Co-operation and Development contained an essay by Riel Miller, Wolfgang Michalski and Barrie Stevens, in which they suggest:

‘...for most economists, money serves three classic functions – as unit of account, means of payment, and store of value. In the future there is little prospect of change in these basic attributes.’ (Miller, 2002, p.11)

Most mainstream economics texts appear to suggest that these ‘functions’ are almost intrinsic to money, that they cut through all cultural levels. Given the vast influence of the functions, what do economists mean by these terms? Below I have taken two explanations for each of the functions directly from contemporary economics textbooks.

1. Medium of exchange.

‘Money as a Medium of Exchange. Money’s primary function is to facilitate trade – the exchange of goods and services. This is called its medium of exchange function. Trade that involves the direct exchange of goods without the use of money is called barter...’ (Stiglitz, 2006, p.616)

‘The complexities of a modern developed economy, however, make barter totally impractical for most purposes (see Case Study 18.1 in MyEconLab). What is necessary is a medium of exchange that is generally acceptable as a means of payment for goods and services and as a means of payment for labour and other factor services. “Money” is such a medium.’ (Sloman, 2015, p.524)

2. ‘Store of value’.

‘A store of value is an item that people can use to transfer purchasing power from the present to the future. When a seller accepts money today in exchange for a good or service, that seller can hold the

money and become a buyer of another good or service at another time. ' (Mankiw, 2012, p.621)

'A means of storing wealth. People need a means whereby the fruits of today's labour can be used to purchase goods and services in the future. People need to be able to store their wealth: they want a means of saving. Money is one such medium in which to hold wealth. It can be saved.' (Sloman, 2015, p.524)

3. 'Unit of Account'

'A unit of account is the yardstick people use to post prices and record debts. When you go shopping, you might observe that a shirt costs \$30 and a hamburger costs \$3. Even though it would be accurate to say that the price of a shirt is 10 hamburgers and the price of a hamburger is 1/10 of a shirt, prices are never quoted in this way.' (Mankiw, 2012, p.621)

'Money as a Unit of Account: Money serves as a means of measuring the relative values of different goods and services. This is its unit of account function. If a laptop computer costs \$1,800 and a desktop computer costs \$900, then a laptop is worth twice as much as a desktop. People wishing to trade laptops for desktops will trade at the rate of one laptop for two desktops. Money provides a simple and convenient measure of relative market values.' (Stiglitz, 2006, p.616)

The two main issues with the economic functions presented above are: firstly, the explanations do not specify a certain cultural context in which these functions are being analysed (In section 2.5 I analyse the monetary paradigm within four historic cultural contexts). Rather they allude to contemporary contexts by mentioning hamburgers or laptops. Secondly, the functions are outlined in a very general way, which is out of character with the usual quantitative economic approach. As Zelizer rightly points out, *'The classic economic inventory of money's functions and attributes, based on the assumption of a single general-purpose type of money, is unsuitably narrow.'* (Zelizer, 1994, p.19).

The two issues are interrelated; the lack of specific cultural context and specific metric for understanding these functions is perhaps a method of avoiding the challenges associated with a plural monetary approach. This reductive approach simply does not accurately reflect the culturally derived currency system and limits our understanding of money. Hence, I refer to these functions from this point on as the 'functional axioms of money,'²⁴ because they appear to be stated as self-evidently true and applicable to all currency systems without giving specific examples within a given context or metric to determine the extent of their influence.

The functional axioms of money are how most economists define money, these have been propagated to become the de facto explanation. In part, the reliance on this explanation has limited understanding,

²⁴ In referring to the functions of money as 'the 'functional axioms of money' I am not refuting the functions' existence, but rather the idea that the three main functions are the only way to define money.

and confined future monetary developments to these general functional axioms. As a general case, this is a problem with all axiomatic descriptions of a particular technology. (Please see section 2.4 for a breakdown of this process).

In this thesis, I will treat the functional axioms as the ‘ring through our noses’, which is pulling us in a certain direction, whether we want to go or not.

Over the next section, I highlight the axioms’ extraordinary influence.

2.3 The axioms as longstanding assumptions

The functional axioms of monetary artefacts and currency systems are ingrained within economic thought; they have been observed for roughly 2,300 years, a timescale that gives the impression they are eternal. The functions can be traced back to Aristotle’s observations and suggestion that money came into being through international trade:

‘When the inhabitants of one country became more dependent on those of another, and they imported what they needed, and exported what they had too much of, money necessarily came into use...’

‘Of this the value was at first measured simply by size and weight, but in process of time they put a stamp upon it, to save the trouble of weighting and to mark the value.’

‘For coin is the unit of exchange and the measure or limit of it.’ (Aristotle, [350BC]2012, p.15)

In the passages above, Aristotle recognises that the main function of the coeval currency systems was to facilitate trade between nations. He goes on to suggest that this trade was made more efficient through a unit of account, by the stamping of the coins. However, he does not explicitly mention that money acts as a ‘store of value’, but alludes to it in a later passage:

When the use of coin had once been discovered, out of the barter of necessary articles arose the other art of wealth getting, namely, retail trade: which was at first probably a simple matter, but became more complicated as soon as men learned by experience whence and by what exchanges the greatest profit might be made. (Aristotle, [350BC] 2012, p.15)

The concepts of profit and ‘wealth getting’ are intrinsically linked to a long-term ‘store of value’.

Without this, wealth would evaporate. Hence Aristotle is one of the first people to write about the functional axioms of money. This reading of Aristotle is one that Joseph Schumpeter, the influential nineteenth-century economist, also suggested to be true:

'...his rule of equivalence in exchange naturally led him to observe that the Medium of Exchange will also be used as a Measure of Value. And finally he recognized, implicitly at least, its use as a Store of Value.' (Schumpeter, [1954] 2006, p.59)

Schumpeter states that Aristotle's writings have had a profound influence on economic thought:²⁵

'It is the basis of the bulk of all analytic work in the field of money. Therefore, we have every motive to make sure of our interpretation of Aristotle, whose personal influence in this matter is recognizable at least as late as A. Smith.' (Schumpeter, [1954] 2006, p.60)

The extraordinary influence that Aristotle's theory of money has had upon how economists define money is still observable today. For arguing that the functional axioms exist within Aristotle's writings solidifies them into a timescale that outstrips many religious books, including the Christian Bible (completed at around 300 BC) or the Koran (completed at around 600 BC).

It seems extraordinary that the three functional axioms of money can be traced back 2,300 years to Aristotle's original writings. Given the vast amount of knowledge and technology that has been developed since ancient Greek times, how has this one set of ideas been maintained over such vast timespans? Surely after 2,300 years, it is time for the functional axioms of money to meet the same fate as 'impetus' in projectile motion, and geocentric to heliocentric. Aristotle's notions on the place of the earth in the centre of the cosmos fell to Copernicus in the fifteenth century. His notion of impetus in projectile motion fell to Galileo in the sixteenth century. Although the functional axioms of money have been questioned by social scientists like Viviana Zelizer and anthropologist David Graeber (Graeber, 2011), design is the specialism best placed to deliver the final nail in the dusty old coffin, for this task, unlike Galileo's or Copernicus's, is one that falls into the cultural realm and is a phenomenon of our own making.

In the next section, I explain why the functional axioms of money are so successful. To address this question, I suggest that money presents itself to people from a young age as a universal phenomenon, an entity that is simply there, undermining the idea that it is in fact an entirely man-made creation.

²⁵ Schumpeter suggests Aristotle's theory of money is what would now be described as a Metallist Theory of Money.

2.4 Paradigm paralysis: The functional axioms of money.

In the previous sections I introduced the functional axioms of money, and then showed how they have been traced back 2,300 years, onto a timescale that pre-dates many religious texts. In this section, I propose that monetary development is limited by a paradigm paralysis, due to the extensive influence of the functional axioms of money. One reason why a large number of historical currency systems affirm the axioms is because of the biases people develop while learning about money within their inherited currency system.

The ubiquity of the functional axioms of money in currency systems is partly due to the vast amount of self-generated evidence that working currency systems create to reinforce them. Almost all historic currency systems appear to use a ‘medium of exchange’, ‘store of value’ and ‘unit of account’, even if the users of the system were unaware of these terms.²⁶ The prevalence of the seemingly universal

²⁶ The functions of money can be traced back to Aristotle’s writings. Within commodity based currency systems, the ‘store of value’ was often understood to mean ‘the money has intrinsic value.’

axioms of money is partly due to the difficulty of stepping beyond a functioning currency system's influence; people are trapped like a hamster on a wheel, paralysed in this paradigm. In a stable economic situation, the tangible, concrete working characteristic of a currency system presents a strong case for adopting a practical approach towards monetary development. For currency systems can be reviewed, analysed and the results discussed just like any empirical research. This observational approach is one that, Schumpeter suggests, Aristotle uses:

Aristotle's theory of money is a theory in the ordinary sense of this term, that is to say, an attempt to explain what money is and what money does. (Schumpeter, [1954] 2006, p.60)

The general observational approach taken by most economists in defining money, and by most people in understanding it, would fall into the philosophical problem of 'Hume's guillotine' or the 'is/ought gap'.²⁷ A premise that states 'this is money, hence this is how it ought to work' is a logical error that jumps from facts to values, without stating why it ought to be the case beyond the limited explanation: 'That's just what money is.'

Schumpeter reiterates a phrase originally coined by the nineteenth-century economist Francis Amasa Walker:

'Money is what money does' (Walker, 1889, p.1)

This simple statement alludes to a key characteristic of money, which is: as individuals, we inherit currency systems. We are born into a society, which already uses money. Hence, all individuals learn about money by observing what it looks like and what it does. These observations become tacit knowledge, like how we form tacit knowledge of gravity: for instance, learning how a ball bounces, but also the consequences of gravitational pull on our bodies that can lead to falls or trips and pain. Similarly, as children we witness the spending of money; we learn what it looks like, what it can do and how we can get it. We also learn the negative consequences of not having money, not getting the toy that we wanted, or witnessing the distress of a parent during financial hardship. When we are born into the world, money appears to play as important a role within life as gravity. And without it, our world might simply cease to be. Economists, policy makers, technologists all learn about money by observing what it is and what it does, from a very young age. This means that, at least in part, the functional axioms of money are embedded within a reinforcing feedback loop; biases from our early experiences with money are reinforced as the scope of currency systems and monetary artefacts increases.

However, in a fiat currency system this term has shifted to mean 'the money maintains its purchasing power.' The latter is the meaning that I used throughout this thesis when referring to 'store of value.'

²⁷ '...the distinction of vice and virtue is not founded merely on the relations of objects, nor is perceiv'd by reason.' (Hume, 1896, p.245).

Stretching the reinforcing feedback process over a timescale of more than 2,300 years mean that the amount of written evidence, and the functioning currency systems that affirm the functional axioms, make any suggestion that they might simply be highly successful man-made creations almost untenable. However, this is exactly what they are; money is made by humans. The argument that it is something more natural or universal, to which the functional axioms allude, is simply an illusion, maintained through deeply held beliefs over timespans unsympathetic to the human lifespan. It could be argued that early types of money evolved from necessity rather than a considered design. Nevertheless, money is still a product of human action. The perspective that currency systems and monetary artefacts are entirely man-made inventions, not some kind of universal phenomena, was outlined to a lesser degree to by Aristotle himself, as Schumpeter suggests.

'But in the Ethics, playing upon the Greek word for current coin (νόμισμα), he did state that money exists not by "nature" but by convention or legislation (νόμος), which seems to point in another direction.' (Schumpeter, [1954] 2006, p.60)

In conclusion, the functional axioms of money are caught up in a reinforcing feedback loop; economists like all people are air-dropped into a society; they observe money, which informs their understanding; and then they restate the observations within their specialism. However, although the functional axioms are extremely successful, the monetary paradigm to which they belong has not always been in harmony with the wider culture in which it exists.

Over the next few sections, I analyse the starting point of this paradigm and how it initially existed through coincidence and convince, but was later imitated, expanded and derestricted through a series of designed interventions and cultural shifts.

2.5 A brief history of monetary paradigm paralysis

In the previous section I suggested that the monetary paradigm has been caught in a reinforcing feedback loop, causing a paradigm paralysis. However, I show in the next section that this paradigm, although successful, has also often been at odds with wider cultural principles.

In the following four sections, I employ Bidney's definition of culture to unpack four significant

currency systems in the development of the longstanding monetary paradigm. Unlike the general uncontextualised economic definition of money (in section 2.2), analysing the monetary paradigm in specific cultural contexts shows how cultural values and monetary values have often been at odds with one another. Each of the four periods in history I analyse represents a significant development in the history of the monetary paradigm: from its Origin 2.51 to Imitation through legislation 2.52, Expansion through homogenised institutions 2.53 to, finally, the complete decoupling of culturally derived values from monetary ones 2.54.

2.51. Origin of the paradigm

2300 BC Athens' culturally discordant currency system

Ancient Athens and the currency system that informed Aristotle's writings. In this section I show Athenian culture was hostile towards monetary paradigm; hence, this was a marriage of convenience, not harmony.

2.52. Imitating the paradigm

1797 Britons' 'restriction notes' and the dawn of consumerism.

I then move on to eighteenth-century Britain at a time called 'the restriction period'. The first time in British history when gold was replaced with paper.

2.53. Expanding the paradigm

1944 The contrite Allies and desire for lasting peace

This section focuses on the Bretton Woods system, an internationally agreed monetary policy that would tie national currency systems together and create a homogenised currency system.

2.54. Derestricting the paradigm

1966 The devalued dollar and telecommunications.

Finally, I review the mainstream electronic fiat-based currency system operating in the UK today. I show that the application of innovation within the currency system has predominantly been directed towards speed and efficiency, or what payment experts term 'frictionless' transactions. Hence, the application of technologies has been mainly to expedite the prevailing monetary paradigm.

2.51 Origin of the paradigm

2300 BC Athens' culturally discordant currency system

As previously mentioned, fundamental aspects of the monetary paradigm, including the functional axioms of money, were originally observed and penned by Aristotle 2,300 years ago. Hence in this section I focus on the ancient Athenian currency system that informed Aristotle's influential writing. I look at what underlies Aristotle's observations by employing Bidney's definition of culture. In doing so I show the Athenian culture was hostile towards commerce; thus the currency system acted discordantly with wider Athenian culture. Meaning that Aristotle and the Athenians helped solidify a monetary paradigm into history that, in principle, they disliked.

Artefactual level:

Aristotle lived between 384 and 322 BC and spent the majority of his life in Athens.²⁸ The success of Athenian society was not solely down to ingenuity but also luck and good fortune in the form of silver, as Athens was geographically placed near the silver mines of Laurium, which enabled the city-state to mint its famous silver drachma. Hence, the historic significance and success of Athens appears to rest heavily on its monetary artefacts. Athens became the wealthiest city-state in ancient Greece, at one point amassing a cash reserve of 10,000 talents on the Acropolis (Osborne, 2000, p.37).²⁹

Sociofactual level:

The silver ore at Laurium, although privately excavated, was owned by the city (Osborne, 2000, p.36) and minted and distributed to citizens by the treasury Demos Trapeza, for state-related work (Michell, 2014, p.351), including jury pay and military service (Eagleton, 2007, p.29). Athens was one of the first city-states to mint its own coinage (Eagleton, 2007, p.26). The process of 'minting' was essentially a standardised way to communicate the size and weight of a piece of silver onto the coin. Prior to this innovation, metal ingots were weighed to determine the value and amount (Eagleton, 2007, p.19).

Aristotle suggested that the addition of minting or 'stamping' saved time:

'Of this the value was at first measured simply by size and weight, but in process of time they put a stamp upon it, to save the trouble of weighing and to mark the value.' (Aristotle, [350BC] 2012, p.15)

Although originating from the state, Athenian silver coinage became a highly successful medium of exchange not only within the borders of Athens or Greece, but in the wider world, where traders valued the silver coinage for its resale value (Osborne, 2000, p.39).

²⁸ Editors, B. C. 2016. Aristotle Biography [Online]. The Biography.com website: A&E Television Networks. Available: <http://www.biography.com/people/aristotle-9188415>

²⁹ One Greek talent is roughly 26kg. 10,000 talents roughly equate to 260,000 kg. The cost of 1kg of silver today is about £422. Therefore the cost of buying that amount of silver today is roughly £109,720,000.

Mentifactual level:

The predominant mentifacts informing the policies and approach to the Athenian currency system appear conflicted. On the one hand, the wealth and power that came from the highly desirable silver drachma enabled Athens to prosper. However, the idea of commerce was not something held in high regard; this is highlighted by Scott Meikle, in his paper, ‘Aristotle on money’:

‘It is true that ancient society was not a market economy, and that fact must always be held firmly in mind in considering matters of this kind... the culture was inhospitable to the values of commerce, and they were not admired or publicly applauded, nor was public policy constructed with them at its heart.’ (Meikle, 1994, p.31)

The hostility towards commerce can be seen in the following passage from Aristotle:

‘Hence men seek after a better notion of riches and of the art of getting wealth than the mere acquisition of coin, and they are right. For natural riches and the natural art of wealth-getting are a different thing: in their true form they are part of the management of a household: whereas retail trade is the art of producing wealth, not in every way, but by exchange.’ (Aristotle, 2012, p.16)

Aristotle appears to be suggesting that ‘wealth getting,’ through trade, where the accumulation of coins is the aim, has no limit, and is at odds with the reality of day-to-day living, where distinct limits exist. Bearing this in mind, the Athenian currency system appears discordant with the wider Athenian culture, thus it was essentially a marriage of convenience.³⁰ It is therefore ironic that Aristotle’s observations would inform a theory of money that centred on commerce, to which Aristotle himself was critical.

In summary, the silver drachma had inbuilt functions that enabled commerce to flourish.³¹ Even though the Athenians disliked commercial values, they exploited the human desire for pretty, shiny, scarce materials³² to help organise society. They were simply being pragmatic. However, given the knowhow and technical ability, would they have chosen to design a more culturally resonant currency system?

³⁰ Louis Sullivan’s famous design quote ‘form follows function’ would not be applicable to the currency system in ancient Athens; a more fitting version would be ‘function dictated by form’.

³¹ Silver and gold were the foundations of the terms ‘medium of exchange’, ‘store of value’ and ‘unit of account’.

³² The use of silver and gold as monetary artefacts existed long before the creation of the drachma through institutions like Demos Trapeza. The Mesopotamians traded silver ingots as early as the 24th century BC (Eagleton, 2007, p.16).

2.52 Imitating the paradigm

1797 Restriction period and the birth of consumption

In this section I analyse a significant point in British history, which saw the connection to precious metals briefly severed: the ‘restriction period.’ This was a turning point in British monetary history, which showed that the design of currency systems, through institutions and government policy, could replicate the characteristics of precious-metal-based monetary artefacts through paper ones.³³ Unlike the culturally discordant Athenian currency system, the general mentifacts in Britain were beginning to reflect the principles of trade, commerce and consumption.

‘...the value of a yellow metal, originally chosen as money because it tickled the fancy of savages, is clearly a chancy and irrelevant thing on which to base the value of our money and the stability of our industrial system’ (Robertson, 1922, p.128)

It should be noted that although the restriction period challenged the established economic thinking and reliance on commodity based currency within Britain. Older civilisations used credit based currency systems thousands of years prior. Anthologist David Graeber, writes:

“The most shocking blow to the conventional version of economic history came with the translation, of Egyptian hieroglyphics, and then of Mesopotamian cuneiform... What these texts revealed was that credit systems of exactly this sort actually preceded the invention of coinage by thousands of years.” (Graeber, 2011 p38)

Nevertheless, these recent discoveries only inform us that in hindsight, the restriction period’s adhoc fiat currency and the functional axioms of money were not only unoriginal, but historically inaccurate. However, its impact on contemporary economic thought was nevertheless profound.

Artefactual level:

Although the invention of the printing press in 1440, by Gutenberg, instigated a new technological

revolution that enabled the mass production of paper monetary artefacts, banknotes were predominantly used as a proxy for the transfer of large amounts of gold and silver rather than a substitution for the gold or silver itself.³⁴

Gold remained king, until a brief time in British history called the ‘restriction period.’³⁵ This was the first time in British history that the characteristics of the precious-metal monetary artefacts were replicated by the monetary sociofacts. The intrinsic qualities of gold were replaced by legislation and the institutions of government, treasury and bank. Smaller denominations of paper notes would be put into circulation; prior to 1797 the lowest denomination banknote in circulation was £10, however, during the restriction period, both £1 and £2 notes were created (Eagleton, 2007, p.222). The effect of restriction was by and large successful in increasing the gold reserves of the Bank of England, with few of the assumptions associated with such a policy coming to fruition:

‘It had been proved that bank-paper did not depend for its credit merely on its convertibility. Month after month had passed away, not only without bringing depreciation, but even rapidly increasing the stream of precious metals which flowed towards England...’ (The North American Review, 1867, p.402)

Sociofactual level

The connection to gold, or the ‘fancy of savages’, would be halted for the first time in Britain, through not design but desperation. This change to the currency system was a reaction to the economic strains that were instigated by war with France: *‘The great war... accompanied by violent commercial crisis throughout Europe, which caused in England a great number of bankruptcies, and a heavy fall in price’ (The North American Review, 1867, p.396)*. The substitution of paper for gold across the entire country was in part possible because of the way the banking system in Britain was linked to a central institution:

‘In 1797, there were about three hundred and fifty such country banks in England and Wales, most, if not all, of which were banks of issue; and as they were always liable to be called upon to redeem their notes either in gold, in Bank of England notes, or in bills of exchange drawn on London, it is evident that their circulation was subject to all the variations of the London money-market.’ (The North American Review, 1867, p.394)

Although the Bank of England managed to maintain the convertibility of the banknotes relatively successfully throughout the first years of the war, the wars with America and France had severely

³⁴ In England towards the end of the 17th century, the first circulating paper notes came from merchants depositing cash to the goldsmith. These credit notes would then circulate and be used as payments. Ibid. page 177.

³⁵ The restriction period operated from 1797 till 1821 ibid. page 222.

depleted the Bank's gold reserves (Williams, 2007, p.221), with the final straw eventually coming in 1797:

'An ungrounded alarm of French invasion caused a run upon the banks of Newcastle, and obliged them to suspend payment. From Newcastle, the panic spread in all directions. Every country bank rushed to the Bank of England for assistance or for gold... Hopeless of averting their fate, the directors at last sent word to Mr. Pitt that suspension was inevitable; and on the morning of Monday, the 27th of February, an Order in Council, issued the preceding day, was posted on the doors of the Bank, forbidding further payments in cash.' (*The North American Review*, 1867, p.398)

The restriction period lasted for twenty-four years, during this time the Bank of England only exchanged banknotes for banknotes in the domestic sphere, using gold reserves in the international sphere against imports and exports.

Mentifactual level:

The eighteenth-century mindset in Britain regarding commerce was conflicted in much the same way as the Athenians were towards the art of 'wealth getting' through exchange. Each employed a currency system that encouraged values that the wider culture held in contempt.³⁶ However, the seeds of a mindset that resonated with the values of commerce and consumerism were planted in 1714. The publication of a book called *The Fable of the Bees*, by Bernard Mandeville, illustrates this shift and marked the beginning of laissez-faire economics.³⁷ Mandeville's fable argued against the doctrine of the Church, which was critical of excessive consumption. The fable concludes with 'the moral':

Then leave Complaints: fools only strive

To make a Great and honest Hive.

...

³⁶ Being members of a predominantly Christian society, 18th-century Briton's will have listened to sermons that warned about the evils of money, such as 'For the love of money is a root of all kinds of evil. Some people, eager for money, have wandered from the faith and pierced themselves with many griefs.' (The Bible, 1 Timothy 6:10).

³⁷ 'In *The Fable of the Bees* Mandeville maintains, and maintains elaborately, the theory at present known as the laissez-faire theory, which dominated modern economic thought for a hundred years and is still a potent force.' (Kaye, 1922, p.105).

*So Vice is beneficial found,
 When it's by Justice lopt, and bound;
 Nay, where the People would be great,
 As necessary to the State
 As Hunger is to make 'em eat.
 Bare Vertue can't make Nations live
 In Splendour: they, that would revive
 A Golden Age, must be as free,
 For Acorns, as for Honesty.* (Mandeville, [1714] 1732, p.76)

Although heavily criticised and condemned at the time,³⁸ Mandeville's fable marked a turning point towards the consumerist society. It seems fitting, then, that the unlimited desires driven by 'vices' would be liberated from doctrine in the same century that money was liberated from the finite limiting influence of gold or silver. However, it would be some time before that tie was completely broken, as the restriction period lasted only twenty-four years and operated only within Britain.

In summary, the restriction period showed that the characteristics embedded within the precious metals of Athenian monetary artefacts could be replicated with paper, provided the sociofacts were strong enough to enforce this new monetary artefact. However, although the money changed from gold to

³⁸ Many prominent thinkers of the time criticised Mandeville's fable, including the father of economics, Adam Smith: '*Mandeville imagines that he has entirely demolished the reality of the virtues of temperance and chastity... But those virtues don't require that one be entirely numb to the objects of the passions they try govern. They aim only at keeping the violence of those passions below the level at which they might harm the individual or disturb or offend society.*' (Smith, [1759] 2011, p.162).

paper, the core mentifact that constituted the functional axioms of money did not change. In fact, this is the point in history where the wider culturally derived mentifacts, hostile to commerce, were altered. Mandeville's *Fable of the Bees* chimed with laissez-faire economics.

2.53 Expanding the paradigm

1944 The contrite Allies and desire for lasting peace

In this section, I examine the Bretton Woods system and the founding of the first global financial institutions. The design of the Bretton Woods system shifted the scope from national to global. Thus the core principles behind the longstanding monetary paradigm would be imbued with a utopian aim that moved the rational beyond self-betterment towards the collective good. The mentifact behind this shift was the rethinking of trade and commerce from drivers of national prosperity, towards drivers

behind global peace and international prosperity.

Artefactual level:

One year after the 1944 Bretton Woods Conference at New Hampshire, in the north-eastern United States, the pound sterling, Finnish markka, Norwegian krone, Greek drachma, Swiss franc and another twenty-nine national currencies were tied together within the Bretton Woods system.³⁹ Although each of these currency systems were already remarkably similar, comprised of monetary artefacts made up from coins and banknotes,⁴⁰ the Bretton Woods system standardised their relationship to one another.

Sociofactual level:

A major significance in the design of the Bretton Woods system is that it led to the creation of two financial institutions that would operate on a global scale to facilitate international trade: the IMF (International Monetary Fund) and World Bank. In its current form, the IMF states its purpose:

*'The International Monetary Fund (IMF) is an organization of 189 countries, working to foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.'*⁴¹

The IMF helped facilitate international trade by limiting national protectionist monetary policies. This was initially achieved by linking each currency to the dollar and the dollar to gold, at predetermined levels that would only change if a 'fundamental disequilibrium' existed.⁴² This semi-homogenised world currency system was intended to increase international trade, and reduce the negative impact of trade from competing domestic monetary policy.

Mentifactual level:

The motivation behind the Bretton Woods system was to prevent the economic climate that had led to the horrific events of World War Two. One of the influential thinkers behind this strategy was the economist John Maynard Keynes. In his book *The Economic Consequences of the Peace*, published after World War One and the Peace Conference, he outlined his opposition to the terms surrounding

³⁹ IMF. 2017. List of Members [Online]. Available: <http://www.imf.org/external/np/sec/memdir/memdate.htm>.

⁴⁰ Prior to the outbreak of World War Two, most nations operated a gold standard; however at the outbreak of war many severed this link and became fiat currencies'. A good overview of the history of sterling can be found here: <http://www.telegraph.co.uk/news/1399693/A-history-of-sterling.html>

⁴¹ About the IMF [Online]. Available: <http://www.imf.org/external/about.htm>

⁴² IMF. Cooperation and reconstruction (1944–71) [Online]. Available: <http://www.imf.org/external/about/histcoop.htm> 2014].

the Treaty of Versailles.

'The future life of Europe was not their concern; its means of livelihood was not their anxiety. Their preoccupations, good and bad alike, related to frontiers and nationalities, to the balance of power, to imperial aggrandisements, to the future enfeeblement of a strong and dangerous enemy, to revenge, and to the shifting by the victors of their unbearable financial burdens on to the shoulders of the defeated.' (Keynes, 1920, p.39)

Keynes' assessment of the Treaty of Versailles proved to be extremely influential, especially considering the hyperinflation that had preceded the war and treaty. The economic strife of the German population proved invaluable in swaying mindsets towards a darker path; in *Mein Kampf*, Hitler writes:

'Each point of that Treaty could have been engraved on the minds and hearts of the German people and burned into them until sixty million men and women would find their souls aflame with a feeling of rage and shame; and a torrent of fire would burst forth as from a furnace, and one common will would be forged from it, like a sword of steel. Then the people would join in the common cry: "To arms again!"' (Manheim, 1943)

This haunting paragraph, by a man who instigated the next world war, highlights Keynes' astute and forward thinking during the peace conference. Although Keynes' opinions were overlooked during the conference in 1919, his ideas had a profound influence during the Bretton Woods Conference:

'Keynes came to think that, if there were an international monetary system that did not pit the interests of countries against each other, and if states could and did pursue economic policies to promote full employment, then there would be no economic causes of war (other perhaps than population pressure).' (Markwell, 2009)

Fig.8: Lord Keynes Addressing Bretton Woods Meeting (IMF, 1944)

Fig.9: Delegation Chairmen Group Shot (IMF, 1944)

The motivation and reason behind the Bretton Woods system was laudable; however, the downside of this system was a diminished diversity of currency systems. If imagining alternatives was difficult before, then mitigating one that encompasses the entire globe is far more difficult.

In summary, the nations that signed up to the Bretton Woods system effectively created a large homogenised currency system. Although the monetary artefacts did not change, the currency system did. National currency systems were tied to the dollar, and all dollars were tied to gold; thus, tied to the 'medium of exchange', 'store of value' and 'unit of account' functions of money. The laissez-faire economics that these functions facilitated was now regulated internationally through the sociofactual institution of the IMF, rationalised with the mentifact that international trade and prosperity enable peace.

2.54 Derestricting the paradigm

1971AC The age of fiat money and consumption at all costs

In this section I analyse the mainstream electronic fiat currency system operating today, while also reviewing its origin. This final section focuses on the derestriction of the monetary paradigm on the sociofactual level ('Nixon shock' and the financial 'Big Bang'), informed by new economic mentifacts of neo-liberalism. However, firstly I focus on the artefactual level and the technological innovation within telecommunications that enabled a shift from monetary artefacts with intrinsic characteristics to monetary artefacts with designed characteristics. Although technology now enabled money to be completely redesigned, the technology was implemented to expedite the longstanding monetary paradigm.

Artefactual level:

Coins and banknotes now make up only 3% of all money within the UK economy. The other 97% exists in a digital form. The vehicle that facilitated this shift from autonomous floating monetary artefacts to institutionally dependent monetary artefacts was telecommunications and the various technologies that facilitate communication between bank accounts at point of sale. Unlike precious metals, digital money has no intrinsic qualities. Hence in theory, it is only bound by the limits of the technology and design. In practice, the prescriptive cultural system heavily informs monetary development (as mentioned in section 1.2). Thus, trust in this technology has taken a long time to establish. The specific monetary artefact that paved the way was the payment card, specifically the

credit card.⁴³ This monetary artefact, as I will show, served as both a saleable item and a vehicle for future technologies.

The first UK credit card was introduced on June 29th 1966 by Barclaycard; this credit card service brought a universality to old store cards (see Fig.26) (UK Card Association, 2015). Adoption of the bank credit card in America rose steadily, from 16% of families in the 1970s to 68% of families in 1998 (Durkin, 2000). Unlike nationally created coins and banknotes, the credit card was a privately owned endeavour and hence a saleable item in and of itself. Adoption relied upon people knowing what it was and what it did, but also in believing that owning one made you better than those who still used cash. Thus advertising became critical in driving adoption.

⁴³ This thesis does not have the scope to go into ‘deferred payments’, hence here I use the credit card to talk about the development of the technology that has led to a substantial decline in cash payments.

Fig.10, 11, 12, 13: Screen shot from Barclaycard Advert

The film shows two businessmen paying for a hotel room. The man on the left is using cash and the man on the right a Barclaycard. The man on the left does not have enough cash.

The early cards promoted through these adverts utilised mechanical technologies, like the manual imprinter.⁴⁴ As new technologies developed they were integrated into the card. Plastic proved to be a perfect material for these monetary artefacts; cheap and durable, and new technologies could be incorporated alongside the old. Indeed, new layers of technology were being integrated at a rapid pace.⁴⁵ In 1969 IBM developed a method of adhering magnetic strip to a plastic card (Fig.27) and

⁴⁴ The manual imprinter was a machine that pressed carbon paper against raised characters on the payment card to transfer payment details to the seller.

⁴⁵ Relative to the speed of development in older monetary artefacts (for instance coins and banknotes).

banks began to integrate this technology into their systems (IBM, 2015).⁴⁶

Adverts promoting the payment cards and the technology soon moved beyond simply highlighting the benefits of credit cards over cash payments. In the following decades, Barclaycard adverts started employing less subtle marketing techniques to encourage adoption. The card was sold as a facilitator of people's fantasies. As such the 1980s Barclaycard adverts starred TV presenter Alan Whicker in various exotic holiday destinations.

⁴⁶ Lloyds Bank was the first to use plastic cards affixed with magnetic strips in conjunction with an online verified ATM. By the 1990's, almost all payment cards incorporated a magnetic strip (UK Card Association, 2015).

Fig.14, 15, 16, 17: Screen shot from Barclaycard Advert

A 1980s Barclaycard advert. In the sequence above, Alan Whicker is on a beach surrounded by scantily clad women. While other holidaymakers struggle to pay for things, he does not.

Figs. 18, 19, 20, 21: Screen shot from Barclaycard Advert.

The 1990s Barclaycard adverts adopted a James Bond-inspired fantasy. Rowan Atkinson plays a British Bond agent who meets 'Q,' who provides him with the latest field gadgets, including a Barclaycard. 'Q' shows Atkinson's character a map of cities that accept Barclaycard (Fig.21).

In 2002, chip and pin was announced in the UK, the biggest change since decimalisation (see Fig.28) (UK Card Association, 2015). Although the new chip and pin scheme was predominantly instigated to tackle card fraud (UK Card Association, 2016), the payment providers seemed to prioritise trade above most other factors.

An example of the payment providers' priorities can be seen a couple of years after chip and pin's launch. In 2004 MasterCard offered a 'quick payment service', which waived the need for a signature on smaller payments,⁴⁷ allowing the retailer instead to simply swipe the card to take the payment, somewhat undermining the security features of chip and pin.

⁴⁷ MasterCard International 'Quick Payment Service Program Guide', published 31st March 2004 [Online]. Available: <http://alpinepaymentsystems.com/file/Best%20Practices/QPS%20Overview.pdf>

Figs.22, 23, 24, 25: Screen shot from Barclaycard Advert.

The next technological update to the payment card was near field communication.⁴⁸ The 2008 Barclaycard advert focused on promoting this new technology's speed. The advert follows an office worker in the city travelling home via a huge waterslide, and buying things as he travels using his 'contactless' Barclaycard.

The plastic card as a monetary artefact was proving to be extremely versatile. New technologies like NFC (see Fig.29) could be integrated alongside the old, rather than replacing them. The imprinter, the magnetic strip, chip and pin and NFC all now exist on one card.⁴⁹ Although this policy undermines security, it highlights the cultural priorities at work, the priority of the trade and expansion of the monetary paradigm. To remove these old technologies would potentially diminish the ability of customers and traders to finalise the transaction at point of sale.

All these technological developments focused on increasing speed of transactions (except for chip and pin). In May 2012, MasterCard Advisors posted a press release that outlined the results of a PayPass

⁴⁸ NFC employs electromagnetic induction to exchange information between the card and card reader.

⁴⁹ Renowned payments expert Dave Birch has suggested this is ludicrous from a security point of view: 'We take that super secure chip and bond it with a trivially counterfeitable magnetic strip, and for very lazy criminals we still emboss the card.' (Birch, 2012).

adoption study.⁵⁰ The research showed that within the first twelve months of a customer adopting MasterCard's contactless service, the adopter spent almost 30% more on average (Advisors, 2012).⁵¹ Similarly to this research, the NFC Forum⁵² states that one of the benefits of NFC for retail is to *'Engage shoppers in store to increase consumer-product interactions and impulse purchases'*.⁵³

In summary, the plastic payment card is the perfect monetary artefact to usher in the digital money age. It is cheap, durable and malleable to the integration of other newer technologies. The plastic payment card acted as a platform for new technologies that expedited the longstanding monetary paradigm. However, the next generation of monetary artefacts to supersede the card will likely be the smartphone. As David Birch states:

'Cards transformed the payments world but they did not, as was once thought, spell the end for cash... it is the specific technology of the mobile phone that will bring us monetary revolution.' (Birch, 2017, p.95)

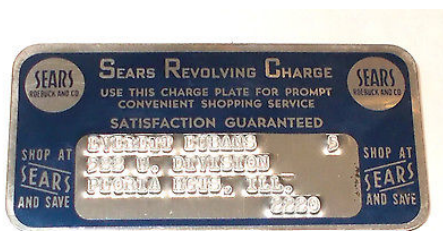


Fig.26: Vintage Sears Charge Plate

⁵⁰ PayPass was MasterCard's 'contactless' payment scheme; it was their branding for 'near field communication.'

⁵¹ 'Research Links Contactless Technologies Such As PayPass With Top-of-Wallet Behavior.' By Mastercard Advisors. An overview of this research can be found here:

<https://newsroom.mastercard.com/press-releases/new-mastercard-advisors-study-on-contactless-payments-shows-almost-30-lift-in-total-spend-within-first-year-of-adoption/>

⁵² The NFC Forum was set up in 2004 as a platform to standardise NFC payments.

⁵³ Forum, N. 2015. About the Retail SIG [Online]. nfc-forum.org.

Available: <http://nfc-forum.org/retail-sig/>.



Fig.27: IBM magnetic strip prototype



Fig.28: CP8 Honeywell Bull smartcard

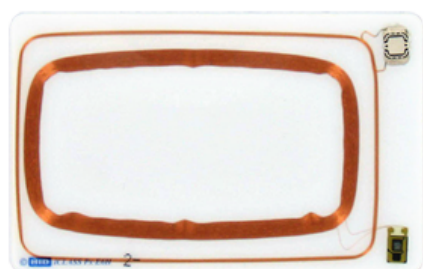


Fig.29: Transparent NFC payment card

Sociofactual level:

The shift from autonomous monetary artefacts to institutionally dependent monetary artefacts arose

alongside a sociofactual shift, the end of the Bretton Woods system. In 1971, Richard Nixon was forced to sever the last link to gold (Ghizoni, 2013). The dollar had been overissued and overvalued, to the point that the level of gold in the federal reserve was insufficient, causing sporadic runs on the dollar and negatively impacting the American economy. This policy change effectively meant that all national currencies pegged to the dollar were forced to become fiat currencies.⁵⁴ Currencies began to float against one another, ushering in a global fiat currency system regulated through the IMF and World Bank. The IMF states:

*'Since the collapse of the Bretton Woods system, IMF members have been free to choose any form of exchange arrangement they wish (except pegging their currency to gold): allowing the currency to float freely, pegging it to another currency or a basket of currencies'*⁵⁵

Another significant sociofactual shift that occurred during this time was the reduction of the state in overseeing monetary matters and an increase in the private sector's involvement. In the 1980s Margret Thatcher's government instigated the deregulation of commercial banking services from higher-risk ventures. One such rule was the 'single capacity' rule:

'...which enforced a separation between brokers acting as agents for their clients on commission and jobbers who made the markets and theoretically provided liquidity by holding lines of stocks and shares on their books; the requirement that both brokers and jobbers should be independent and not part of any wider financial group' (Lawson, 2006)

The result of this deregulation was the explosion of market activity due to the annulment of such rules; this period became known as the 'Big Bang'.⁵⁶

⁵⁴ Fiat currency has no intrinsic value; it is money established by government and law.

⁵⁵ IMF. The end of the Bretton Woods System [Online]. International Monetary Fund. Available: <https://http://www.imf.org/external/about/histend.htm>.

⁵⁶ The term 'Big Bang' was coined to signify the sudden jump in market activity experience as a result of deregulation. Market turnover per day, prior to deregulation in 1986, was around £1.25 billion; by 1989 turnover had jumped to £4.5 billion. (Bulletin, 1989, p.50)

Mentifactual level:

The artifactual changes in the form of electronic payment devices, and the sociofactual changes from the Bretton Woods system to the global fiat currency system, occurred alongside a shift on the mentifactual level. During the late 70s and early 80s the combination of uncompetitive nationally controlled industries and economic stagnation pushed post-war Keynesian economic policies out of vogue. Free market economists like Milton Friedman and Friedrich Hayek became influential to Ronald Reagan and Margaret Thatcher's economic neoliberal policies.⁵⁷ Friedman promoted deregulation and small government:

'...the approach has been to regard any market failure, however minor, as a sufficient excuse for government interventions, the market has failed therefore the government should step in. But this is a basic error, because it involves a double standard, there is not only such a thing as a market failure, there is also a government failure... The cure maybe worse than the disease.' (cmmorty99, 2011)

Friedman's exception to this stance was the active involvement of governments in maintaining liquidity:

'The great depression was produced by government, by a failure of monetary policy. It was produced by a failure of the federal reserve system to act in accordance with intentions of those that established it... the facts were, that from 1929 to 1933, the total amount of currency in the United States... declined by one third... the constitution of the United States gives power to Congress to coin money and set the value therefore. It was in the management of this fundamental function that government failed and produced the great depression.' (Broker, 2013)

Thus, for Friedman, the role of government intervention was boiled down to one of supplementing money into the marketplace. Friedman's and Hayek's theories greatly influenced the governments of Britain and America to deregulate and decouple governmental involvement with the market. This neoliberal idea, that an economy is at its most prosperous when individuals and private institutions are left to their own devices, brought the laissez-faire economics that resonated with Bernard Mandeville's controversial eighteenth-century publication *The Fable of the Bees* into mainstream governmental policy.

However, despite the benefits of the laissez-faire economics it did not come without its fair share of problems. The issues of free market economics alongside embracing vices as a motivating force for productivity were personified by one prominent stock trader during the 80s. In the same year as the financial 'Big Bang,' 1986, Ivan Boesky gave a speech at the University of California, Berkeley:

⁵⁷ John Ranelagh wrote of one Conservative Party meeting, in which the new leader Margaret Thatcher took out a book from her briefcase: '...held up the book for all of us to see. "This," she said sternly, "is what we believe," and banged Hayek down on the table.' (Ranelagh, 1992).

'Greed is all right, by the way. I want you to know that. I think greed is healthy. You can be greedy and still feel good about yourself.' (Greene, 1986).

A few months after giving this speech, Boesky was arrested for stock manipulations. He was sentenced to three and a half years in prison and fined \$100 million. (Sterngold, 1987).

In the next section I summarise what the four previous sections have highlighted.

2.6 Culture resonating with money, due to the paradigm paralysis

Over this section I give an analysis of the four previous sections, outlining a general case surrounding the historical interplay between the monetary paradigm and the cultural aspects of a given society. I suggest that the monetary paradigm, which encompasses the functional axioms of money, was initially incongruous to many aspects of coeval culture; however through a paradigm paralysis, culture has shifted to resonate with the functional axioms of money rather than vice versa.

Sections 2.51 and 2.52 show that the monetary paradigm has, historically speaking, often been at odds with many cultural aspects of society, leading other culturally derived principles and values to exist as adjuncts to the monetary paradigm, in the form of additional laws or policy. For instance, the Athenian Society did not embrace principles of 'wealth getting' (Aristotle), even though the silver drachma provided a highly successful 'store of value'. Likewise, the general principles in eighteenth-century Britain were at odds with the notion of unfettered consumption, facilitated by an unrestrained medium of exchange. These examples, and many throughout history, show that the monetary paradigm that includes the functional axioms of money – medium of exchange, store of value, unit of account – have often been incongruous to the principles held by the wider culture. One reason that this incongruity endured was because no viable alternatives existed, possibly due to the limits of monetary technological advancement, imagination or economic understanding. Thus, the monetary paradigm could not change; rather culture begin to harmonise with it.

The turning point in this deep-seated disparity chimed with the publication of Mandeville's *Fable of the Bees*. Mandeville exposed the lowest common denominators behind the motivation for a prosperous state that utilised the current conception of money. Through his work, Mandeville initiated a harmonisation between the intrinsic functions within the monetary paradigm and the wider mentifacts within a society. Sections 2.53 and 2.54 show that the theories developed by economists like Keynes, Hayek and Friedman served to rationalise and synthesise the tenets outlined by Mandeville. In fact, John Maynard Keynes cited Mandeville directly in *The General Theory of Employment, Interest and Money* to illustrate that the idea of consumption driving employment is nothing new (Keynes, 1936, p.222). Friedrich Hayek, the economist who inspired many of Margaret Thatcher's economic and political policies, dedicated a chapter to Mandeville in his book *New Studies in Philosophy, Politics, Economics and the History of Ideas*: he states '*Mandeville for the first time developed all the classical paradigmata of the spontaneous growth of orderly social structures*' (Hayek, 1991, p.80). Hayek goes on to contextualise Mandeville's achievements against the failure of the ancient Greeks to achieve the

same ends:

'The ancient Greeks, of course, had not been unaware of the problem which the existence of such phenomena raised; but they had tried to cope with it with a dichotomy which by its ambiguity produced endless confusion' (Hayek, 1991, p.79)

The 'dichotomy' to which Hayek referred was the ancient Greek notion that the things in the world could be divided into 'natural,' occurring from nature, and 'artificial', occurring from man. Hayek argues this left *'no distinct place for any order which was the result of human actions but not of human design'* (Hayek, 1991, p.80). Here Hayek's assessment seems accurate; however, it overlooks the influence that monetary functions have upon human actions, as functions intrinsic to any device enable or prohibit actions and thus influence behaviour and consequently shape society. Hence, Hayek's analysis is correct; however, it is inward-looking and fails to acknowledge that the functions of money enable and disable certain actions. Perhaps the ancient Greeks, given the technological knowhow, could have created a different type of money with functions that resonated with the wider cultural priorities. Not designing all human actions; rather encouraging or enabling the actions of the people that the culture regarded as desirable.

The 2,300-year-old monetary paradigm that constitutes the functional axioms of money has facilitated vast technological advancements and social change. However, it can also be a means to an end – it has enabled us to come this far – but it is not necessarily the monetary paradigm that will get us any farther.

In the next section, I highlight that the functional axioms are not absolute but malleable.

2.7 Limitations of complementary currency systems

In this section I review complementary currencies and alternative currency systems that have tentatively altered the functional axioms of money. Hence this section begins to explore alternative monetary theories that relate to RQ1: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

The term ‘complementary currencies’ was popularised by Bernard Lietaer, in his book *The Future of Money*:

‘First and foremost, these money innovations are not attacking the official money system. What they do instead is complement the conventional money system, providing new tools that can operate in parallel with it, without replacing it. That is why I call them “complementary currencies”, and not “alternative” ones.’ (Lietaer, 2013, p.3)

Lietaer advocates the use of complementary currencies that operate alongside the main currency system, arguing that alternative currency systems will likely be destroyed by the central authority, as they will be a threat. However, the problem with the complementary approach regarding the focus of this thesis is that these systems operate within the same monetary paradigm as the mainstream currency system; hence most do not radically alter the functional axioms of money, only shift them slightly.

In this section I give an overview of some prominent complementary currency systems and alternative counterparts, which have shifted the scope of the functional axioms. I have split the section into two categories: currency systems that limit the ‘medium of exchange’ function, and ones that limit the ‘store of value’ function. I have excluded alternative-value-based currency systems and

cryptocurrencies.⁵⁸

Limiting the ‘medium of exchange’: local complementary currency systems

Local complementary currency systems have recently exploded in popularity.⁵⁹ But why not just use sterling? The statement on the homepage of the Cardiff pound indicates the general intention:

‘Keep our cash in Cardiff.’⁶⁰

The mentifact informing the Cardiff Pound is based on a belief that money can too easily move beyond the locality where the value is created, thus a belief in economic localism. Hence, these local complementary currencies use an altered monetary artefact to limit the ‘medium of exchange’ function. This works by limiting the coins’ acceptance at point of sale. Although it carries the same value as the pound sterling, the Cardiff pound coin has local signifiers, like the Welsh dragon stamped into the face. Thus, Cardiff pounds are only accepted in shops that are involved with the scheme (all located in Cardiff). The system works in the same way as the Lewes Pound:

‘The Lewes Pound is essentially a voucher or token that can be traded locally as a complementary currency and used alongside Pounds Sterling... Money spent locally circulates within, and benefits the local economy. Money spent in national chains doesn’t. The Lewes Pound encourages demand for

⁵⁸ Currency systems like E-gold, or Liberty dollars and time banking, do not alter the functional axioms but rather use alternative-commodity-based systems, for instance gold or time. As for cryptocurrencies, I have not come across any that alter the functional axioms; Bitcoin is based on a mining concept that echoes the creation of coinage within a gold standard. (Adminadam, 2017).

⁵⁹ For example; the Bristol Pound, Brixton Pound, Calderdale Green Currency, Exeter Pound, Eko issued in the Findhorn Ecovillage, Lewes Pound, Stroud Pound, Totnes Pound and the Cardiff Pound.

⁶⁰ Available online: <http://cardiffpound.co.uk>.

local goods and services.’⁶¹

Looking at the sociofactual level, it becomes clear that the sub-culture driving the creation of the Cardiff Pound is not the usual financial service providers. The organisations behind these endeavour are ones that have experienced the negative impact of a lack of money in Cardiff; for instance, Cadwyn Housing Association is a prominent supporter of the initiative.

Although complementary currency systems like the Cardiff Pound have reduced the ‘medium of exchange’ function, they have not profoundly altered how money functions, only taken the historical precedent and deliberately applied the same type of alteration by contracting the ‘medium of exchange’ function.

Limiting ‘store of value’: alternative demurrage currency systems

Shifting from complementary currency systems to alternative currency systems, this section focuses on alternative currency systems that have altered the ‘store of value’ function of money, through the implementation of a concept called demurrage.⁶² The economist who proposed this monetary concept was called Silvio Gesell. Gesell was a merchant, who lived in Argentina during the 1890 depression, known as the ‘Baring Crisis,’ which saw an 11% drop in the economy and heavily affected Gesell’s business. Witnessing this depression, he concluded that a compounding factor during economic crises is that individuals stop spending money and start hoarding it, which simply compounds the collective economic hardship:

‘Money makes exchange possible, and exchange is complete only when two producers have exchanged their products. When a producer has sold his product for money, exchange is not yet complete; someone is in the market waiting for him. The purpose of money demands that the sale of a product for

⁶¹ ‘What it is’ the Lewis pound. 2014. [Online]. Available: <http://www.thelewespound.org/what-it-is/>.

⁶² A cost associated with hoarding money.

money shall immediately be followed by the purchase of a product with money, to complete the exchange. Anyone hesitating with his purchase leaves exchange incomplete and interrupts a sale for another producer. This is a misuse of money. Without purchase there can be no sale, therefore, if money is to fulfil its purpose, purchase must follow step for step on the heels of sale.' (Gesell, 1918, p.112)

Hence, Gesell instigated a new mentifact, in that the 'store of value' function of money is the main protagonist of this problem of the 'misuse of money'. After devising this new mentifact, he proposed a concept that became known as 'demurrage':

'Our goods rot, decay, break, rust, so only if money has equally disagreeable, loss-involving properties can it effect exchange rapidly, securely and cheaply. For such money can never, on any account, be preferred by anyone to goods.' (Gesell, 1918, p.121)

Gesell's 'free money' concept has been tested several times, initially within his homeland during the economic depression of the 1920s and 30s. The first trial was initiated by Hans Timm, a friend of Gesell's, who created a monetary artefact called 'Wara', and a sociofact called the 'Wara exchange association', an organisation from which Wara could be purchased using Reichsmarks. The Wara monetary artefact was a paper note, which bore stamps that could be bought from the 'Wara exchange association' and affixed to the notes each month to validate them (see Fig.30) (Fisher, 1933). Each stamp cost a fraction of the note's value, but without this monthly validation the note became worthless. Thus, the cost associated with keeping money encouraged people to spend it.



Fig.30: Wara Note 1931

Any holder of one of these needed to validate the note each month by purchasing a stamp and affixing it to the calendar printed on the note.



Fig.31: Wörgl Shilling 1933

	NOTE		INDIVIDUAL		INSTITUTION	
	Type	Validated	Validation Cost Groschen	Individuals Balance:	Validation Cost Groschen	Institutions Balance
January	1 Shilling	Yes	-1	100	1	1
February	1 Shilling	Yes	-1	99	1	2
March	1 Shilling	Yes	-1	98	1	3
April	1 Shilling	Yes	-1	97	1	4
May	1 Shilling	Yes	-1	96	1	5
June	1 Shilling	Yes	-1	95	1	6
July	1 Shilling	Yes	-1	94	1	7
August	1 Shilling	Yes	-1	93	1	8
September	1 Shilling	Yes	-1	92	1	9
October	1 Shilling	Yes	-1	91	1	10
November	1 Shilling	Yes	-1	90	1	11
December	1 Shilling	Yes	-1	89	1	12

Fig.32: Breakdown of demurrage in Wörgl system.⁶³

If an individual was to hold on to a Wörgl shilling note for eight years, he/she would have paid the total of one shilling to the central institution that validates the notes.

⁶³ The Wörgl currency system cost the holder money, but the overall system increased the centrally controlled wealth. The table shows the accrued debt and credit from using the Wörgl notes.

The most successful implementation of Silvio Gesell's idea happened during the Great Depression in an Austrian town called Wörgl (for the note see Fig.31). From 1932 for just over a year the town operated a currency system with demurrage. In this short time, employment grew and new houses were built along with a reservoir, a *'new ski jump and a water basin for the Fire Department'* (Fisher, 1933), defying the general economic climate in the rest of the country.

Unfortunately the 'free money' concept never gained widespread coverage; emergency legislation was passed by the German government in November 1931 to bring an end to the use of Wara (Douthwaite, 2002, p.139). However, these experiments show that new technologies and materials enable a redesign of monetary artefacts and currency systems informed by alternative mentifacts. The mentifact instigated by Gesell, that money should have 'disagreeable, loss-involving properties,' would not have worked if the monetary artefact was made of gold. The paper notes enabled a redesign that shifted a core function of money, the 'store of value'.

In conclusion, most complementary currency systems run alongside the mainstream electronic fiat currency system, operating within a sub-culture not dissimilar to the mainstream culture. In this regard, these complementary currency systems can never offer a truly alternative currency system, simply because they are operating in the same monetary paradigm as the mainstream currency system. Alternative currency systems, however, like Silvio Gesell's 'free money', do highlight the potential for redesign, through a redefining of the functional axioms of money, embodied within a paper monetary artefact. For in the past money was limited by concrete materiality, but now it is only limited by faith and assumptions, not materiality or technical knowhow.

2.8 Summary of chapter

At the end of this chapter, I now summarise how the literature review has addressed the research questions and moved the development of Redefinition Design forward. The chapter addressed RQ1: Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

Section 2.2 outlines that the economic definition of money constitutes an assumption, as the functions are often stated as self-evidently true. Section 2.3 shows how the functional axioms of money have been cemented into a timespan that goes back to Aristotle's writings, 2,300 years ago. Section 2.4 proposes that most people take an observational approach to understanding money, and therefore the functional axioms are caught within a reinforcing feedback loop that propagates the longstanding monetary paradigm. Thus, answering RQ1: the functional axioms of money constitute the core assumptions that have heavily informed the design and development of the money. In sections 2.5 to 2.6, I show that these core assumptions have pushed culture to resonate with the monetary paradigm rather than money being redesigned to resonate with wider cultural principles. Hence, a design methodology is needed to step beyond the paradigm paralysis, and redefine and redesign money to chime with the cultural context within which it operates.

Having established the main assumptions informing monetary development, the second half of the chapter lays the groundwork for RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

Finally, in section 2.7 I analyse 'complementary currencies and alternative currencies', showing how Silvio Gesell's 'free money' concept and subsequent experiments indicate the potential for monetary change through a redefinition of the functional axioms of money. This last point gives hope to the idea that alternative monetary artefacts and currency systems can be designed, providing the deeply held assumptions that limit monetary development are acknowledged and methods are developed to help mitigate their influence.

In general, I have shown that we are witnessing a shift from concrete to abstract money,⁶⁴ and therefore a greater reliance of faith in the functional axioms of money. Thus, can money be redefined? Could it be designed to harmonise with distinct cultural values?

The next chapter is the work review, reviewing relevant design projects and possible methods used to mitigate prescriptive culture.

Chapter 3 – WORK REVIEW

⁶⁴ I should note, this is not the first time the world has witnessed the creation of credit based currencies. As I point out in section 2.52, David Graeber draws from recent anthropological research to show credit systems from Mesopotamia and ancient Egypt predate the commodity systems from ancient Greece.

Previous attempts at mitigating paradigm paralyses

I have shown in chapter 2 that the longstanding functional axioms of money have kept development within a holding pattern; however, the functions are in fact far more flexible than traditional economics texts would lead us to believe. However, knowing this is not enough, I now move on to design.

This chapter moves forward the development of the Redefinition Design approach, by showing that general speculative design has not been able to overcome the paradigm paralysis that affects monetary development in relation to RQ1: Paradigm paralysis. None of the speculative design projects reviewed in 3.1 have managed to alter the functional axioms of money beyond what we have seen complementary currency systems achieve in 2.7; this shows the need for a new specific design method. In section 3.2, I review three projects that utilise a specific method called ‘counterfactual conditionals’, to alter historical cultural contexts. Although this method signals a promising approach in answering RQ2: Paradigm Breakout, it does not enable the designer to alter fundamental functions surrounding a

design, thus the needle is only moved so far. Nevertheless, this shows a way forward.

3.1 Speculative Designs constructed within the monetary paradigm.

Design work that engages money, but does not acknowledge the monetary paradigm and functional axioms of money.

3.2 Counterfactuals in speculative design practice.

General speculative designs that utilise a method of mitigating paradigm paralysis.

3.3 Summary of chapter.

3.1 Speculative Designs constructed within the monetary paradigm

In this section I review seven relevant speculative design projects that have engaged with the subject matter of money.⁶⁵ However, even with no real-world restrictions, I show that these projects are still confined by the longstanding monetary paradigm.⁶⁶

One of the first speculative design projects that engaged with the subject matter of money was a Royal

⁶⁵ Due to the difficulty in implementing a functioning currency system, the projects in this section are all speculative designs. For an explanation of speculative design see section 4.1.

⁶⁶ This was also the case for my own preliminary speculative design projects in section 1.2.

College of Art design brief called E-money, sponsored by Intel.⁶⁷ All the projects from this RCA brief played with notions of value and methods of payment; however, none of them looked at the fundamental functions of money. No projects from this brief mention a ‘medium of exchange’, ‘store of value’ or ‘unit of account’. For instance, Daisy Ginsberg’s *Early Exit* (Ginsberg, 2008), proposed an alternative credit system based on reducing future medical costs through euthanasia. Thus, focusing on a sociofactual level, the project proposes a new service that utilises a type of ‘deferred payment.’⁶⁸ The monetary artefacts in this scenario are not mentioned, hence will likely be money as we know it today. Another project from this series was Chris Woebken’s *A new relationship to money* (Woebken, 2009). Woebken designed several monetary artefacts that attempt to make intangible electronic payments more tangible. For instance, Fig.35 shows a monetary artefact specifically designed to pay for a time-dependent service, combining an oven timer with a payment terminal. Woebken designed the monetary artefacts (payment terminal) and the mentifact informing their design (consciousness of electronic payments), but the sociofacts are not mentioned. ‘Visa’ can be seen on the payment card; hence this project utilises our current notion of money and therefore does not change the functional axioms of money.



⁶⁷ Projects from this brief featured in *Core77*, (Taylor, 2008). *Axis Magazine* (Nakajima, 2009). and *Icon* (McGuirk, 2008).

⁶⁸ Deferred payment is the postponement of payment on an outstanding bill or debt.

Fig.33: Early Exit

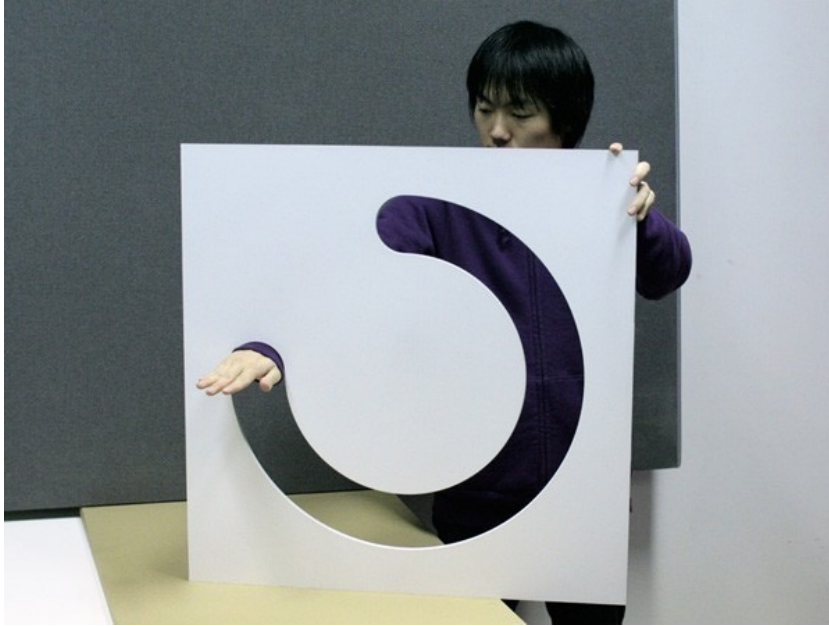


Fig.34: – The Spectacle of Paying

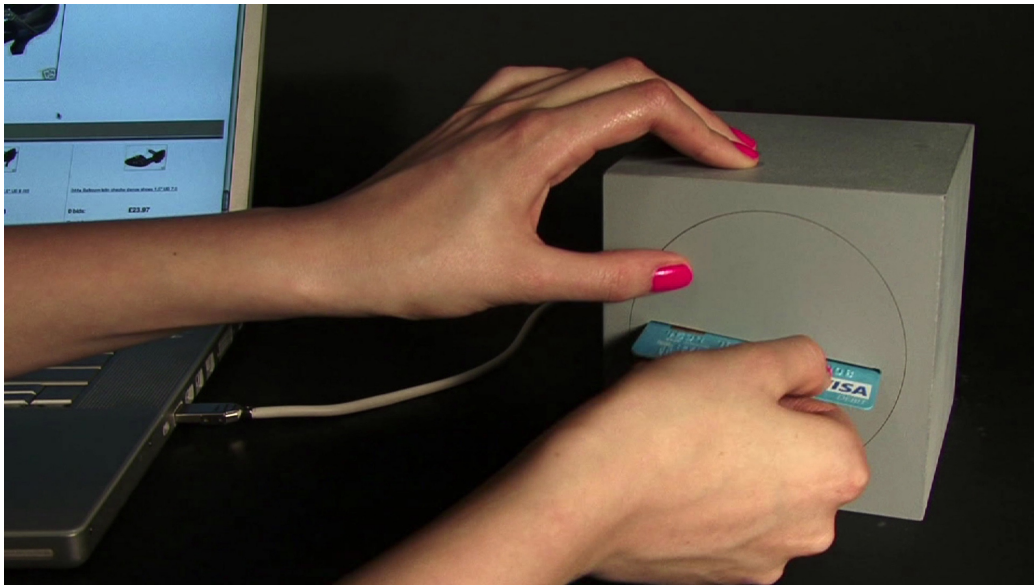


Fig.35: A new relationship to money (Wobken, 2008)



Fig.36: A new relationship to money (Woebken, 2008)

For the same brief, Gunnar Green created *The Spectacle of Paying* (Green, 2009), which imagined gestures replacing cards at point of sale (see Fig.34). Like the update from chip and pin to NFC, this was an alternative monetary artefact that provided no sociofactual or mentifactual context. As such, we can conclude that the project exists in the current monetary paradigm. Therefore, did not alter the functional axioms of money.

I have also witnessed the influence of monetary assumptions on speculative design proposals while running the FOM Awards. The Future of Money Design Award, sponsored by Consult Hyperion, is a competition that has been running since 2010, founded by payment expert Dave Birch and myself, and is a yearly speculative design competition specifically focused on money that over the past seven years has received over 200 entries. The FOM Awards are intended to:

'develop links between the financial industry and creative practitioners from around the world. This is achieved by awarding the opportunity to present thought-provoking ideas to a group of financial

experts and industry leaders, during Tomorrow's Transactions, the 16th annual Consult Hyperion Forum in London.

Arguably there has been no greater time of financial uncertainty than today and no greater need for fresh ideas and imaginative insights which help inform, suggest and question our current technological, social and cultural direction.' (Houldsworth, 2012)

For FOM each year, I write a new brief that responds to some notion surrounding money. Previous briefs have included: 'Design a smart banknote' in 2011, 'Ease of Transactions' in 2012, 'Design a future financial crime' in 2013, 'Identity is the new money' in 2014, 'Modern money's ethical dilemma' in 2015 and 'The origins of money' in 2016. Not one brief has resulted in a single entry that directly challenged the functional axioms of money.⁶⁹ Rather the entries often add additional functions to the main three. For instance, the winner in 2011 was Nitipak Samsen's project The Money Trailer, proposing an electronic banknote with a history of its previous users. This project redesigned the monetary artefact to add an additional function, history of ownership; the notes worked in the same way as traditional paper banknotes. 2012's competition winner, Jessica Charlesworth's project A Cautionary Tale imagines a commodity-based money backed by blood, sweat and tears. Here Charlesworth designs new monetary artefacts that measure value through the liquids expelled from the body. The mentifact behind this scenario seems to be that emotions often inform purchases, so why not let the indicators of emotions pay for the purchase. Although the project alters the mentifactual level, the assumption that money is a 'unit of account', 'store of value' and 'medium of exchange' is unaltered, as the monetary devices she designed measure, store liquid and transfer to another party. In 2013, Joe Carpita and Craig Stover created Bigshot, a proposal for a crowd-funded platform for illicit activities. As such this project does not propose an alternative monetary concept. None of these winning projects and the numerous unsuccessful entries alter the fundamental functions of money, thus highlighting that the functional axioms of money are almost always taken as a given, and the focus of alternative currency systems within speculative design have mostly been on the development of additional functions, payment technologies or alternative-commodity-based value systems.

An example of an independent speculative design engaging with the subject matter of money is a 2013 project by Studio PSK, called Reciprociti Bank. Below is an excerpt from their website:

'Studio PSK worked with numerous elements of the financial services to explore new ideas on what economics means, and how it might be different. We created an immersive space to challenge the public on the future of finance. Using fully interactive installations, visitors could engage with the ideas in a tangible way.' (Stevenson-Keating, 2014)

The designer Patrick Stevenson-Keating created a fictitious bank during his 2013 London Design

⁶⁹ A couple of proposals have referenced Silvio Gesell's monetary concepts, but not significantly updated his original contribution.

Museum residency. The bank's aim was to encourage its customers to consider where and how they were spending their money. Thus, the mentifact was the same as Chris Wobken's earlier project: consciousness of electronic payments. The artefacts Stevenson-Keating created were a facsimile of Wobken's designs; for instance he combined a payment card and ruler to make the user aware of how much they were spending (see Fig.37).

Fig.37: Reciprociti Bank (PSK, 2013)

A monetary artefact that incorporated a ruler into a payment card, enabling the user to tangibly measure how much they spend.

All the speculative design projects that I have reviewed appear to take the functional axioms of money as intrinsic qualities that are contained within all currency systems and monetary artefacts. However, as shown in the case of some alternative currencies (chapter 2 sections 2.7 and 2.8), these functional axioms are malleable. Hence these speculative designers do not challenge or change the functional axioms of money, but add new functions or create new commodity-based systems or new types of interaction at the point of sale.

For speculative design projects to step beyond the deeply held assumptions of money that include 'medium of exchange', 'store of value' and 'unit of account', the cultural, societal and behavioural bubble in which we exist needs to be burst. This can only be done by firstly recognising that the functional axioms of money are a limiting factor in the development of genuine alternatives, then developing methods to mitigate these culturally derived assumptions to challenge these inherited notions and influence the tacit assumptions on the mentifactual level of culture.

3.2 Counterfactuals in speculative design practice

In the previous section I showed that most speculative designs that deal with money are positioned in the current monetary paradigm, hence they do not alter the functional axioms of money. Therefore, we now move from general speculative proposals to ones that use historical contexts as a lever to determine formal choices.

Within this section, I will review three speculative design proposals that employ a method of mitigating prescriptive culture (and thus are relevant to RQ2) using counterfactual conditionals (see methodology section 5.53). Counterfactual conditionals are ‘what if’ questions applied to historical events, ultimately used to imagine alternative timelines. In this section, I show that although these projects do alter aspects of prescriptive culture, they combine both actual and altered timelines, hence they create hybrid cultures rather than alternatives.⁷⁰ Thus, these projects do not redefine the artefact within an alternative cultural context, as the mentifacts informing the projects are taken from the actual timeline; as a result, fundamental principles surrounding the design remain unchanged.

Although this is the case, the technique does show alternative cultural contexts can be used as leverage when making formal design choices, illustrating the value of recontextualising while designing alternatives.

3.21 The MacGuffin Library

This speculative design project by Noam Toran and Onkar Kular features an object from a British/Nazi hybrid culture, resulting in the manifestation of ‘Goebbels’s Teapot’. The mentifact in this project is that the British love tea, and is taken from the actual timeline.

3.22 The Golden Institute

This project by Sascha Pohflepp moves beyond a solitary object and is comprised of a few models and

⁷⁰ James Auger in his PhD thesis labels these types of design project ‘alternative presents’ (Auger, 2012).

a short fictional documentary video. The counterfactual conditional question is ‘What if Jimmy Carter had won the 1980 US election?’ It is also taken from the actual timeline, based on his 1977 energy legislation.

3.23 The Attenborough Design Group

David Chambers’ project asked what if ‘David Attenborough started an electronics company.’ The mentifact informing this design is again taken from the actual timeline.

3.21 The MacGuffin Library

One of the first speculative design projects to utilise an explicitly counterfactual approach was Noam Toran and Onkar Kular’s 2008 project The MacGuffin Library. This dystopian project by Toran and Kular is comprised of a collection of diverse fictional objects, collated together under the filmic term ‘MacGuffin’, coined by Alfred Hitchcock to describe a plot device that acts as motivation within a story.

One of the objects from this project is the ‘Goebbels’s Teapot,’ an object from a timeline in which England has been conquered by Nazi-controlled Germany. In the framing of this counterfactual, Toran and Kular borrow an approach from the populist counterfactuals found in literature, echoing novels like *Fatherland* by Robert Harris (1992), *SS-GB* by Len Deighton (1978), *Collaborator* by Murray Davies (2004) or *Dominion* by C. J. Sansom (2012), all of which propose the dystopian counterfactual question ‘what if the Nazis had successfully invited Britain?’

A brief description of events explains the context behind the teapot’s creation:

‘With all of Europe and England conquered, Adolf Hitler now takes residency in his new home at Buckingham Palace, appointing Princess Margaret his bed warmer and Churchill his butler. Dr Goebbels’s first priority as minister of the Anglo-Nazi Alliance is to pacify the English population, transforming them from insurgents into ardent supporters of the new Reich. With the Schutzstaffel demanding results, and his American nemesis Edward Bernays air-dropping propaganda to undermine

him, Goebbels's only chance is to formulate an audacious public relations program, which if successful, could have the Brits goose-stepping from Brighton to Aberdeen.' (Toran, 2013)

The description, although rather playful in tone, nevertheless outlines a scenario where the material culture of Britain would likely change. Elements from both the actual and altered timelines are combined to create this hybrid culture, as shown in Fig.38.

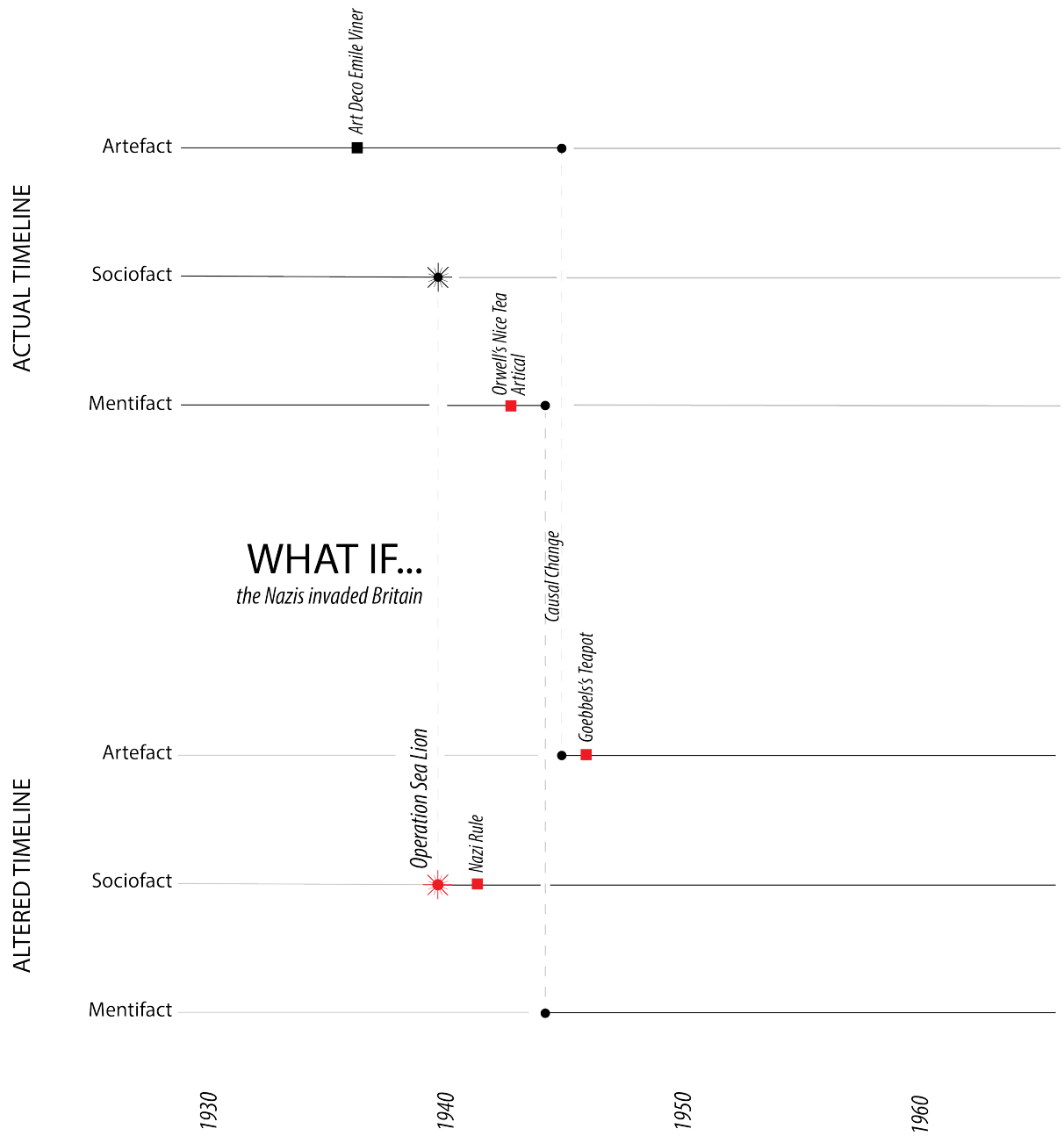


Fig.38: Counterfactual timeline of The MacGuffin Library

As Fig.38 shows, the initial counterfactual conditional ‘What if the Nazis invaded Britain?’ is

instigated on the sociofactual level, in this case, the institutions of a government overcoming another government. Hence this aspect of the project is one from the altered timeline, where the Nazis have occupied Britain. The mentifact surrounding this scenario is one from the actual timeline, in that the people of Britain love drinking tea. This notion is tacit knowledge in Britain, but the habit was especially rife during World War Two; a time when George Orwell wrote a 11-point guide called 'A nice cup of tea', published in the *Evening Standard* newspaper (Orwell, 1946). In this scenario, this mentifact is used by the Nazi propaganda machine to influence the mindset of the British public, by associating the Nazi party with the well-established British love of tea. Finally the artefact or 'Goebbels's teapot' is from the altered timeline, but combines the typically British icon of an Art Deco teapot with a Nazi symbol. A provocative image that amalgamates the two popular cultural identities of the period.

To summarise, Toran's project is weighted towards the sociofactual level; this is the level where most of the genuinely alternative aspects of the project arise. The mentifact that the British love tea is taken from the existing timeline. Finally, the artefact 'Goebbels Teapot' is from the altered timeline; the British Art Deco teapot is replaced with a Bauhaus-inspired aesthetic (see Figs.39 and 40).



Fig.39: Art Deco Teapot (Emile Viner, 1937)



Fig.40: Goebbels Teapot (Noam Toran, 2008)

3.22 The Golden Institute

Sascha Pohflepp's 2009 project was amongst the first speculative design projects to create a utopian counterfactual scenario. His project, titled The Golden Institute, was his graduation project at his Royal College of Art final show. The Golden Institute was a project that presented a scenario based around a politically oriented counterfactual question, 'Where would the US stand on climate issues, if Carter won the 1980 election?':

'For every future that happens, many others are being forgone. The world which we live in is the result of countless choices in the past. Many aspects of our world would potentially look very different if, at crucial moments, other paths had been chosen. The 1980 US presidential election represents such a crucial moment in regard to energy technologies. While Jimmy Carter had a declared interest in renewable energy sources the victorious Ronald Reagan quickly rolled back such efforts and embraced a future based on fossil fuels.' (Pohflepp, 2009)

Please see Fig.41 for the breakdown of the various cultural levels surrounding this counterfactual project.

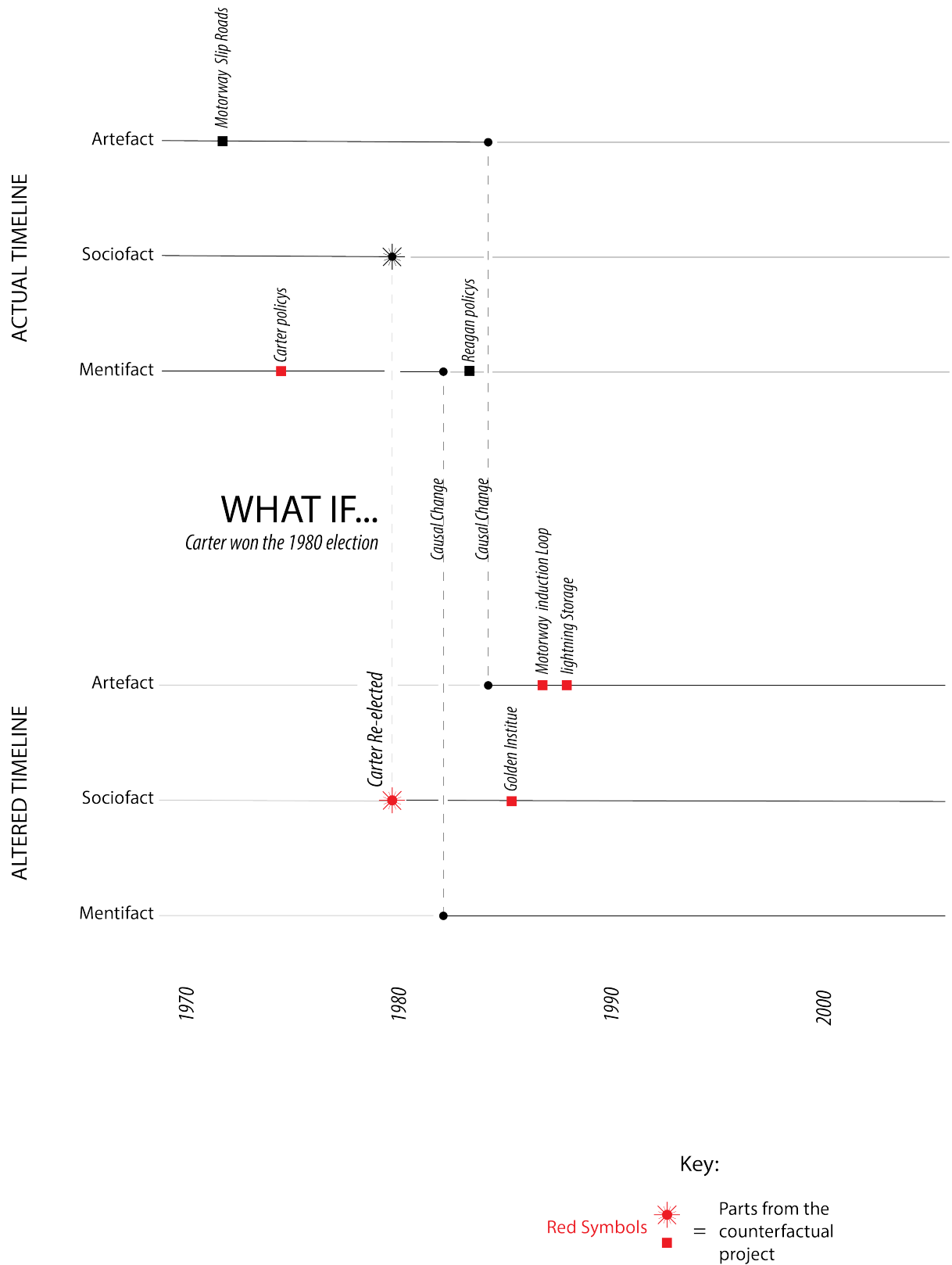


Fig.41: Counterfactual timeline of The Golden Institute.

Like Toran's project, Pohflepp's counterfactual conditional was instigated on a sociofactual level. The

mentifact informing the scenario was taken from the actual timeline, by diverging from Ronald Reagan's later 1981 energy policy, like Executive Order 12287:

'Section 1. All crude oil and refined petroleum products are exempted from the price and allocation controls adopted pursuant to the Emergency Petroleum Allocation Act of 1973, as amended. The Secretary of Energy shall promptly take such action as is necessary to revoke the price and allocation regulations made unnecessary by this Order.' (Reagan, 1981)

And continuing Jimmy Carter's original mandate for his next term in office and his commitment to renewable energy sources (Selwyn-Holmes, 2009), below is a section from Carter's 1977 April 20th address to Congress:

'3. We must protect the environment. Our energy problems have the same cause as our environmental problems – wasteful use of resources. Conservation helps us solve both at once...
a. In the short term, to reduce dependence on foreign oil and to limit supply disruptions.
b. In the medium term, to weather the eventual decline in the availability of world oil supplies caused by capacity limitations.
c. In the long term, to develop renewable and essentially inexhaustible sources of energy for sustained economic growth.' (Carter, 1977)

The above policies of Jimmy Carter's administration indicate that the mentifacts surrounding this energy plan are based on the notion that fossil fuels are finite and environmentally destructive, hence renewables need to be developed. Pohflepp uses this mentifact to inform the design of his artefacts. For instance, during the RCA graduation exhibition, Pohflepp displayed a series of office models alongside a 1980s-style video explaining the role of the 'Golden Institute'. The models communicated general ideas about alternative energy-generating devices (see Figs.42 and 43).



Fig.42: Motorway inductance loop (Pohflepp, 2009)

One such model represented an idea for a motorway loop, which decelerates cars coming off the motorway while generating electricity.



Fig.43: Energy capture trailer (Pohflepp, 2009)

Another model represented a modified pickup and trailer intended to capture electricity from lightning strikes.



Fig.44: Richard Nixon at NASA 1972

The aesthetics Pohflepp uses in his artefacts echo the aesthetics from the established timeline. This picture shows Richard Nixon visiting the NASA Institute in 1972; note the wood-panelled office and models are reminiscent of the ones in Figs.42 and 43.

3.23 The Attenborough Design Group

The next counterfactual is also instigated on a sociofactual level. James Chambers' 2010 project The Attenborough Design Group proposed the counterfactual question 'What if David Attenborough had started an electronics company?' (Debatty, 2010).

In this scenario, Chambers borrows David Attenborough's ideas and beliefs and applies them to a new subject matter, a 1980s electronics business. Thus, he uses a mentifact from the actual timeline, borrowed from David Attenborough: the notion that all living things strive to survive (see Fig.48). Chambers applies this mentifact to the 1980s consumer electronics industry, shifting the consumption-fuelling notion of engineered obsolescence towards the notion of longevity within consumer electronics. To show this change, Chambers adds additional functionality to the artefacts. In the project, he labels these artefacts 'Floppy Legs', 'Gesundheit Radio' and the 'Anti-touch Lamp.' (see Figs.48–50) (Chambers, 2010).



Fig.45: Floppy Legs (James Chambers, 2010)

A floppy disc drive that jumped up on four legs when a liquid was detected underneath the drive.



Fig.46: Gesundheit radio (James Chambers, 2010)

A design solution for the dust-sensitive electronics of the time and sneezed to displace the dust collected within the product.



Fig.47: Anti-touch Lamp (James Chambers, 2010)

Moved away from a person to prevent the sensitive halogen bulb from being damaged.

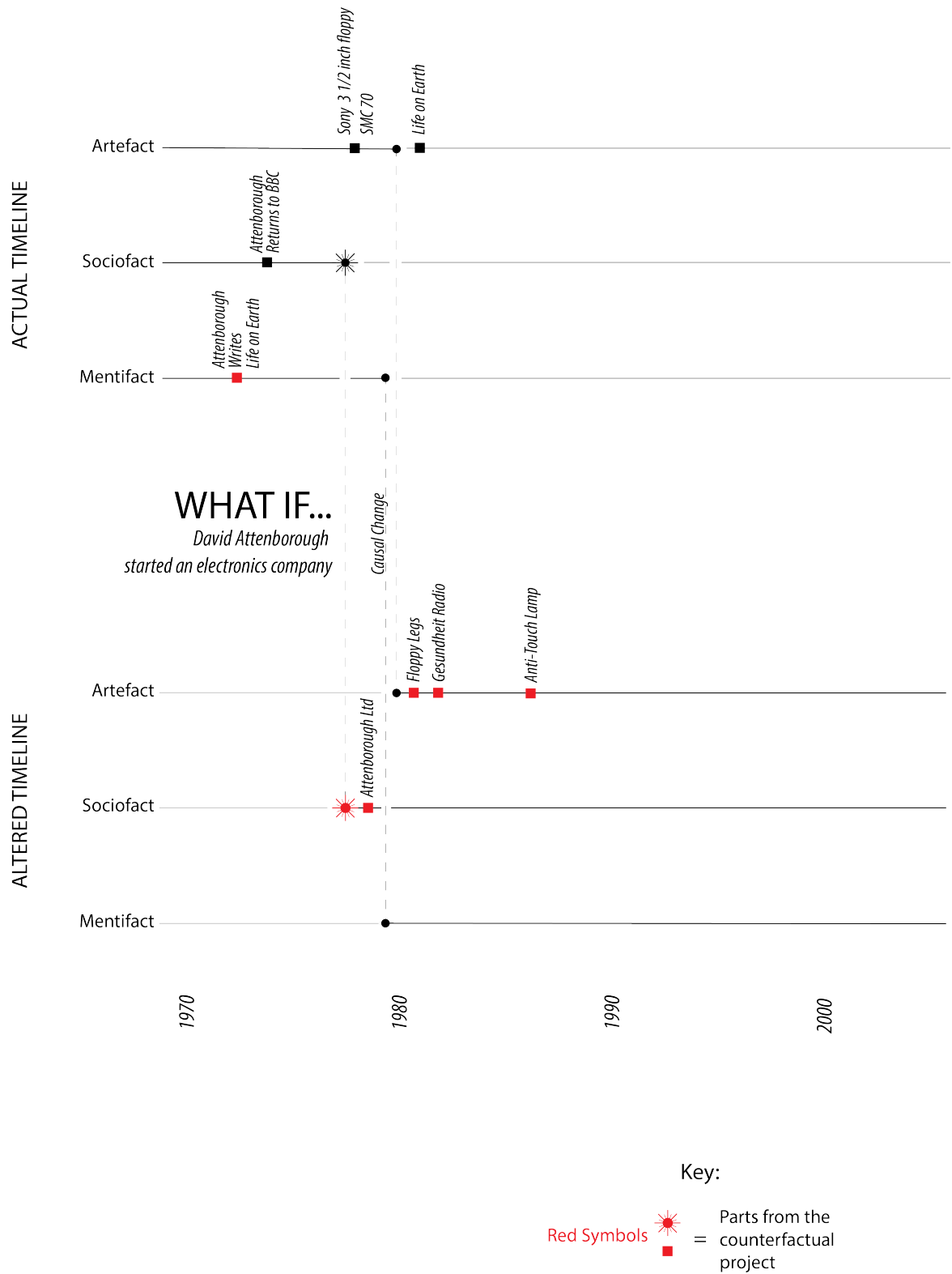


Fig.48: Counterfactual timeline of The Attenborough Design Group

The artefacts in Chambers' counterfactual are, aesthetically and functionally, carbon copies of the original electronic devices produced back in the 1980s; the only change is the addition of a new

survival function: jumping away from liquid, expelling dust or avoiding human touch. This project is the only one of the three that developed objects that function; however, this functionality does not alter the core functionality of each artefact but rather acts as an additional function.

In all three speculative design counterfactuals, the designers have amalgamated aspects of both actual and altered timelines; they are all hybrids in this regard. Although the projects alter aspects of culture, they do not challenge or alter fundamental principles. For instance, the principles behind the British love of tea were not challenged or altered in Toran's counterfactual; this mentifact was simply reappropriated by the Nazi propaganda machine. Likewise, Pohflepp's counterfactual focused on the way energy was created, not the fundamental principles behind energy generation or society's need for energy. And finally, Chambers' counterfactual did not alter the fundamental principles behind consumer culture, but rather the speed of consumption.

Although all the projects are thought-provoking and well crafted, the counterfactual method does not gel completely with the aim of this thesis, which is to facilitate a Paradigm Breakout RQ2, to facilitate not only the redesign of technology, but the redefining of fundamental aspects of technology. With the counterfactual approach, there is always some aspect of the actual culture informing the design, which limits the point of difference.

Therefore, counterfactuals are not a method that will allow me to design incongruous monetary artefacts. I need to find a new method to sever all links to coeval culture, including the fundamental principles that lie at the heart of any technological or social advancement. That said, counterfactual conditionals are a step in the right direction; they have informed me that the Redefinition Design approach will need to use alternative cultural context to leverage the formal choices of design.

3.3 Summary of chapter

Over the course of chapter 3, I have shown that general speculative design, although useful in creating culturally relevant and engaging projects, is not so successful in redefining fundamental technologies, either in the case of speculative money-related designs or in the use of counterfactual conditionals. Thus, Redefinition Design can possibly operate in this space.

In section 3.1. I showed that most speculative design proposals that deal with money are limited by the same longstanding monetary paradigm and functional axioms of money, which we found to be at the core of RQ1: Paradigm Paralysis – what characterises the underlying assumptions that heavily inform the design and development of money?

In Section 3.2 I review three speculative design projects that employ counterfactual conditionals to mitigate contemporary culture. Although these projects do reduce the influence of contemporary culture, they are hybrid cultures rather than alternatives, and fail to alter fundamental principles surrounding the technology. That said, although counterfactual conditionals will not facilitate a complete redefinition of money, they point in the right direction; appropriating alternative cultural contexts to gain leverage when designing alternatives. Thus they contribute to RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

The next chapter focuses on methodology and therefore RQ2 and the associated Redefinition Design approach.

CHAPTER 4 – METHODOLOGY

Redefinition Design, breaking out of the paradigm

In this chapter I introduce the Redefinition Design approach, which can be understood as a special case to the general cases of speculative and critical design. Then I introduce the general methodology and finally outline the research methods. This chapter introduces the research methods that are intended to answer RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

4.1 Speculative and Critical Design, the general case.

Why speculative design is the most appropriate design approach for this investigation.

4.2. Redefinition Design, a special case.

A special case of speculative and critical design.

4.3 General Methodology – Eisenhardt.

4.4 Initial Research Tools for Redefinition Design:

4.41 Identify Underlying Axioms.

4.42 Altering Axioms

4.43 Sympathetic cultural context

Cultural recontextualisation, using either:

a) Counterfactuals – Utilising ‘what ifs’ at significant events in history

b) Counterfictions – Utilising literary worlds as an alternative cultural context

4.44 Analyse cultural levels within selected cultural context

Unpack cultural levels using Bidney’s definition of culture.

4.45 Design with altered axioms in selected culture.

4.5 Map of Procedures

4.6 Summary of chapter

4.1 Speculative and Critical Design, the general case

The complexity of a functioning currency system, with all the stakeholders, belief required for it to have collective relevance and the infrastructure for it to work, means it is almost impossible to design a currency system and test it. Hence, monetary designs will likely remain as ‘proposals,’ or hypothetical ideas, like those in section 3.1. Thus speculative design might be the most appropriate approach. James Auger defines speculative design as follows:

‘Speculative design combines informed, hypothetical extrapolations of an emerging technology’s development with a deep consideration of the cultural landscape into which it might be deployed, to speculate on future products, systems and services. These speculations are then used to examine and encourage dialogue on the impact a specific technology may have on our everyday lives.’ (Auger, 2013)

An early example of a speculative design comes from an article written by Gregory Yob in 1981, for *Creative Computing* magazine, titled ‘An exercise in speculative design’:

‘The first thing to do is dream about what the electronic blackboard (a nicer name for the VLLCD) can

do. Then take a look at the features which are really desirable, and combine these in a preliminary Design...

...It is 1990, and my study is the almost-paperless office with a terminal-desk and the electronic blackboard (EB) on the far wall. (See Figure 1.) I sweep my viewing wand over the sheet of paper on my desk... Now I walk to the wall and point a pen-like device at the spot where the image is to be "posted." (Yob, 1981)

Based on Auger's definition and Yob's 'exercise in speculative design', speculative design is predominantly positioned in a future context, based on emerging technology. In this regard, speculative design does not exactly match the core aims of this thesis, because one of the focuses of this thesis is RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money? Thus, rather than an emphasis on the future of technology, I am attempting to step beyond the entrenched ideas from the past that are still present in new technologies when applied to longstanding notions like money (As shown in section 2.54 and 3.1).

Another closely related design approach to speculative design is critical design, a term coined by Anthony Dunne:

'What is Critical Design?

Critical Design uses speculative design proposals to challenge narrow assumptions' (Dunne, 2008)

In this regard the approach I take is closer to critical design, where the focus is not necessarily on extrapolations of developing technology, but rather on moving beyond the holding pattern of a prescribed, dominating aspect of culture.

'Critical design uses designed artefacts as an embodied critique or commentary on consumer culture. Both the designed artefact (and subsequent use) and the process of designing such an artefact cause reaction on existing values, mores, and practices in a culture. A critical design will often challenge its audience's preconceptions and expectations thereby provoking new ways of thinking about the object, its use, and the surrounding environment.' (Dunne, 1999)

That said, unlike critical design, this thesis is not focused on specifically critiquing a certain aspect of culture like consumer culture on an artefactual level. Rather, the core aim is to provide a design approach and general methods that help designers in facing refractory design situations.

Creating or proposing methods within the context of speculative or critical design is not intended to

limit the breadth of work in this field or create a prescribed method that is unchanging. Rather the intention is to build a tool kit that all designers can use and develop. Lionel March's 1976 book *The Architecture of Form* points out some intrinsic qualities of speculative designs:

'Logic has interests in abstract forms. Science investigates extant forms. Design initiates novel forms. A scientific hypothesis is not the same thing as a design hypothesis. A logical proposition is not to be mistaken for a design proposal. A speculative design cannot be determined logically, because the mode of reasoning involved is essentially abductive.' (March, 1976)

Although Lionel March is correct in saying speculative designs are essentially abductive, this is not to say that there are not good reasons behind the decisions taken by a designer that lead to the creation of a certain speculative design. Thus, steps taken by the designer can be retraced and these can form a method to enable other designers to take the same steps. The abductive nature of speculative design just means the outcomes will be different even when the steps are the same.

In conclusion, speculative and critical design touch upon aspects of the design approach taken within this PhD; however, speculative design is mostly orientated towards the future while critical design is predominantly focused on counteracting consumer culture. Neither aim completely incorporates the approach taken in this thesis.

4.2 Redefinition Design, a special case

This section introduces a new design approach to which the methodology and methods relate. I call the approach Redefinition Design and it focuses on redefining refractory systems governed by assumption. Redefinition Design can be understood as a special case to the more general cases of speculative and critical design. As a special case, Redefinition Design does not focus on future extrapolations of technology like speculative design, nor critique consumer culture like critical design. Rather it embodies the core research question of this thesis: 'What characterises a methodology that can

facilitate designers to step beyond the underlying assumptions informing the development of money?' Thus, Redefinition Design methods aim to facilitate the creation not only of alternative designs, but also of incongruous designs, which the designer can imbue with both subject matter and motivation.

The reason for settling on the term 'redefinition' is because the methods are intended to free imagination from the confines of a prescriptive culture, and hence 'redefinition' is the most appropriate term. Definitions, like the economic definition that describes the functional axioms of money, are a collectively recognised conceptual border that a given group use to understand and build their world; definitions ringfence notions within our minds of what an object can or cannot do, what it does and does not look like, how we do and don't interact with it. Definitions often strive to outline the very general characteristics of an object; in doing so, fundamental aspects of the object become seemingly immutable, because to change such notions would undermine the collective understanding of this object. Hence the approach taken in the thesis is intended to break through definitions and alter fundamental principles to redefine cultural levels surrounding objects/services.

Many speculative design projects look to a near-future scenario, whereas Redefinition Design is not focused on a temporal framework, but rather on redefining refractory systems governed by deep underlying axioms, assumptions and beliefs. The broad temporal labels like 'past, present and future' do not help in uncovering axioms or assumptions. In fact, foundational axioms often transcend time – this was true for Euclidean geometry (see section 4.42), and Aristotle's fundamental functions of money (see section 2.3). Each set of notions lasted for thousands of years and were repackaged with new contexts and technologies. Hence, when the aim is to fundamentally redefine a socially dependant system, temporality is linked to framing, and therefore not the focus of this approach.

The difficulty in a Redefinition Design approach is that definitions are only understandable within a certain cultural context; hence redefining an object not only means redesigning the artefact but also the sociofacts and mentifacts within the larger cultural context. This challenge is one focused on maintaining meaning, as meaning is intertwined within all layers of a cultural context. This notion of meaning is related to Wittgenstein's concepts surrounding the meaning of language from his 1963 publication *Philosophical Investigation*. Bryan Magee neatly summarises Wittgenstein's theory:

'Because the sum total of a word's possible uses constitute its meaning, in the end, what language means and what words mean depends on forms of life, on the social contexts in which they are used.'
(Searle, 1987)

Thus Redefinition Design's core aim is to provide designers with a tool kit to enable them to move beyond refractory design situations associated with paradigm paralysis, while also maintaining meaning by not only enabling the design of odd artefacts, but also relating them to sociofacts and mentifacts within an alternative cultural context.

4.3 General Methodology – Eisenhardt

Having outlined Redefinition Design as the approach that will contextualise the methods of this research, I now will state what methodology I will be employing and why.

This is a practice based research project, thus the general methodology I employ is a combination of ‘research through design’ and ‘theory building through case studies’. The approach taken in the first preliminary project was my practice based design approach, falling into the loosely defined ‘research through design’ methodology. Godin’s paper on ‘research through design neatly generalises the methodology as “...one that ‘will be’, the preferred state. It is one that comes naturally out of the interaction of the current state with its environment.” (Godin, 2014)

Although the ‘research through design’ methodology exists within all my design work, the later works in the thesis will be more heavily weighted towards a case creation methodology. The procedure behind creating these works required a much more formal approach; due to the need to mitigate the “*current state with its environment.*” Left to the more instinctive, less formalized design methodologies would mean the current state of culture would actively affect the outcome of the design.

Thus the general methodology employed in the later works is one that builds theory through case studies. As Eisenhardt suggests, this is a ‘*strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory...*’ (Eisenhardt, 2007). Although building theory through case creation has its critics, Eisenhardt notes, ‘*Some readers make the faulty assumption that the cases should be representative of some population, as are data in large-scale hypothesis testing research... A key response to this challenge is to clarify that the purpose of the research is to develop theory, not to test it, and so theoretical (not random or stratified) sampling is appropriate.*’ (Eisenhardt, 2007, p.27). Theory building is exactly what the cases in this study are attempting to achieve; the generation of alternative theory surrounding the functions of money.

The focus of theory building in this dissertation is the three functional axioms of money: ‘medium of exchange’, ‘store of value’ and ‘unit of account’. Following Eisenhardt, the specific approach I take in this methodology is a theoretical sampling of multiple cases. As Eisenhardt says ‘*Whilst single case studies can richly describe the existence of a phenomenon (Siggelkow, 2007), multiple-case studies typically provide a stronger base for theory building (Yin, 1994).*’ (Eisenhardt, 2007, p.27). The benefits of the multiple-case approach appear perfectly suited to the multifaceted aspect of the ‘functional axioms of money’; as there are three core functional axioms of money, there will be three case studies, one to focus on each axiom.

4.4 Initial Research Tools for Redefinition Design

In the previous section, I determined that Redefinition Design is the label of my design approach; case creation will be the general methodology and I now introduce the specific methods that address RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

As shown in section 3.1, the limiting factor in creating unique alternative designs lies in the designer's ability to see clearly the tacit parameters of prescriptive culture. Thus, the intuitive thinking that designers often pride themselves on⁷¹ needs to be managed to prevent contemporary notions from limiting design proposals. On the other hand, logically derived processes can limit creative freedom. Thus, a series of methods need to be developed that apply intuitive thinking in a logical and considered way, allowing designers to step beyond tacit parameters of prescriptive culture without the design proposals becoming formulaic.

In this section I will introduce a series of research tools that can be used to achieve the general aim mentioned above. It is important to note that other methods can be employed; this is only the beginnings of a research tool box.

4.41 – Identify Underlying Axioms.

4.42 – Altering Axioms

Altering the core axioms of a given subject to create general cases.

4.43 – Sympathetic cultural context

Cultural recontextualisation, using either:

⁷¹ 'Design thinking relies on our ability to be intuitive, to recognise patterns, to construct ideas that have emotional meaning as well as being functional, and to express ourselves in media other than words or symbols.' (Brown, 2010)

- a) *Counterfactuals – Utilising ‘what ifs’ at significant events in history*
- b) *Counterfictions – Utilising literary worlds as an alternative cultural context*

4.44 Analyse cultural levels within selected cultural context
Unpack cultural levels using Bidney’s definition of culture.

4.45 Design with altered axioms in selected culture.

4.5 Map of Procedures.

4.6 Summary of chapter.

4.41 – Identify Underlying Axioms

The first step in the Redefinition Design approach is to identify underlying axioms. Virtually every field of study in the western tradition relies on identifying first principles. These principles, like the functions of money, act as the foundation upon which all other aspects of a given subject rest. As Elon Musk states:

‘I think it’s important to reason from first principles rather than by analogy. The normal way we conduct our lives is we reason by analogy. [With analogy] we are doing this because it’s like something else that was done, or it is like what other people are doing. [With first principles] you boil things down to the most fundamental truths... and then reason up from there.’ (Baer, 2015)

Identifying the underlying axioms of money came as a result of researching the subject matter, looking for explanations or descriptions that occurred again and again. In the case of money, this was relatively straightforward, as the functions of money have been written about since Aristotle. However, this process applies to all subjects. It’s a matter of finding the fundamental beliefs, assumptions or principles that can’t be boiled down any further, the foundation on which all else rests.

4.42 Altering Axioms

After identifying a subject's axioms, the next step is their alteration. Hence, this research tool is intended to facilitate the designer in altering fundamental principles, axioms or beliefs around the selected subject matter, thus assuring that the designed outcome is significantly different from the original.

'Altering Axioms' is a method inspired by Russian mathematician Nikolai Lobachevsky, when he created the first non-Euclidean geometry through his 1829 publication *A Concise Outline of the Foundations of Geometry*. Until this publication, Euclid's five postulates, like the functions of money, had been accepted by mathematicians for over 2,000 years unchanged and unchallenged. But the fifth postulate caused problems:

'Postulates

1. *To draw a straight-line from any point to any point.*
2. *And to produce a finite straight-line continuously in a straight-line.*
3. *And to draw a circle with any center and radius.*
4. *And that all right-angles are equal to one another.*
5. *And that if a straight-line falling across two (other) straight-lines makes internal angles on the same side (of itself whose sum is) less than two right-angles, then the two (other) straight-lines, being produced to infinity, meet on that side (of the*

original straight-line) that the (sum of the internal angles) is less than two right-angles (and do not meet on the other side).’ (Euclid, [300BC] 2007)

Lobachevsky did not prove the fifth postulate, nor did he disprove alternative versions. Rather, he took altered forms of the postulate and pursued the geometry that resulted (Counton.org, 2013).

Lobachevsky realised that adhering to all Euclid’s postulates limited geometry (Lobachevsky, 1897, p.17).

The method I will use approaches the challenge of overcoming established dogma in a similar way to Lobachevsky. For this thesis, Euclid’s five axioms are replaced by the functional axioms of money: ‘medium of exchange’, ‘store of value’, ‘unit of account’.

The functional axioms of money share similar characteristics with Euclid’s five axioms.

Both have existed for a vast length of time, which has often meant that these notions are regarded as sacred. Each conceptualise a certain set of notions that make up a functioning system (either currency or geometry). As Lobachevsky observes ‘...there is no contradiction in our mind when we admit that certain natural forces obey the laws of a certain geometry, while certain others are governed by the laws of another geometry particular to them.’ (Lobachevsky, 1897, p.16). Also, the general terms used to describe axioms (in either money or geometry) obscure their exact characteristics, as Lobachevsky notes: ‘In short, one commences geometry by words such as space, dimension, locus, solid, surface, line, point, direction, angle, – words to which one attaches never a clear idea. (Lobachevsky, 1897, p.21).

Alterations to axioms or principles do not destroy the system that came before; they only create alternatives, such as what happened when Lobachevsky disregarded Euclid’s fifth postulate and created hyperbolic geometry. This did not undermine Euclidean geometry, rather simply added another perspective and tool.

‘The principal results at which I have arrived, after having supposed the mutual dependence of lines and angles, lead to admitting the existence of Geometry in a sense much more extended than Euclidean. I have called this science Imaginary Geometry, which the Customary Geometry enters as a particular case.’ (Lobachevsky, 1897, p.3)

The method I will employ in the case studies will alter one function of money. Possible operations could include: remove, oppose, extend, diminish and transform.

4.43 Sympathetic cultural context

After altering an axiom, a context needs to be found that resonates with this altered version. In this section I outline two methods for selecting sympathetic contexts for cultural recontextualisation:

- a) Counterfactuals – Utilising ‘what ifs’ at significant events in history.
- b) Counterfictions – Utilising literary worlds as an alternative cultural context.

Each of these methods borrow cultural contexts that allow the designer to use them as leverage in making formal design decisions. Each method is a practical approach to overcome the challenges associated with designing entire worlds. These methods also allow the designer to select an appropriate cultural setting that resonates with the altered axioms that were immutable within the original paradigm.

a: Counterfactuals

In this section I will introduce an established method that uses ‘counterfactual conditionals’ to apply ‘if clauses’ to history (see section 3.1 for three works that take this approach). Thus, the result of a counterfactual conditional is a shift from the established timeline to an alternative, which subsequently shifts coeval culture towards a hybrid culture. Counterfactual conditionals are used within a wide range of disciplines, for different purposes and rationales. Hence, here I give a brief overview of the mainstream terms used in conjunction with ‘counterfactual’:

‘Counterfactual histories is a type of historiography that is used to analyse moments in history’ (Bunzl, 2004)

Counterfactual thinking encompasses a number of theories related to psychology, which psychologist Neal J. Roese suggests *‘is a common feature of mental life that is often intermeshed with potent emotional states’* (Roese, 1997).

Popular culture counterfactuals are created by writers to imagine alternative timelines for the creation of intriguing narratives (Schmunk, 2015). All these methods are somewhat interlinked, but there is a significant difference in these approaches, between the motivations of the creative disciplines (art, design, writing) and the analytical disciplines (history, philosophy, economics), in that creative disciplines focus on the destination or creation of alternative culture and the analytical disciplines focus on the journey or timeline, or how history unfolds (this is the same for the design projects in section 3.1).

This research tool focuses on the creative counterfactuals within speculative and critical design practice and how counterfactual conditionals can enable the designer to create material culture that would otherwise not exist. To help explain how counterfactuals can be utilised by designers in this way, I’ve taken a paragraph from David Hume’s *An Enquiry Concerning Human Understanding*, published in 1748, which outlines his observations of causality, ending with what could be described as the universal consequence of a counterfactual preposition:

'Similar objects are always conjoined with similar. Of this we have experience. Suitably to this experience, therefore, we may define a cause to be an object, followed by another, and where all the objects like the first are followed by objects like the second.' (Hume, [1748] 2011, p.60)

If we analyse Hume's statement from a design perspective and take the use of the word 'object' in a literal manner, his description of causality could also be a description of how material culture develops over time. Alternatively, how designed objects, within a given context, are informed by similar objects that have gone before, resulting in an iterative process of development. However, Hume ends his observation with an idea, or perhaps opportunity, for subverting the process of causality:

'Or in other words where, if the first object had not been, the second never had existed.' (Hume,[1748] 2011, p.60)

This could be described as the universal consequence of a counterfactual conditional, and is one reason why speculative designers began employing counterfactual conditionals to facilitate a dissociation with the constraints of coeval culture, and in turn the creation of hybrid material culture. However, the cultural level where the counterfactual conditional can be applied is not only limited to the artefact, but could be applied to all levels of culture; including artefacts, sociofacts and mentifacts.

For instance the artefact version would be:

Object 1 ———> Object 2
 Altered Object 1 ———> ~~Object 2~~
 Altered Object 1 ———> Altered Object 2

The sociofact version would be:

Institution 1 ———> Institution 2
 Altered Institution 1 ———> ~~Institution 2~~
 Altered Institution 1 ———> Altered Institution 2

The mentifact version would be:

Idea 1 ———> Idea 2
 Altered Idea 1 ———> ~~Idea 2~~
 Altered Idea 1 ———> Altered Idea 2

The issue with counterfactual conditionals (regarding the aims of this thesis) is the extent to how 'alternative' the culture is proportional to the time from when the 'what if' conditional occurred. Hence, to make a radically different alternative culture using this method would eventually mean most aspects of culture need to be redesigned, which is a huge task, beyond the specialisms and expertise of most designers. Thus, rather than reimagining an entire timeline, perhaps pre-existing cultures can be used by the designer?

b: Counterfictions

In this section I introduce a new method I have developed that appropriates existing cultural contexts from social science fiction. Specifically, contexts in which the subject matter is not present and therefore can be designed. I call this a 'counterfactual' method. Rather than designing fictions (counterfactuals) from reality (history), counterfictions are designs created within literary worlds.

In theory, any literary world could be used; however, I have decided to focus on social science fiction, because money is often absent in this genre. As Batiz-Lazo points out in his paper 'Case of the cashless society', '*When a fictional society was cashless it was generally also a moneyless utopia*' (Batiz-Lazo, 2014, p.11). For instance, in Thomas More's *Utopia*, the seminal work that instigated this genre, he describes an island without money.⁷² Later utopias followed this moneyless format, including *A Crystal Age* by William Henry Hudson and *News From Nowhere* by William Morris.

Popular contemporary utopias like *Star Trek* also suffer from this same moneyless affliction. In the 1996 Star Trek film *First Contact*, Captain Picard was asked '*How much did this ship cost?*' His reply: '*you see, the economics of the future are somewhat different. Money does not exist in the twenty-first century. The acquisition of wealth is no longer the driving force in our lives, we work to better ourselves.*' (Franks, 1996)

Batiz-Lazo observes that science fiction writers were more interested exploring space opera than money: '*readers and writers of science fiction were perhaps more interested in rockets and physics than they were in banking, economics, or organizational innovation.*' (Batiz-Lazo, 2014, p11).

As Batiz-Lazo suggests, even when works do mention a monetary artefact, most only engage with money on a superficial level. Generic terms like 'credit' or 'intergalactic credit' '*...functioned as a simple linguistic substitution for "dollar" and one reads of credits being slapped onto counters, flung to parking attendants, drawn from pockets, and the like.*' (Batiz-Lazo, 2014, p.11).

Hence most popular science fiction deals with money as a plot device and not a subject in and of itself.

In the absence of monetary concepts in fiction, Batiz-Lazo argues, the future of money was

⁷² Thomas More's disdain for money was probably informed by his Catholic faith and the sentiments found in the Bible, for instance 'You cannot serve both God and Money.' (The Bible, Matthew 6:24)

monopolised by the business world: *'the idea of a "cashless society" appears to have originated within the world of business and moved only later into the realm of fiction.'* (Batiz-Lazo, 2014). Hence, the counterfactual method of using social science fiction novels takes advantage of the absence of currency systems and monetary artefacts within literary works of fiction.

I should note that this is not the first time design has used science fiction. Nathan Shedroff and Christopher Noessel's 2012 book *Make It So: Interaction Design Lessons From Science Fiction* proposed that interface designers can utilise science fiction movies and TV programmes to inform and inspire interaction design projects. Shedroff and Noessel suggest designers use science fiction to inspire new interface designs. In this regard *Make It So* is operating in a traditional interaction design context, one that uses popular science fiction as a post-rationalised marketing strategy and design brief. A famous example of this is the film *Minority Report* (Shedroff and Noessel, 2012). Also *Star Trek* communicators, Shedroff and Noessel suggest, informed the public's expectations about mobile telephony in the late 1960s (Shedroff and Noessel, 2012).

Unlike the approach taken within *Make It So*, which uses artefacts from science fiction to engineer equivalent devices and objects for the market, the counterfactual approach uses social science fiction novels that are void of the artefact, thus allowing the designer to build monetary artefacts and sociofacts that resonate with the writer's imagined cultural context. Essentially the writer of any good social science fiction novel has built a scaffold of an alternative world, carving out the parts of the world to help inform the narrative, but the details of what other socially dependent technologies exist within this world are yet to be designed. What transport systems exist within *Nineteen Eighty-Four*? Presumably the totalitarian regime of Big Brother would have a very different transport policy from that found in Edward Bellamy's socialist utopia *Looking Backward*. And what communication technologies exist within Yevgeny Zamyatin's *WE*?

What legal framework helps maintain Aldous Huxley's primitive utopian communities within his novel *Island*? And how might money function within his other novel *Brave New World*? The large quantity of social science fiction that has been written over the years means the designer has a wealth of pre-fabricated worlds to design within, and each novel incorporates very different ideologies from the previous... In fact the nature of a great work of social science fiction is that it needs to be original.

4.44 Analyse cultural levels within selected cultural context

Having introduced the methods of axiom identification, axiom alteration and the counterfactual method, I now move on to the method that enables a designer to unpack an alien cultural context. The consequence of utilising other cultural contexts is that the designer does not intuitively know them. Thus, the designer needs to analyse the alien cultural context prior to designing within this context. Using an analytical approach to unpack the various levels of a given culture context will always be somewhat contrived, relative to living within a given culture and intuitively knowing what would resonate. But it is the best worst option, if a designer intends to step outside their own culturally derived notions.

Although lots of different methods could be employed to facilitate the analysis, the method I utilise in this thesis is one based on David Bidney's broad definition of abstract culture:

'Abstract, or ideal, culture is an impersonal, super organic aggregate and configuration of forms of experience transmitted by human society and embodied in the sum total of human artefacts, sociofact (institution), and mentifacts (ideas and ideals) produced by human effort.' (Bidney, 1968, p.328)

Bidney's abstract definition of culture will help me unpack a cultural context, allowing me to deconstruct and reconstruct various cultural contexts throughout this thesis, between:

Artefacts – the stuff that constitutes the materiality of a given culture like objects, devices and hardware. For example: coins, paper notes and communications electrical devices.

Sociofacts – institutions and social structures, everything that constitutes the organisation of a society. For example: companies, co-operatives, government etc.

Mentifacts – ideas, concepts, notions, values, beliefs and assumptions.

Although Bidney's definition of culture is imperfect, it has proved a useful tool to help fathom the often obscure multilayered aspects of a given culture.

4.45 Design with altered axioms in selected culture

After identifying axioms, altering axioms, selecting a cultural context and unpacking this context with Bidney's definition of culture, the designer can now intuitively design the missing object/service within the new cultural context, informed by the altered axioms and alien culture.

4.5 Map of Procedures

Finally, the table below shows the procedural steps to be undertaken in chapter 5:

Redefinition Design Procedure					
Section	Tasks and Methods	Procedural Steps			Intention
Chapter 2 - Literature review	1. Task – Identify Axioms	Medium of exchange, Store of value, Unity of account.			Understanding the entrenched notions within a refractory design situation.
Chapter 5 - Procedure	2. Methodology – Eisenhardt Case Creation	Case Study A	Case Study B	Case Study C	

	3. Method – Alter Axioms	Medium of exchange, Store of value.	Store of value, Unity of account.	Medium of exchange, Store of value.	Alter Axioms to create fundamentally different notions.
	4. Method – Counterfactuals	Walden Two	WE	Nineteen Eighty Four	Find a cultural context that gels with the altered axioms.
	5. Method – Bidney Framework	Analysis of Walden Two cultural context	Analysis of WE cultural context	Analysis of Nineteen Eighty Four cultural context	Analyse the mentifacts and sociofacts in the alternative cultural context.
	6. Task – Output	Design	Design	Design	Design artefacts / sociofacts within the alternative cultural context.

Fig.49: Redefinition Design Procedures.

4.6 Summary of chapter

In summary, this chapter introduced the Redefinition Design approach, which can be understood as a general case to the special cases of speculative and critical design. The initial Redefinition Design methods outlined in the chapter propose a 5-step procedure that potentially answers RQ2: Paradigm Breakout – What characterises a methodology that can facilitate designers to step beyond the underlying assumptions informing the development of money?

However, up until now, this is just theory. Hence the next chapter puts the Redefinition Design methods into practice.

Chapter 5 –

CASE STUDIES A, B and C

A Redefinition Design approach to money: three case studies

As outlined in the previous chapter; Redefinition Design is comprised of a set of methods. This chapter presents three case studies employing a Redefinition Design approach to the subject matter of money. Like Eludician geometry, which remained entrenched for thousands of years, so too has money. Like Euclidian geometry's transformation by Lobachevsky's redefinition of the fifth postulate, Redefinition Design offers designers of money a method for making deep change to currency systems and monetary artefacts. In a more general application Redefinition Design offers a method for making change in refractory contexts. Money has been in a holding pattern for thousands of years, maintained through our institutions and artefacts; Redefinition Design is intended to help designers break out of this holding pattern.

All three case studies follow the methods and procedure outlined in the previous chapter, in section 4.5. Each case study ends with specific results and discussions that inform the output of the next case study.

5.1 to 5.15 – Case Study A (This case study alters the 'store of value' function.)

5.16 – Result

5.17 – Discussion

5.2 to 5.25 – Case Study B (This case study alters the 'medium of exchange' function.)

5.26 – Results

5.27 – Discussion

5.3 to 5.35 – Case Study C (This case study alters the 'unit of account' function.)

5.36 – Result

5.37 – Discussion

5.1 Case Study A ('Store of value')

The steps for this case study are as follows:

5.11 – Alter Axioms

5.12 – Select Context (Counterfactual)

5.13 – Mentifacts

5.14 – Sociofacts

5.15 – Artefacts

5.16 – Result (impact and interaction)

5.17 – Discussion (what worked and what didn't)

Case Study A

5.11 Alter Axioms

The first procedural step is to alter a monetary axiom, using a method inspired by Nikolai Lobachevsky. Following Lobachevsky I will change one axiom at a time, not all. Below I present the alteration in a logic table:

	Functional Axioms of Money		
	Medium of Exchange	Store of Value	Unit of Account
Contemporary Money	1	1	1
Case Study A	1	0	1
Case Study B	0	1	1
Case Study C	1	1	0

Fig.50: Logic table to alter axioms #1

This first case study will combine the ‘medium of exchange’ and ‘unit of account’ functions but alter the ‘store of value’ function. Historically speaking, the ‘store of value’ has been problematic, in that it has continually shifted – expanded and contracted. Thus, this type of money would facilitate trade and measure relative values, but altering the ‘store of value’ would mean the general cultural mentifact surrounding the notion of wealth would be different.

Case Study A

5.12 Select Context (Counterfactual)

This section will focus on selecting an appropriate social science fiction novel with a culture that might be sympathetic to a currency system without a 'store of value'. The chosen society would operate a culture that requires no long-term store of wealth, negating the method that enables the economic distinctions of rich and poor; hence this society would need to be highly egalitarian.

Egalitarian societies from social science fiction come in both dystopian and utopian forms, monocultures that act as the author's vision of heaven or hell on earth. Unfortunately, dystopian egalitarian science fictions outweigh their utopian counterparts. Many egalitarian societies from fiction are socialist dystopias that achieve equality through reduced individual freedom and increased state rule. To counteract this general trend, I have chosen a novel that imagines alternative methods other than force to maintain the equality. Hence, B.F. Skinner's 1948 behaviourist-inspired novel *Walden Two* will be the cultural context in which an alternative currency system will be designed.

Skinner himself introduces the book in a 1964 interview with Richard Evans:

'I wrote the book quite seriously, it's not a dystopia it's a utopia. I thought it was possible at the time I wrote, and is so today. For a group of people, well-meaning people, to get together and organise their lives by cutting down some of the things they normally consumed and to cut down in turn the aversive labour that is required of them. To organise their social environment in such a way that they make more contacts of a satisfactory nature. To organise a school system in which they are educated for the life they are going to lead. Organise the economic system so that if you do have to work, at least you work under pleasant conditions. And so on. I think that could be done. It's quite a feasible possibility and I described this in my book.' (Skinner, 1964)

Hence, the world envisaged by Skinner in his novel is a planned economy. However, in this regard, how is it different from the planned socialist economies? The answer to this question is answered by Skinner himself:

'What value is used to judge one society as good or as bad? There is first of all a question of techniques. If you govern by threat of cohesive action as the Nazis did, waking people up in the middle of the night by a knock on the door by the Gestapo, you can control, a government can control for a long period of time. But it is governing a group of frightened people. Moreover it encourages support from outside and eventually it fails... In the long run, you have to look to the question of the survival of the group. And a despot who controls through techniques which weaken the group, eventually weakens himself.' (Skinner, 1964)

Unlike the cohesive techniques often employed by totalitarian regimes, the techniques in *Walden Two* are based on the behaviourist techniques Skinner developed through his own research. His work was concerned with developing a theory of behaviour. The term 'positive reinforcement', coined by him, refers to a conditioning technique he developed through his experiments on pigeons. One of the machines he developed in his research was named the 'Skinner box' (Cherry, 2015) and was an enclosed environment that facilitated his 'operant conditioning' research, to determine the behavioural characteristics of pigeons and rats.

In writing *Walden Two*, Skinner applied his research and theory of behaviourism to a fictional society. The small community described within the book embrace Skinner's behavioural conditioning techniques to create an egalitarian society. Thus, the people of *Walden Two* are ethically trained as children to act in a certain way; they are also raised in common and encouraged to experiment with all aspects of life, with an eye to improving society (Skinner, 1976).

Over the next section I will use Bidney's definition of culture to unpack the various cultural levels at work within *Walden Two*; these will inform the design of the alternative currency system and monetary artefacts.

Case Study A

5.13 – Mentifacts

The society portrayed in *Walden Two* is a utopia, brought about through ‘behavioural engineering’, which includes the ‘positive reinforcement’ techniques developed by Skinner. The aim of this

behavioural engineering is to overcome the psychological issues surrounding group living:

'Political action was of no use in building a better world, and men of good will had better turn to other measures as soon as possible. Any group of people could secure economic self-sufficiency with the help of modern technology, and the psychological problems of group living could be solved with available principles of "behavioural engineering".' (Skinner, 1976, p.24)

The underlying notions that inform the general approach taken to create the society in *Walden Two* are outlined by one of the book's protagonists, Frazier, the man who founded the community:

'Each of us has interests which conflict with the interests of everybody else. That's our original sin, and it can't be helped. Now, "Every-body else" we call "society." It's a powerful opponent, and it always wins... for it has the advantage of numbers and of age.' (Skinner, 1976, p.95)

Frazier goes on to argue that as soon as a person is born into a society, they are shaped by it. However, the process is badly planned with no standard approach; hence the results are varied and inconsistent:

'Society attacks early... it enslaves him before he has tasted freedom... Considering how long society has been at it, you'd expect a better job.' (Skinner, 1976, p.95)

Frazier advocates an experimental approach to child-rearing. What would usually fall under the remit of a parent's prerogative, however, in *Walden Two* is overseen by the community.

'The behaviour of the individual has been shaped according to revelations of "good conduct," never as the result of experimental study. But why not experiment? The questions are simple enough. What's the best behaviour for the individual so far as the group is concerned?' (Skinner, 1976, p.95)

Hence, in *Walden Two*, all children undertake the same training (the arrangement of which I will outline in the sociofacts section). But to what end? Within *Walden Two* the application of this type of behavioural conditioning has enabled the creation of a more equal society. Equal in terms of gender, class, economic and cultural identity:

'You may have noticed the complete equality of men and women among us. There are scarcely any types of work which are not shared equally.' (Skinner, 1976, p.123)

And divisions of social classes or the rich and poor:

"What if someone liked to be really shabby?" I said. "Would you permit him to follow his whim?" "I can't imagine it," said Frazier, "but I know you can. You are thinking of a world in which a fine suit is a mark of wealth, as well as a means of wealth. A shabby suit is a sign of poverty or a protest against

the whole confounded system. Either is unthinkable here.” (Skinner, 1976, p.45)

Or the divisions of culturally successful people:

‘I grant you that some events – a championship tennis match, can’t be repeated. But matches aren’t important here. We are not hero-worshippers.’ (Skinner, 1976, p.48)

To conclude, the behavioural engineering in *Walden Two* strives to create individuals who place the group interests and needs above their own; they embrace experimentation with all aspects of life, with the overall aim of creating an egalitarian utopia.

Case Study A

5.14 – Sociofacts

The institutions in *Walden Two*, particularly the education system, are based on notions of behavioural engineering, experimentation and social/economic equality. Such notions would usually be found within social science fiction novels that imagine heavy-handed institutional control, but Frazier suggests freedom is central to *Walden Two* society:

'We're utterly free of that institutional atmosphere which is inevitable when everyone is doing the same thing at the same time. Our days have roundness, a flexibility, a diversity. A flow. It's all quite pleasing and healthful.' (Skinner, 1976, p.52)

The reason why *Walden Two* has a planned economy, without heavy-handed institutional control, is because of the behavioural engineering undertaken by all *Walden Two* children. It is designed to teach methods of thinking and behaving that are conducive and complementary to the overall social structure.

'You can't force all future circumstances, and you can't specify adequate future conduct. You don't know what will be required. Instead you have to set up certain behavioural processes which will lead the individual to design his own "good" conduct when the time comes. We call that sort of thing "self control".' (Skinner, 1976, p.95)

Hence, the behavioural conditioning undertaken by the children in *Walden Two* is designed to promote certain behaviours, for instance, tolerance of annoying experiences:

'Society and nature throw these annoyances at the individual with no regard for the development of tolerances. Some achieve tolerances, most fail.' (Skinner, 1976, p.97)

'...Remember we control the social environment, too... Take this case... A group of children arrive home after a long walk tired and hungry. They're expecting supper; they find, instead, that it's time for a lesson in self control: They must stand for five minutes in front of steaming bowls of soup. the assignment is accepted like a problem in arithmetic. Any groaning or complaining is a wrong answer. Instead, the children begin at once to work upon themselves to avoid any unhappiness.' (Skinner, 1976, p.99)

This type of behavioural engineering has presumably enabled the citizens of *Walden Two* to endure

duties that are not enjoyable but necessary. One aspect of society that this might be applied to is work-related duties.

The economic system that operates within *Walden Two* is a form of labour credits:

'Each of us pays for what he uses with twelve hundred labor-credits each year – say, four credits for each workday. We change the value according to the needs of the community...' (Skinner, 1976, p.45)

The egalitarian nature of *Walden Two* plays a significant role in the way the credit system is organised:

'We're satisfied to keep just a state beyond breaking even. The profit system is bad even when the worker gets the profits, because the strain of overwork isn't relieved by even a large reward.' (Skinner, 1976, p.45)

The organisation of this system falls to the planners, who determine the amount of pay on a job-by-job basis, based on supply and demand.

'A credit system also makes it possible to evaluate a job in terms of the willingness of the members to undertake it. After all, a man isn't doing more or less than his share because of the time he puts in; it's what he's doing that counts. So we simply assign different credit values to different kinds of work...' (Skinner, 1976, p.45)

In conclusion, the success of the institutions and social organisation of *Walden Two* rests upon the quality of the behavioural engineering used to create tolerant and socially minded individuals. The economic system is planned; hence all work-related duties are written down in a ledger for a suitably skilled person to undertake them.

Case Study A

5.15 – Artefacts

The credit system operating within Walden Two's planned economy means there is no free-floating money:

'I'm sorry. I had forgotten. Labor credits are a sort of money. But they're not coins or bills – just entries in a ledger.' (Skinner, 1976, p.45)

This aspect of the economy appears to undermine one of the previous arguments presented by Frazier, that Walden Two is free from institutional control, as the use of a 'ledger' for organising jobs and duties suggests heavy institutional control. A point that the antagonist Castle raises with Frasier:

“Then you don't really offer personal freedom do you?” said Castle, with ill-concealed excitement. “You haven't really resolved the conflict between a laissez-faire and a planned society.” (Skinner, 1976, p.45)

Although Walden Two operates a 'labour credit' system, I will update this with a more culturally harmonious currency system and monetary artefacts. Thus what type of currency system would harmonise with the cultural context of the novel?

Walden Two's behavioural engineering is a key aspect to the success of the society; however, the institutionally controlled credit system undermines both the notion of freedom and the benefits of a society comprised of self-controlled, tolerant, thoughtful individuals. Surely if the behavioural engineering is successful, the people of Walden Two would be trustworthy enough to have more responsibility over money, including its creation? Also, aspects of contemporary money are designed to overcome inherent flaws in human behaviour, like the watermarks on banknotes designed to prevent counterfeiting. Would these aspects of monetary artefacts be required?

The monetary artefacts that I have designed over the following section build on the 'labour credit' based system, but substitute the ledger with an alternative currency system that reflects the underlying principles within the culture.

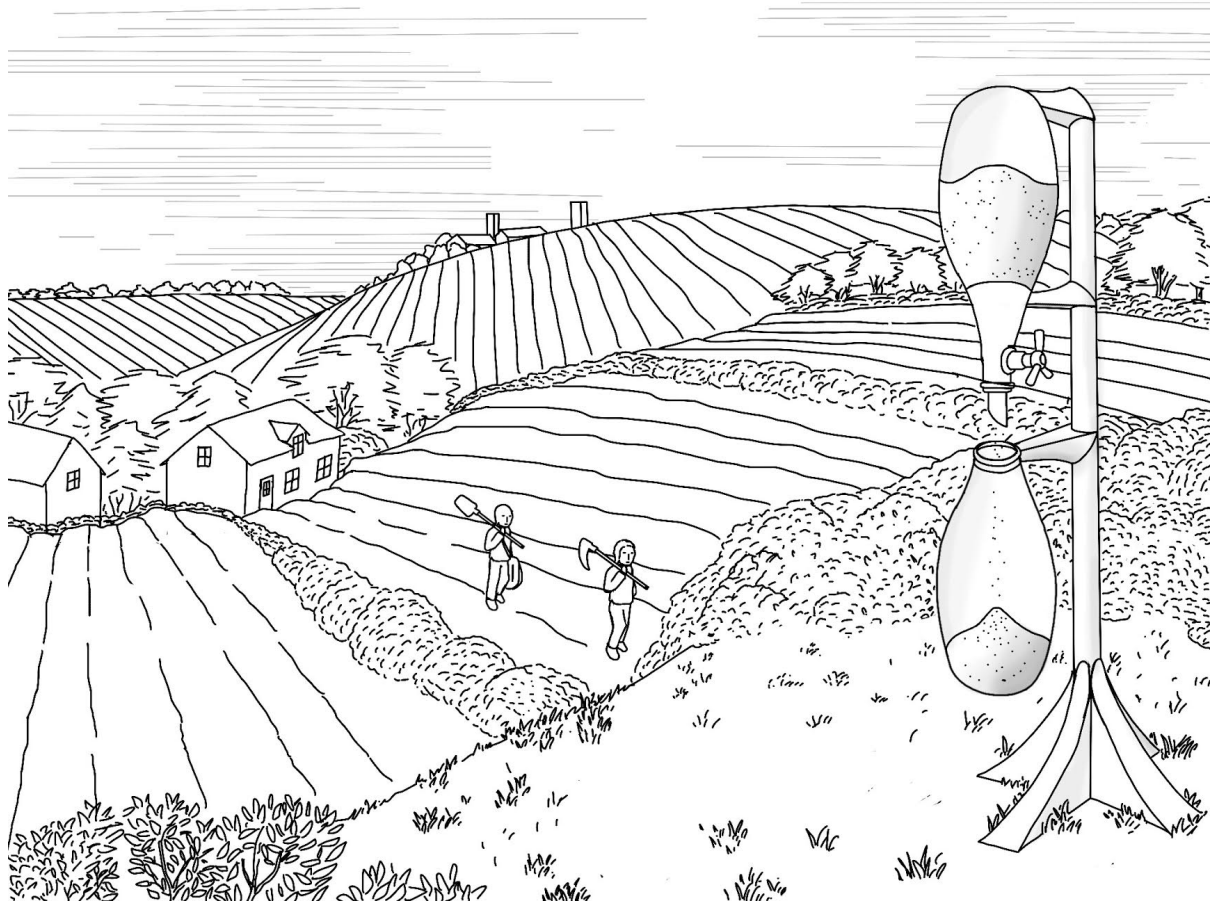


Fig.51: Earning.

'There were a few farmhouses and barns dotted about, and ahead and far up the sloping field to the right, a series of building of another sort. They were earth coloured and seemed to be built of stone or concrete, in a simple functional design.' (Skinner, 1976, p.26)

When a job needs to be done, the individual starts the job by turning the tap on one of the sand clocks;

each clock is pre-filled with the amount of sand equal to the labour credits allocated (see Fig.51). These sand clocks also give the workers a clue as to how long a job ought to take.

One of the issues with any type of central planning is inflexibility. Unanticipated problems can occur; hence sometimes there are inaccuracies in how long a job will take. For this reason, the final wage is decided by the worker; he/she has the option of taking more money than the planners allocated. A bucket holding the 'coins' is located near all designated working areas (see Fig.52).



Fig.52: Payment.

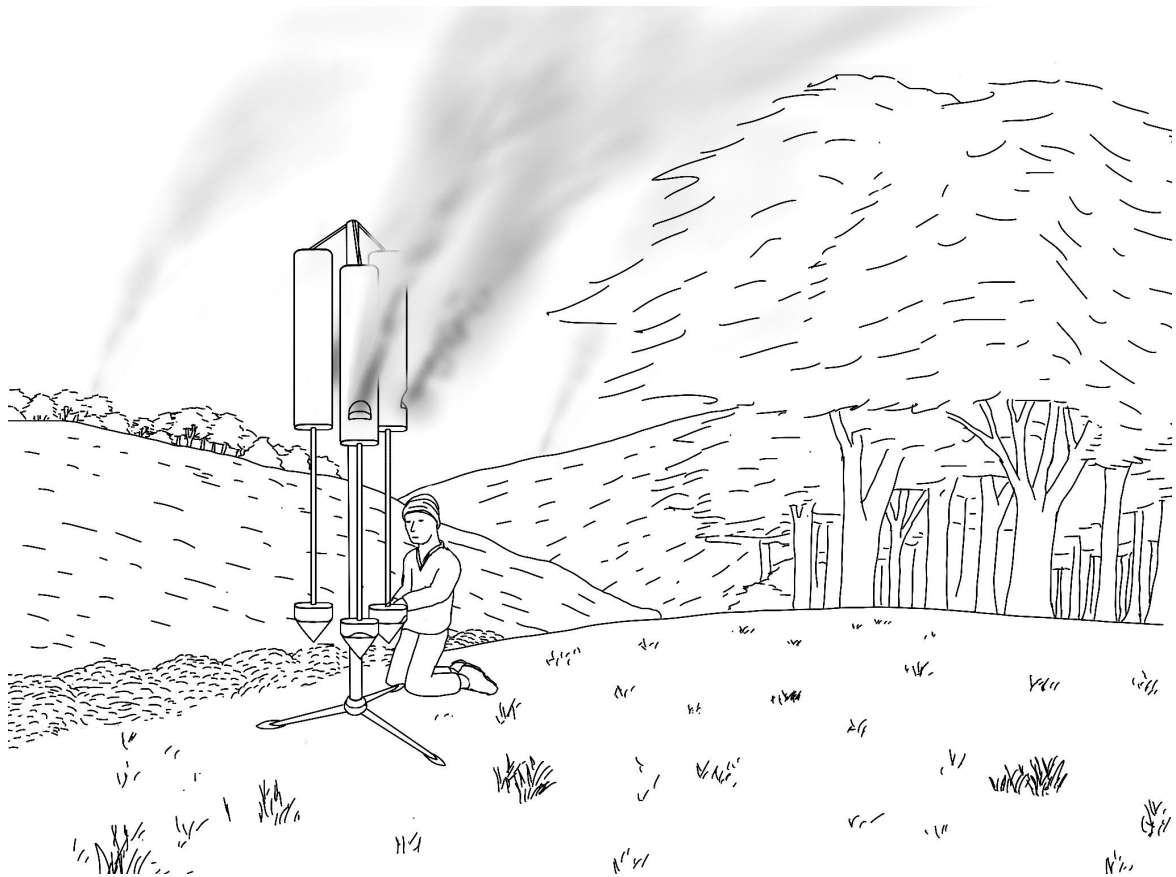


Fig.53: Purchase.

With this free-floating currency system, workers can buy things directly from one another. However, the money is not transferred from one person to another; rather, it is destroyed.

The responsibility of the seller is to aid in the destruction of the buyer's money, equal to the amount of credit that was needed to create it. For instance, if a farm worker wanted to buy a textile worker's shirt, he would spend (destroy) his own labour credits equal to the quantity of credits that the textile worker created while producing the shirt. The destruction of the money occurs within a transaction machine that resembles a pipe organ made from plywood, a material local to Walden Two:

'There were two comfortable chairs, made of heavy plywood, which appeared to be a local product.'
(Skinner, 1976, p27)

Within the transaction machine the coins act as propellant. Each coin is made from potassium nitrate and sugar, which when ignited produce copious amounts of smoke. The expansion of smoke produced from the burning coins travels up to the organ pipes and produces a musical note; these pleasant musical notes help reinforce this ritual (see Fig.53).

The musical notes created not only help reinforce this behaviour but also signal to the managers and planners the state of the economy and the success of the behavioural engineering; as the creation of

money rests in the hands of the worker, each worker could undermine the economy and simply take too much money for too little work. Hence the musical notes indicate the quality of the behavioural engineering.

'We had already worked out a code of conduct subject, of course, to experimental modification. The code would keep things running smoothly if everybody lived up to it. Our job was to see that everybody did.' (Skinner, 1976, p.95)

The economy is monitored by the transaction listeners who are often Walden Two's composers, as they can ascertain which note is being played (see Fig.54). This is important, because each note is a denomination, for instance a C is 1, D is 2, E is 3 and so on – the duration of the note indicates the amount. For instance, D played for three seconds is $2 \times 3 = 6$ Walden credits. A secondary benefit of this system is that the composers often gain inspiration from the burning money as they record the transactions. Thus, Walden Two citizens take gratification in the knowledge that their money-burning has directly inspired the creation of new orchestral symphonies.

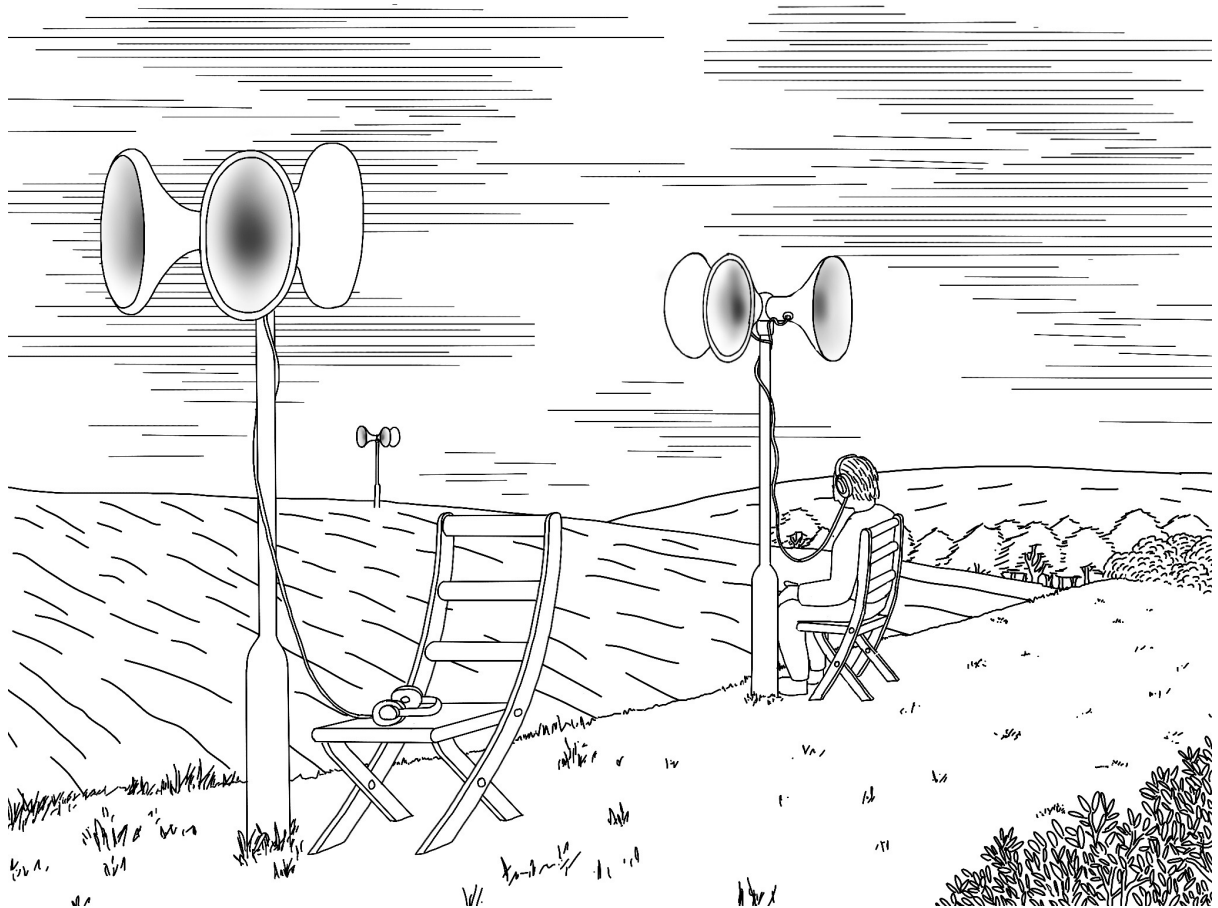


Fig.54: Listening and planning.

Case Study A

5.16 Result

In the previous section I designed an alternative currency system in the context of *Walden Two*. I now test the idea by bringing the proposal into the real world through crafted objects. In this results section I

take a broad-based approach regarding the work's dissemination into the wider world. The intention is to highlight the possible outlets for these incongruous designs, ultimately informing the approach I take in the subsequent case studies. Regardless of the work's output, my major concern in taking these projects into a public setting was that people might simply dismiss the projects as unrealistic, pointless or puerile. Thus, in an attempt to dispel people's disbelief I decided the best approach was to adopt MIT's 'demo or die' motto. The rationale being that if I could show aspects of the project working, then this might convince the audience to entertain the project long enough for me to explain the finer details.

Making Walden Two Palpable

The artefact from the Walden note-money proposals that I decided to develop was the money-burning transaction machine (Fig.53). I chose this aspect of the project as it would potentially enable the creation of engaging interactions within a gallery setting and represent the day-to-day transactions occurring in Walden Two.

Bringing the machine into the real world required several different tests, firstly creating musical notes from burning various pyrotechnic materials. The material I decided to use to mint the Walden money (see Fig.52) was a toffee-like substance, a combination of sugar and potassium nitrate (Fig.55), which when ignited produced vast amounts of smoke.



Fig.55: Potassium nitrate and sugar



Figs.56, 57, 58: Test fire

Rig to test the ability of mixture to create musical notes from the expanding gas.

I placed the mixture into a sealed copper pipe, with a toy wooden whistle attached to one end. The sealed container forced the plumes of smoke into the whistle, creating a rather high-pitched but pleasant sound. Changing the quantity of mixture increased or decreased the length of notes that the whistle produced. However the toy whistle created a chord; hence, I began to build my own wooden organ pipes.

Alongside creating a functioning prototype, the money-burning organ also needed to look aesthetically pleasing, intriguing and in keeping with the *Walden Two* context. So after this initial test I began to tweak the design, settling on building the object from birch plywood, in keeping with this particular reference from the book:

'There were two comfortable chairs, made of heavy plywood, which appeared to be a local product.'
(Skinner, 1976, p.27)

Regarding the style of the artefact, I turned to the book. In one part, while explaining to the group about the design of the building, Frasier mentions that most of Walden Two's architecture was created by:

'...A young couple interested in modern housing and willing to work within the limits of our initial poverty. It would be hard to exaggerate what they have contributed to Walden Two.' (Skinner, 1976, p.21)

He goes on to say:

'They were also interested in interior design, especially in inexpensive modern furniture which could be mass produced. Our most flourishing industry is the manufacture of some unusual pieces which they designed.' (Skinner, 1976, p.21)

For the above sentence, I found a resonant and analogous aesthetic in Charles and Ray Eames, as they

were famed for their modern, mass-produced, simple designs, often employing plywood forms. Hence, I used two specific Eames designs, which influenced the look of the money-burning organ. The first was a rough test rig, as this seemed to embody the *Walden Two* experimental approach to society (see Fig.59). The second was the iconic bent plywood chair (Fig.60). Combining aspects of each of these designs enabled me to create the money-incinerating organ (Figs.61 and 62).



Fig.59: Test rig (Charles and Ray Eames, 1954).



Fig.60: Eames plywood chair (Charles and Ray Eames, 1946).



Fig.61: Money-incinerating organ.

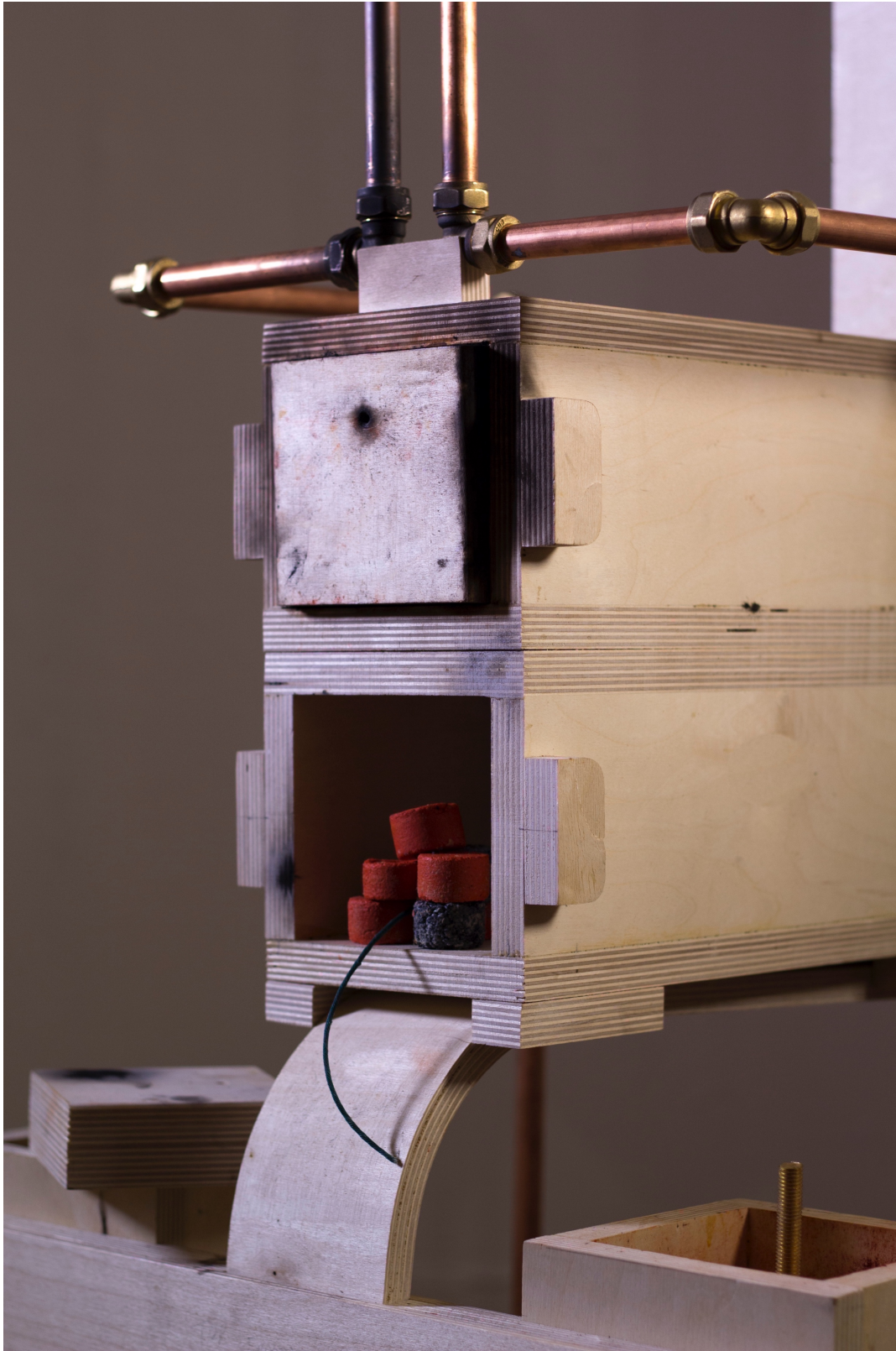


Fig.62: Money-incinerating organ.

Case Study A

5.17 Discussion

In this section I discuss the reaction and impact of the money-incinerating organ and the Walden note-money project. The project was exhibited in several different venues and events, some more successful than others at encouraging the audience to engage with the notions surrounding the work. These exhibitions and talks were conducted in front of two main categories of audience, an informed audience and a lay audience. These two categories will be the focus of the subsequent case study results/discussion sections.

What worked and why (informed audience):

Regarding the informed audience, the Walden note-money project was successful in facilitating discussions surrounding monetary assumptions. For instance, following the project's display at Airspace Gallery in Stoke on Trent, one of the curators, Michelle Rheeston-Humphreys, wrote of the project:

'It was fitting that Walden note-money was to coincide with the event, as it shared many of the same sentiments and concerns discussed during the two days of events to re-imagine the city. It got a lot of attention from the participants and generated further dialogue. In addition politically it interrelates with two recently commissioned artworks for "The Bird Garden", which each explore nature's detoxification of the capitalist monetary system, utilizing text from economists Friedrich Hayek and Milton Friedman. (Humphreys, 2014)

Thus, the project generated discussion for a small engaged audience already interested in the topic of money. Likewise, when I presented the project during the conference *Memories of the Future*, organised by ULA (University of the Arts London), I was subsequently invited to write a chapter of the book by the same name, published by Peter Lang (Fig.63). The project also won a core77 'notable' award in 2014. Thus, whenever I presented the project to an audience engaged with either the subject matter of money or the role of design in monetary development, generally the audience found the project entertaining and thought-provoking. In light of this success, the focus of Case Study C's output will be an informed audience, moving beyond the familiarity of academic audiences and designers towards the financial and payments sector that operates within our collectively derived monetary assumptions.



Fig.63: Money-incinerating organ in context.

This picture was shot for the front cover of the *Memories of the Future* book.

What didn't work and why (Lay Audience)

In the context of a design exhibition, interest in the project was raised by demonstrating the music that the machine could produce. Highbrow ideas of monetary functionality could be preceded by a satisfying 'toot' from the money-incinerating pipe organ. However, without my explanation, the project didn't communicate effectively to a lay audience. This issue was highlighted in an email exchange with the We-make-money-not-art blogger Regine Debatty:

Hi Regine.

...I was wondering if you were planning to pop along to the wip show at the Rca this week? I have a bit of money related work in the show... It's the first project from my research where I've designed a monetary system within a social science fiction novel.

Hi Austin,

...I'm just back from the rca show but i can pop by again if you're going to be around because i didn't see your work. where was it? ...

Once I explained the project, Regine decided to write about the work on We-make-money-not-art (Debatty, 2014). However, the fact that she had initially overlooked the project raised my concerns surrounding its ability to communicate as a stand-alone exhibit. The issue was twofold: firstly, how best to communicate a large quantity of information without losing the audience's attention and secondly, how to dispel disbelief and encourage the audience to entertain alien monetary concepts

without simply dismissing them as completely fanciful or without merit.





Figs.64, 65, 66, 67. Walden note-money screen shots.

Stills from the video that accompanied the artefact.

One of the contributing factors that inhibited the communication and impact of the Walden note-money project for a lay audience was space. As the curator of Airspace Gallery recognised, in her review of the Walden note-money display in Stoke on Trent:

'On reflection, due to the closed-off nature of the window space that does not allow fully for participation (the reason for the hand contact sensor addition), the work might be more suited to a space offering further physical interaction with its audience.' (Humphreys, 2014)

The limitation of space is systemic to the traditional design exhibition. For practical engineering-based solutions, or aesthetically unique normative designs, limited space does not often cause issues. Often the cultural precedent for market-orientated products is to present them close together, competing for attention, simply echoing how they are displayed on the shelf within a market, shop or online. However, when the role of the design isn't intended for the marketplace, should the context and manner in which they are displayed be adjusted to reflect this change in role?

The Walden note-money project would have benefited from an alternative exhibition space, one that would grant enough space to the object to fabricate a facsimile of the Walden Two society, enabling visitors to step into this world and play with this type of money, through a well-orchestrated immersive experience. The long explanations of the system could become part of a roleplay so the visitors would play an active part in recreating the society. However, the limitations of space within the average design exhibition makes such a display difficult to achieve.

James Auger, within his thesis *'Why Robot? Speculative design, the domestication of technology and the considered future'*, also recognised that conceptually challenging design projects benefited from practical demonstrations to suspend an audience's disbelief:

'...It is therefore often possible to manufacture convincing demonstrations through the use of experiential prototypes. The power of a more immersive aesthetic experience can help build a convincing argument for the reconfigured object or function.' (Auger, 2012, p.16)

Here Auger refers to his work 'iso phone'. This was a reconfigured phone, designed to separate the user from outside stimuli entirely and create a completely isolated phone conversation, a technology demonstrated during Ars Electronics 2004. The issues of 'odd' or 'alienating' design proposals, highlighted by Auger, are exacerbated with regards to the incongruous Redefinition Designs like Walden note-money, as the technology is not only reconfigured, but completely redefined in a way that adheres to a different social framework and culture. In contemporary life, phone conversations can often be drowned out by background noise, and therefore people can relate to some aspects of the iso-

phone speculative design. However, demonstrating the Walden note-money project doesn't only require a verification of the object's functionality, but also the recreation of the context in which said functionality might be relevant; i.e. the environment, in this case the Walden Two society. The anthropologist David Bidney also suggests the limitations in attempting to understand an artefact outside its cultural context:

'In and by themselves these products are but symbolic manifestations of cultural life. It is the use or function of an artefact, its contribution to cultural life in a given context, which is significant – not the artefact in and by itself..

I am inclined to agree, therefore, with those who maintain that the term "material culture" is a misnomer in that we thereby divorce the object of knowledge from the knowledge and art of the manufacture and use of the artefact.' (Bidney, 1968, p.27)



Fig.68: Saw Mill/Cheese Maker (Atelier Van Lieshouts, 2013)



Fig.69: Insect Farm (Atelier Van Lieshouts, 2012)

In search of a solution to this problem of incongruous design proposals, I came across the work of artist and designer Joep Van Lieshout. His work goes some way in addressing the problems of incongruous design projects. Van Lieshout mixes elements from art, design and architecture to create large-scale objects and buildings, which form part of a built environment from an alternative world. Insect Farm, a 2012 project, presents the idea of insects becoming a part of the westerner's staple diet. The stainless-steel modernist prefabs suggest a high-tech sterile environment, which also seems to reflect the cold functional environment of the modern slaughterhouse. The approach Lieshout takes to engaging an audience with challenging alternative ideas is one that might facilitate the effective communication of the Redefinition Design projects that are presented to a lay audience.

In conclusion, I have established two main categories of audience for further study in the subsequent case studies: an informed audience and a lay audience. These inform the focus of the subsequent case studies' results and discussion section. Hence, in the next case study a lay audience will be the focus of the results and discussion section. I will build on what was discussed in this section, by moving beyond the traditional design exhibition and creating an immersive experience to demonstrate the functionality of the system.; like Auger's iso phone, but combined with Lieshout's large-scale building of imaginary worlds.

5.2 Case Study B

This case study follows the methods and procedure outlined in the previous chapter, in section 4.4. Each section represents a procedural step.

The steps for this case study are as follows:

5.11 – Alter Axioms

5.12 – Select Context (Counterfactual)

5.13 – Mentifacts

5.14 – Sociofacts

5.15 – Artefacts

5.16 – Result (impact and interaction)

5.17 – Discussion (what worked and what didn't)

Case Study B

5.21 Alter Axioms

The first procedural step is to alter a monetary axiom, using a method inspired by Nikolai Lobachevsky. Following Lobachevsky I will change one axiom at a time, not all. Below I present the alteration in a logic table:

	Functional Axioms of Money		
	Medium of Exchange	Store of Value	Unit of Account
Contemporary Money	1	1	1
Case Study A	1	0	1
Case Study B	0	1	1
Case Study C	1	1	0

Fig.70: Logic table to alter axioms #2

The second altered form of the functional axioms of money will combine the ‘store of value’ and ‘unit of account’, altering the ‘medium of exchange’ function. This means that this type of money would hold wealth and measure relative values; changing the ‘medium of exchange’ means an alteration to the notion of trade.

Case Study B

5.22 Select Context (Counterfactual)

In this second step, I employ the counterfactual method. Thus this section will focus on selecting an appropriate social science fiction novel within a culture that might be sympathetic to a currency system without a 'medium of exchange'. I established in section 2.2 that the 'medium of exchange' facilitates trade; it appears to be a fundamental requirement within a society that adopts a free market approach. So a society that operates a currency system with no 'medium of exchange' would likely be organised through a planned economy.

Planned economies are popular economic models in social science fiction. However, planned economies still often utilise a type of trading system. For instance, the first novel to suggest a national credit-based system was *Looking Backward* by Edward Bellamy, published in 1888. In this book,

Bellamy describes a mechanical credit card device⁷³. Although operating in an institutionally controlled planned economy, these credit cards were sometimes used as a free-floating ‘medium of exchange’.⁷⁴ Thus the book I choose for the next case study needs a culture that has negated any potential for a ‘medium of exchange’.

To find a context in social science fiction that has no monetary artefacts or currency system, the investigation needs to move towards moneyless utopias or dystopias that operate not only a planned economy, but an entirely planned society. Thus, I have decided to use Yevgeny Zamyatin’s seminal work *WE*.

Many of the ideas that recur in dystopian science fiction – people being represented as numbers, the erosion of individuality, state monitoring, capital punishment and the cultural disassociation of sexual intimacy and love – originate from Zamyatin’s novel *WE*, published in 1924. The influence and originality of his work resulted in Aldous Huxley and George Orwell blaming one another for plagiarism (Owen, 2009). Due to the impact of this work, and the fact that money, credit and exchange are never mentioned within *WE*, the counterfactual design of a currency system and monetary artefacts without a ‘medium of exchange’ will be based on this novel.

Case Study B

5.23 Mentifacts

The society described within the novel adheres to an egalitarian ideology within a totalitarian dictatorship. All aspects of life are organised in line with the collective goal, including creative practices tailored to public duty:

‘In the name of the Well-doer, the following is announced herewith to all Numbers of the United State:

⁷³ The credit cards were paper cards that were punched by a machine each time they were used. (Bellamy, [1888], 2009).

⁷⁴ In one part of the book, there is a suggestion that credit could in theory be transferred from one person to another. Ibid.p. 65

Whoever feels capable must consider it his duty to write treatises, poems, manifestoes, odes and other compositions on the greatness and the beauty of the United State. (Zamyatin, [1924] 2013, p.5)

The general understanding within the 'United State' is that the relationship between individuals within a society can be understood as a set of numbers within an equation: *'It didn't enter the heads of all their Kants to build a system of scientific ethics, that is, ethics based on adding, subtracting, multiplying and dividing.'* (Zamyatin, [1924] 2013, p.15). The protagonist D-503 exemplifies this 'scientific ethics' while observing highly organised labour and comparing it to the beauty of a dance:

'Then the thought came: why beautiful? Why is the dance beautiful? Answer: because it is an unfree movement. Because the deep meaning of the dance is contained in its absolute, ecstatic submission, in the ideal non-freedom.' (Zamyatin, [1924] 2013, p.7)

'Ideal non-freedom' is a concise way to describe the core notion that informs the workings and organisational structures within the 'United State'. Individual freedom is associated with a primitive state of being, a state of being that the citizens wish to eradicate from other civilisations:

'Your mission is to subjugate to the grateful yoke of reason the unknown beings who live on other planets, and who are perhaps still in the primitive state of freedom.' (Zamyatin, [1924] 2013, p.5)

Therefore the collective mentifact of the United State is one that regards individual liberty as a dangerous, savage and irrational concept that undermines the unity required for a fully cohesive and productive society:

'For every spark from a dynamo is a spark of pure reason: each motion of a piston, a pure syllogism. Is it not true that the same faultless reason is within you?' (Zamyatin, [1924] 2013, p.170)

'You are perfect; you are mechanised: the road to one-hundred-per-cent happiness is open!' (Zamyatin, [1924] 2013, p.171)

Case Study B

5.24 Sociofacts

The institutions within the novel reflect the ideas of 'ideal non-freedom'. To say the society operates a 'planned economy' would be understating the level of organisation overseen by the 'well-doer', for every aspect of everyone's life is counted and assigned to a certain task, both for work and pleasure:

'The Tables transformed each one of us, actually, into a six-wheeled steel hero of a great poem. Every morning, with six-wheeled precision, at the same hour, at the same minute, we were up, millions of us at once. At the very same hour, millions like one, we begin our work, and millions like one, we finish it. United into a single body with a million chances, at the very same second, designated by the Tables, we carry the spoons to our mouths; at the same second we all go out to walk, go to the auditorium, to the halls of the Taylor exercises, and then to bed.' (Zamyatin, [1924] 2013, p.14)

The 'tables' appear to be a kind of rota that plans every citizen's day, including afternoon walks:

'On days when the weather is so beautiful, the afternoon personal hour is usually the hour of the supplementary walk.' (Zamyatin, [1924] 2013, p.8)

The method of communicating to the people a change within the rota appears to have been the job of what is referred to as the 'accumulating tower'.

'At the end of the avenue the big bell of the Accumulating Tower resounded seventeen. The personal hour was at an end.' (Zamyatin, [1924] 2013, p.11)

Although the 'rota' and 'accumulating tower' are presented as effective means of organisation in this highly planned society, how successful would this system really be? The interaction of the people in response to the rota and accumulating tower appears far too binary, in that you either do your duty or you don't; however in reality, the extent to which a person performs his/her duty is far greyer than simply yes or no. For instance, is the quality of work not a factor? How fast or slow is it being performed? Is attendance a requirement? All these factors would ultimately mean that a scale or 'unit of account' would be more appropriate in gauging whether a person is performing their duty than a binary yes or no.

Another issue that a unit of account could overcome would be lack of self-reflection or self-observation. In the book, the monitoring of a citizen's duty occurs in one direction, from dictator to the citizens, but how do citizens themselves know if their actions are conducive to the collective goal? In this regard, the unit of account should be open and transparent for all the citizens to see, so their actions can change in response to positive or negative changes in their accounting unit.

Lastly, what motivates and directs the citizen's actions? Perhaps the system would also need to reflect culturally derived value as a 'store of value'. Unlike an individually owned asset, within the United State, value is collectively derived. Hence the system would need to embody the core mentifacts of 'Ideal non-freedom' and collective cohesion.

5.25 Artefacts

Considering the mentifacts and sociofacts from the book, I have designed the monetary artefacts and larger currency system as one collective whole. Unlike the dispersed, free-floating banknotes and coins within a free market economy, the United State is completely planned, so why would the currency system not also be planned and confined to the ‘ideal none-freedom’?

The currency system I have designed within *WE* takes the form of a huge sphere that is suspended above the city via long cables that reach outwards to columns constructed in line with the city perimeter, which is called the ‘green wall’ (see Figs.71 and 74).

‘From behind the green wall, from some unknown plains the wind brings to us the yellow honeyed pollen flowers. One’s lips are dry from the sweet dust... this somewhat disturbs my logical thinking.’ (Zamyatin, [1924] 2013, p.6)

The sphere is comprised of thousands of separate sections, which are suspended on individual wires linked to the outer walls of the city (see Fig.73). Each citizen has their own individual section; even the book’s protagonist ‘D-503’ has his own section and suspension wire (see Fig.72).

The sphere represents the cohesion and ‘ideal non-freedom’ of the United State. If all the numbers (citizens) are performing their duties then all the sections that make up the sphere stay centrally located, forming the perfect unifying form comprised of individuals. The inspiration that informed this design was a short sentence from the book that compared the citizens with a piece of architecture:

‘The auditorium: an enormous half-globe of glass with the sun piercing through. The circular rows of noble, globe-like, closely shaven heads.’ (Zamyatin, [1924] 2013, p.17)

In the above reference, the ‘globe-like, closely shaven heads’ are an identifying feature of a citizen. But the circle is also a sign of perfection, as the below reference illustrates:

‘The philosophy of the cranes, presses and pumps is complete and clear like a circle. But is your philosophy less circular? The beauty of a mechanism lies in its immutable, precise rhythm, like that of a pendulum, you who are brought up on the system of Taylor.’ (Zamyatin, [1924] 2013, p.170)⁷⁵

⁷⁵‘Taylor’ is a reference to Frederick Winslow Taylor, an American mechanical engineer who sought to improve efficiency within industry. An introduction to Taylor can be found here: Available: <http://www.eldritchpress.org/fwt/taylor.html>.

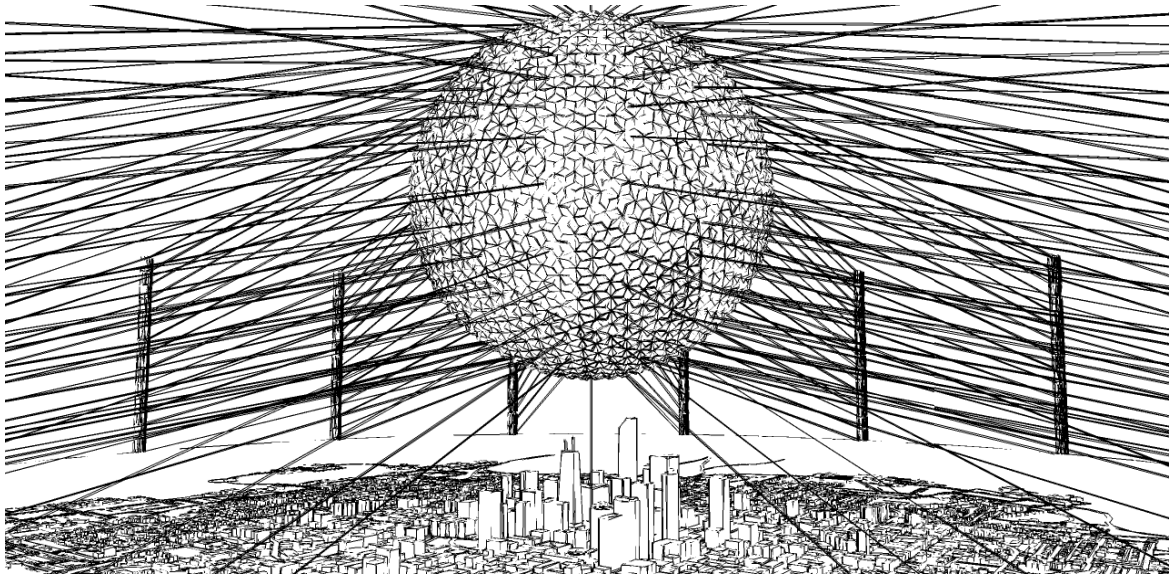


Fig.71: *WE* sphere.

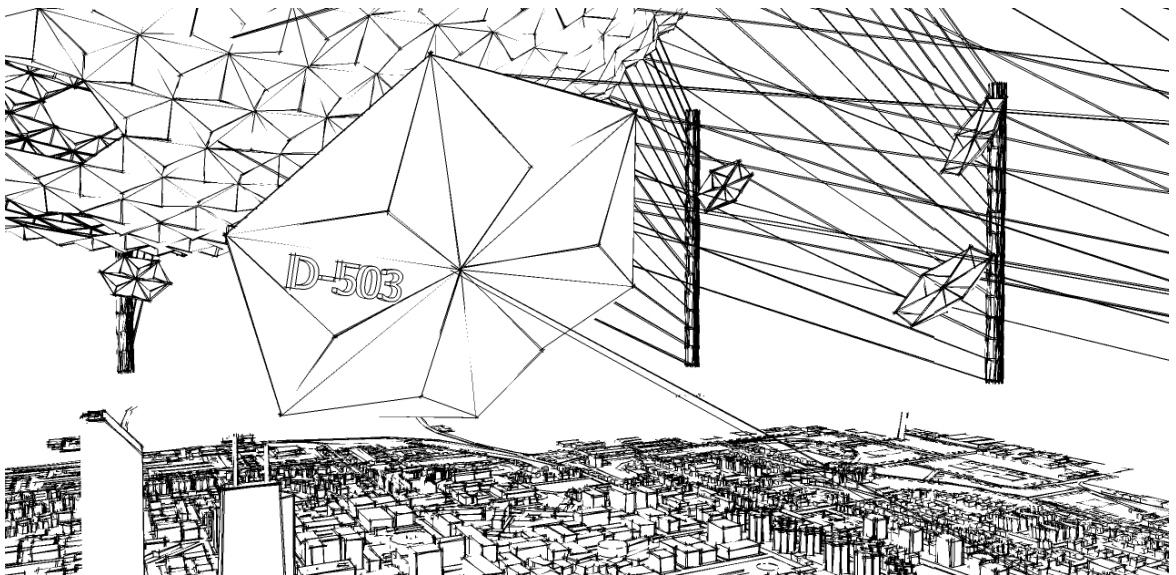


Fig.72: *WE* sphere section.

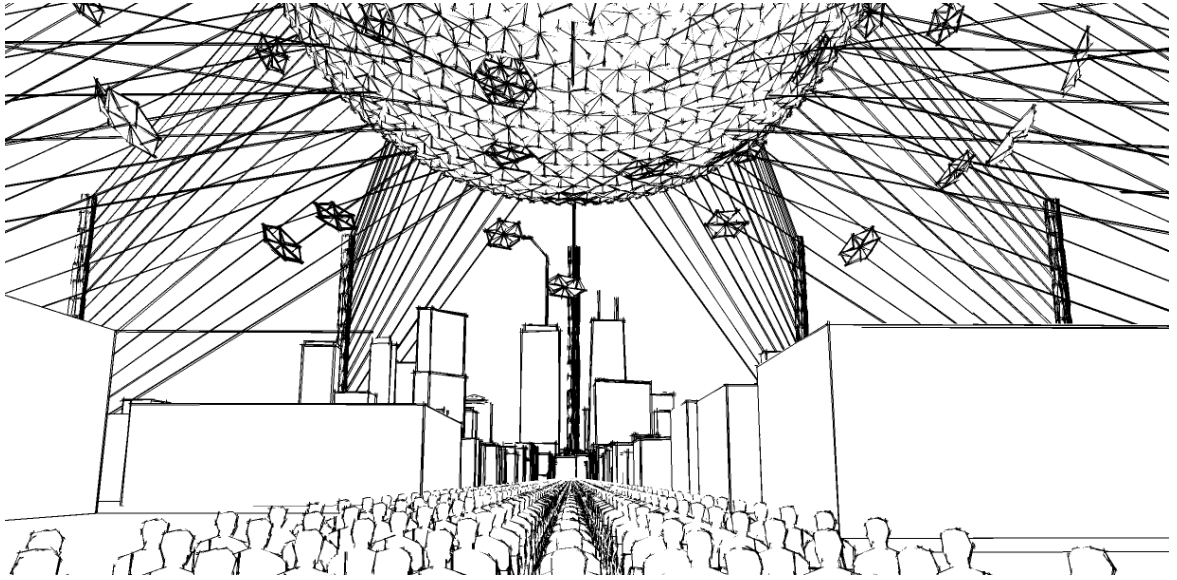


Fig.73: *WE* sphere multiple sections.

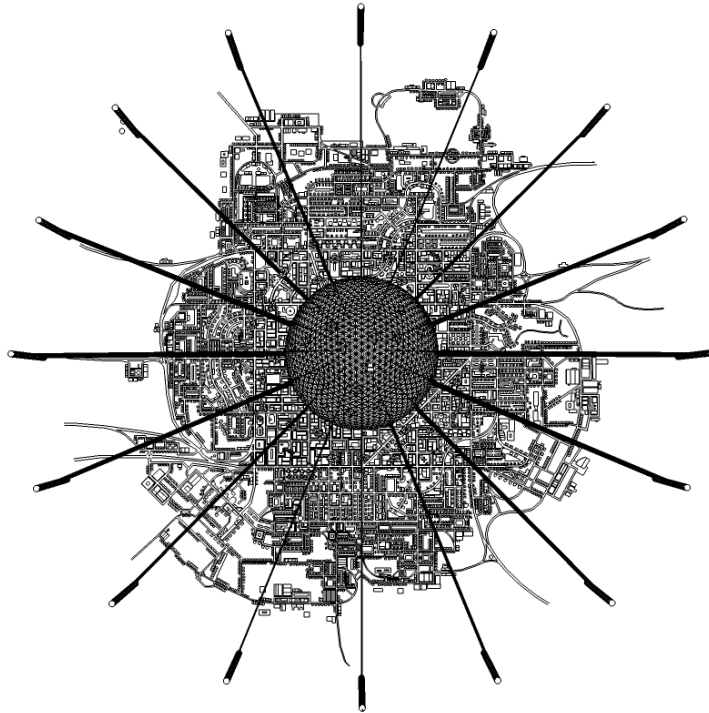
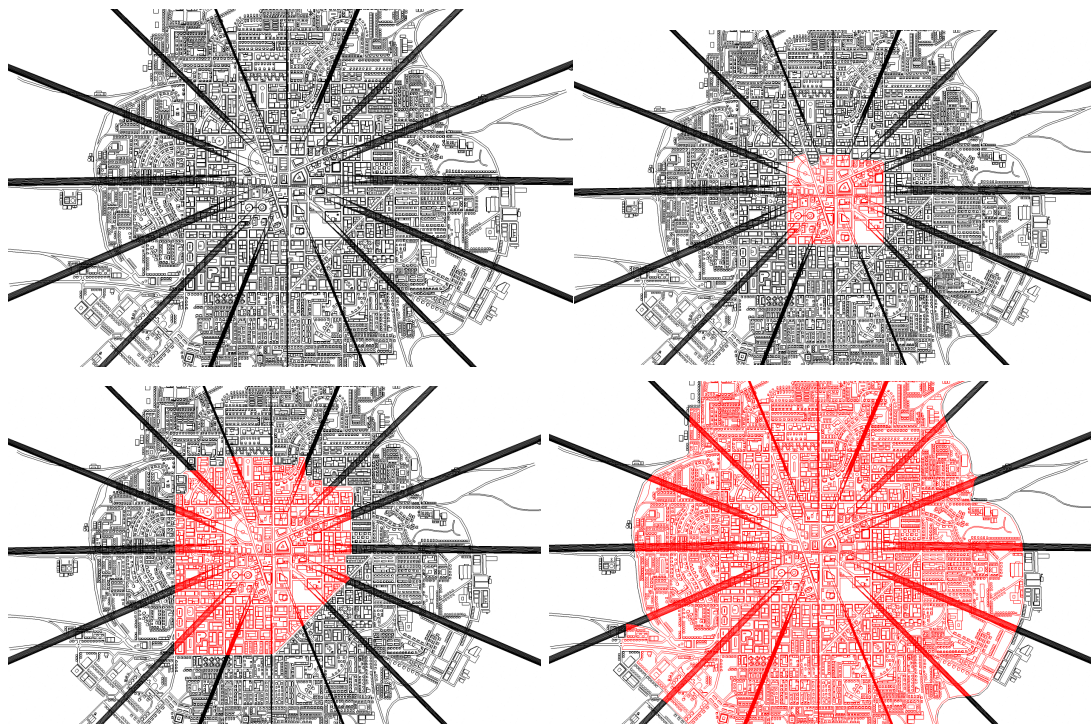


Fig.74: *WE* sphere top view.

So how does this currency system work? It operates as a unit of account and store of social value. If a citizen begins to diverge from the prescribed duties (ones from the table), their section of the sphere will move outwards towards the 'green wall'. The extent to which the section moves is relative to the extent to which the person diverges from their expected duties; the effect of this movement is twofold. Firstly, all citizens in the city will see which section was moving away from the group, hence the individual in question would be ostracised as a result. Secondly the benefits of living within the city – the food, the accommodation and access – would slowly be reduced.

In Figs.75–78 I show the view of the city from above, without the sphere. If an individual section of the sphere stays in the centre, the related citizen has access to all the benefits of living within the city (Fig.75). However, if the citizen diverges from his/her duties the section moves towards the green wall (Figs.76–78), reducing the access the citizen has within the city and eventually pushing them out of the city entirely.



Figs.75, 76, 77, 78: WE city above view.

This sequence of illustrations shows how access to the city is reduced as an individual's section of the sphere moves out from the centre.

Case Study B

5.26 Result

In the previous case study, I highlighted two general audiences for subsequent investigation; an informed audience and a lay audience. This case study focuses on communicating to the lay audience.

In Case Study A's discussion section I proposed a potential approach, which might rectify the difficulties in communicating incongruous Redefinition Designs: immersive fictions. Hence, in Case Study B, I attempt to create the immersive fiction version of the *WE* Redefinition Design proposal.

To recall, the aim of an immersive fiction was to firstly maintain an audience's attention while communicating large amounts of information and secondly, encourage an audience to entertain alien monetary notions.

Making the immersive fiction

The city-sized sphere is the main monetary artefact within the 'one state, one currency' design proposal. However, working on this scale is impossible, hence I reduced the size of the monetary artefacts to something a little more manageable, a three-metre sphere. Although dramatically smaller than the original, it was still of a size unsuitable for the traditional design exhibition and a scale that would require additional funding to build. Fortunately, the funding and venue came when I proposed the project to an arts festival called Longbridge Light Festival in 2014. The budget for the festival was limited, thus I decided to focus on creating the artefact.



Fig.79: Visualisation for Longbridge Light Festival.

A visualisation included in the design proposal submitted to Longbridge Light Festival. The sphere was initially intended to be installed round a lamppost on a street in Longbridge.





Figs.80 and 81: Longbridge test rig

Due to budget restraints a resourceful approach to problem-solving was required. Pneumatics used to control the sphere's sections were made from household PVC piping and adapted plumbing fittings.



Fig.82: Longbridge Installation #1



Fig.83: Longbridge Installation #2

Unfortunately, the finished artefact did not completely satisfy the initial design brief, as some aspects were distinctly different. Firstly the materials and aesthetics were not fully in keeping with the book's cultural context. This was due to budgetary restraints, as heavy duty steel fittings (which would be in keeping with the book's cultural context) were too expensive. Thus, I was forced to substitute these with PVC piping.

Secondly, for the project to work as an immersive fiction, it required a context that could be controlled and managed, where interactions from the book could be recreated and experienced by the audience. Hence, I viewed the Longbridge Light Festival as a method to create the artefact, developing the work further at a later date, within a more appropriate venue. However, I was unable to complete this aim as the challenges of creating this truly immersive exhibit were increased by other stakeholders and constraints, as will be discussed in the next section.

Case Study B

5.27 Discussion

In this section I discuss the impact of the *WE* project and how effectively the output enabled communication of the project to a lay audience.

What worked and why?

Longbridge Light Festival provided the space, finance and lay audience for this case study. In general, the project received interest from the public, and the context gave a much broader cross-section of society than that found in a gallery setting. Hence arts events and festivals that fall outside the traditional design gallery setting can provide a fresh audience and unrestricted space.

What didn't work, why?

Although the outdoor space enabled the scale of the project to increase, it also represented the opposite challenges of the packed design exhibition context. The vast space meant many people simply wandered by, without engaging with the ideas surrounding the project. Although a leaflet describing the work was given to the public, this was an ineffective communication method in this dimly lit and sprawling context. The fully immersive fiction had not been realised.

The next opportunity to develop the project came about from a meeting with Pat Kain, organiser of Nesta's FutureFest. In 2015, FutureFest had a section dedicated to the future of money, and they expressed interest in the *WE* monetary artefact. However, again the challenges in adhering to the Redefinition Design approach, while gaining funding for the project, was challenging. The differing agendas of the creator (myself) and the festival's theme became apparent rather quickly, as the following email exchange illustrates:

Hey ***,

...

We also spoke about his installation (photos attached) and repurposing it to fit the themes of FF and ideally make it more interactive. I think it'd be useful for the two of you to resume that discussion.

.....
.....

Hi **** and ***

Good talking to you yesterday...

Personally... for the project to relate to my phd work and design methodology... I'd prefer the interaction to relate directly to the book, so people at the conference would step into this totalitarian world and experience this alternative system...

Hope you're both well

Best wishes

Austin

.....
.....

Hey Austin,

My issue with the allusion to the book is that it would be lost on the audience without explanation or context...

Would it be incredibly cheeky of me to ask why this has to link to your PhD? Could it not be repurposed to align with our themes in a way that's more explicit? Just a thought, no offence intended.

Hi ****,

No offence taken...

As the whole project was born out of this idea of designing alternative monetary systems within science fiction novels, I don't think I can reappropriate it for a different purpose... from my perspective, it would undermine the reason why I created the work.

Regardless of the type of interaction or if it's autonomous... I feel that the explanation for the work needs to adhere to the reasons why it was originally created, I personally don't think they are at odds with some of the themes you've mentioned (like money/democracy)... but it would be good to know your thoughts?

Regarding the phd question... as I'm in my last fully funded year, all my energies need to be focused on finishing my research on time and avoiding anything which is a distraction (regardless of how fun the distraction).

I understand your concerns and I realise that this is a festival, and therefore the display needs to gel with the larger picture.

Hopefully both our aims can be satisfied.

Best wishes

Austin

.....
.....

No worries, let's have a chat with *** next week via Skype/Hangout. Let me know some times that you are both available – Tuesday afternoon or Wed morning are best for me.

At the risk of coming across as incredibly predictable, my immediate thought when looking at the piece is that it could be a globe, with the different sections being pulled apart by an 'invisible' force (Money? Governments? Technology?). Don't kill me if that's a lame idea!

Unfortunately, the differing needs of FutureFest's agenda and my own work meant that the project never happened. And a truly immersive version of the *WE* Redefinition Design proposal is still in search of an appropriate venue and funding for its completion. It seems the major hurdle restricting large-scale immersive redefinition designs is, again, the incongruous nature of these proposals – removed as they are from current thinking and trends, there is no intuitive aspect of the project to

convince the commissioner of its worth. This problem appears endemic to the Redefinition Design approach.

5.3 Case Study C ('Unit of account')

This case study follows the methods and procedure outlined in the previous chapter in section 4.4. Each section represents a procedural step.

The steps for this case study are as follows:

5.31 – Alter Axioms

5.32 – Select Context (Counterfactual)

5.33 - Mentifacts

5.34 – Sociofacts

5.35 – Artefacts

5.36 – Result (impact and interaction)

5.37 – Discussion (what worked and what didn't)

Case Study C

5.31 Alter Axioms

The first procedural step is to alter a monetary axiom, using a method inspired by Nikolai Lobachevsky. Following Lobachevsky I will change one axiom at a time, not all. Below I present the alteration in a logic table:

	Functional Axioms of Money		
	Medium of Exchange	Store of Value	Unit of Account
Contemporary Money	1	1	1
Case Study A	1	0	1
Case Study B	0	1	1
Case Study C	1	1	0

Fig.84: Logic table to alter axioms #3

The third altered form of the functional axioms of money will combine the ‘medium of exchange’ and ‘store of value’, dispensing with the ‘unit of account’ function. This means that this type of money would facilitate trade and hold wealth; dispensing with the ‘unit of account’ means an end to collectively shared measures of value.

Case Study C

5.32 Select Context (Counterfactual)

This section will focus on selecting an appropriate social science fiction novel with a culture that might be sympathetic to a currency system without a unit of account. The unit of account function of money can only be maintained through an agreement that unifies a group of people to use the same measure. This has traditionally often been done by an institution, be it government or industry. Hence a society most likely to operate a currency system without a unit of account would be an anarchistic type of society that loathed institutional control of any kind.

Anarchistic societies from science fiction are often contextualised in a dystopian future, where civilisation has regressed to a more primitive state due to some devastating event. *The Road* by Cormac McCarthy or the *Mad Max* film series would be stereotypical examples of the clichéd anarchist context. However, most anarchists do not desire destruction or conflict, but rather a society that increases the choices of individuals; they are against all forms of government and institutional control (Rooum, 1995). Thus, anarchism is the antithesis of heavy-handed state control. In this regard, the social science fiction books that would resonate with an anarchist perspective are the societies that give examples of hellish institutional and governmental control. Because anarchism has gained traction in the shadow of paternalistic governments, it seems fitting to contextualise an anarchistic society alongside a classic ‘Big Brother’ state. Therefore, this particular counterfactual will be contextualised within the Orwellian world of *Nineteen Eighty-Four*.

Although *Nineteen Eighty-Four* seems at first glance to be far from the anarchistic society that might support the discontinuation of the ‘unit of account’ function of money, the backdrop of the warring super-states of Oceania, Eurasia and Eastasia would surely breed pockets of people that actively and fervently reject the horrors they have witnessed at the hand of state-controlled agendas. Hence, in this regard, the context of *Nineteen Eighty-Four* is far more likely to produce a pocket of society that has culturally rejected governmental control in favour of an anarchistic approach.

In the next section, I outline the project, called Wealth Beyond Big Brother, which is a currency system and monetary artefact designed within the context of the Orwellian world, not within the super-states but in the disputed territories.

Case Study C

5.33 Mentifacts

To find a context outside the Big-Brother-controlled Oceania, I have found aspects of the book that describe the wider Orwellian world. The general politico-geographical landscape of the Orwellian world is comprised of three super-states and a portion of land between them called the ‘disputed territories’:

‘Between the frontiers of the super-states, and not permanently in the possession of any of them, there lies a rough quadrilateral with its corner at Tangier, Brazzaville, Darwin and Hong Kong, containing within it about a fifth of the population of earth.’ (Orwell, [1949] 2004, p.194)

The disputed territories represent the area where the super-states meet, and hence is a place where most conflict takes place. War in these areas is never-ending:

‘To understand the nature of the present war – For in spite of the re-grouping which occurs every few years, it is always the same war – one must realise in the first place that it is impossible for it to be decisive.’ (Orwell, [1949] 2004, p.194)

The control of the disputed territories is always in a state of flux, as is the amount of land that each side holds.

'In practice no one power ever controls the whole of the disputed area. Portions of it are constantly changing hands, and it is the change of seizing this or that fragment by sudden stroke of treachery that dictates the endless changes of alignment.' (Orwell, [1949] 2004, p.195)

Hence, the edges of the 'disputed territories' represent the super-states' frontlines in the continual war. But what about the people living within these areas; what would they think of the never-ending war?

'Those whose attitude towards the war is most nearly rational are the subject peoples of the disputed territories. To these people the war is simply a continuous calamity which sweeps to and fro... which side is winning is a matter of complete indifference to them.' (Orwell, [1949] 2004, p.224)

The people in the disputed territories would have the insight of witnessing the futility of conflict. They would see the indifference of each side and the ignorance with which the people under these regimes exist. In fact, the culture within these areas might become the antithesis to those of the super-states.

For the people living in the central areas of the disputed territories the propaganda and ideology that is peddled by the super-states represent the worst kind of society. These people would perceive the super-states as hell on earth, hence all aspects from governmentally controlled society are regarded with the same venom, with any kind of institutional control viewed as a form of oppression and slavery.

The people in this land want individual freedom so fervently that even large families are culturally frowned upon as representing the start of a cabal.

Case Study C

5.34 Sociofacts

Institutional freedom is the overriding manifesto that informs the perspective of the people within the disputed territories. This deeply held belief is formed from witnessing the horrendous conditions of their fellow people who live on the frontlines:

'The inhabitants of these areas, reduced more or less openly to the status of slaves, pass continually from conqueror to conqueror, and are expended like so much coal or oil in the race to turn out more armaments, to capture more territory, to control more labour power, to turn out more armaments, to capture more territory, and so on indefinitely.' (Orwell, [1949] 2004, p.195)

The inhabitants who are centrally located have largely avoided the conflict:

'It should be noted that the fighting really moves beyond the edges of the disputed areas.' (Orwell, [1949] 2004, p.195)

'Round the Pole all three powers lay claim to enormous territories which in fact are largely uninhabited and unexplored.' (Orwell, [1949] 2004, p.195)

Freedom from institutional control is the core aim for the people living in the disputed territories; the social structures consist of small groups, which occupy small sections of the land, a patchwork of independent cultures and customs. For the most part the communities are organised through a type of gift economy; all the members of the society are known to one another and money is not needed for the simple subsistence living that these people strive to maintain.

However, the downside to the small communities is that minimal landmass offers only a few natural resources, meaning trade with the other groups is necessary. This is where the fervent mistrust and dislike of institutional control become problematic, because maintaining a unit of account would require some sort of institutional body. Rather than forming such an organisation to facilitate trade between the groups, the inhabitants have chosen to develop a currency system and monetary artefact without a unit of account function. The measure of value within these types of trades is relative to something every person holds dear.

Case Study C

5.3 Artefacts

The centrally located inhabitants are far from the frontline, but still share social and family connections with their enslaved counterparts. Hence, some of the products created in the outer rim are smuggled into the central areas; these consist mostly of weapons, items that the outer inhabitants are forced to produce:

'Moreover, the labour of the exploited peoples round the Equator is not really necessary to the world's

economy. They add nothing to the wealth of the world, since whatever they produce is used for purposes of war' (Orwell, [1949] 2004, p.196)

The abundance of weapons of war, combined with the inhabitants' extreme disdain for any kind of conflict, has led to these people reappropriating the weapons as machines to facilitate transactions and trade (see Fig.85). Placing weapons in this benign everyday context is a symbolic act that reminds them of both their enslaved counterparts and the hellish super-states that they must never become.

'All of the disputed territories contain valuable minerals, and some of them yield important vegetables and products such as rubber which in colder climates it is necessary to synthesise by comparatively expensive methods.' (Orwell, [1949] 2004, p.195)

Each group casts their most precious materials into the form of bullets (see Fig.85). The bullets fit into a modified weapon that has a groove that runs through the breach. The people use the transaction guns in combination with the resource-rich land.



Fig.85: Re-appropriating weapons.



Fig.86: Face to Face transaction

When a trade between two groups occurs, the buyer loads the most precious metals into the gun's breach and points the gun at the seller. Unlike a currency system that relies on an institutionally defined unit of account to measure the value of items, the bullet money creates a stalemate situation (see Fig.86). For the buyer will not want to fire the gun and potentially lose his wealth; likewise, the seller will not want to lose his life.

The high stakes mean the trade takes place with extreme pleasantries and understanding. Each side communicates at length the reason why they need the wealth or the goods, an exercise that is never rushed, for every detail of the situation will help the other party understand one's perspective. For this reason, transactions have been known to take days. There is always one party that gains more than the other, but providing each person maintains his honesty and authenticity, usually the most in-need party gets the better deal.

Although the factions maintain a mutual respect, issues still sometimes arise. Very rarely do trades go wrong, but if this does occur, the high stakes can mean relations between two factions turn sour. To avoid outright conflict, a period of settlement is established. Each party will request compensation be delivered to make amends for the losses incurred. The delivery of the payment is often undertaken within a modified sniper rifle, which is either shot into a large water tub or, if the party has suffered a loss of life, then it can be shot into a person (see Fig.87).



Fig.87: long distance payment

Case Study C

5.36 Result

Wealth Beyond Big Brother

In Case Study A, I highlighted two general audiences for subsequent investigation: an informed audience and a lay audience. This case study focuses on communicating to the informed audience; specifically, the financial and payments sector. Hence, the aim of the project is to broaden payment experts' notions surrounding money.

Palpable with a hook

This project was focused on addressing an informed audience. For this reason, I initially thought the artefacts needn't be highly finished prototypes, but rather sketches that enabled a conversation. Hence, in the first output for this project I created a rough 3d sketch with a work-in-progress quality (see Figs.88 and 89). The artefact that I decided to create from the Redefinition Design proposal was the one involved with 'face to face' transactions (Fig.86).

These artefacts in Figs. 88 and 89 were presented at the Royal Geographical Conference, as part of a session on 'everyday security'; the project fitted this theme as it related to a payment system void of institutional control – *'The term "everyday security" relates to security achieved by people on their own terms without institutional intervention to protect aspects of space and place.'*⁷⁶

⁷⁶ Royal Geographical Society. 2014. Scrapheap Challenge for Everyday Security [Online]. Available: <http://conference.rgs.org/AC2014/2>.

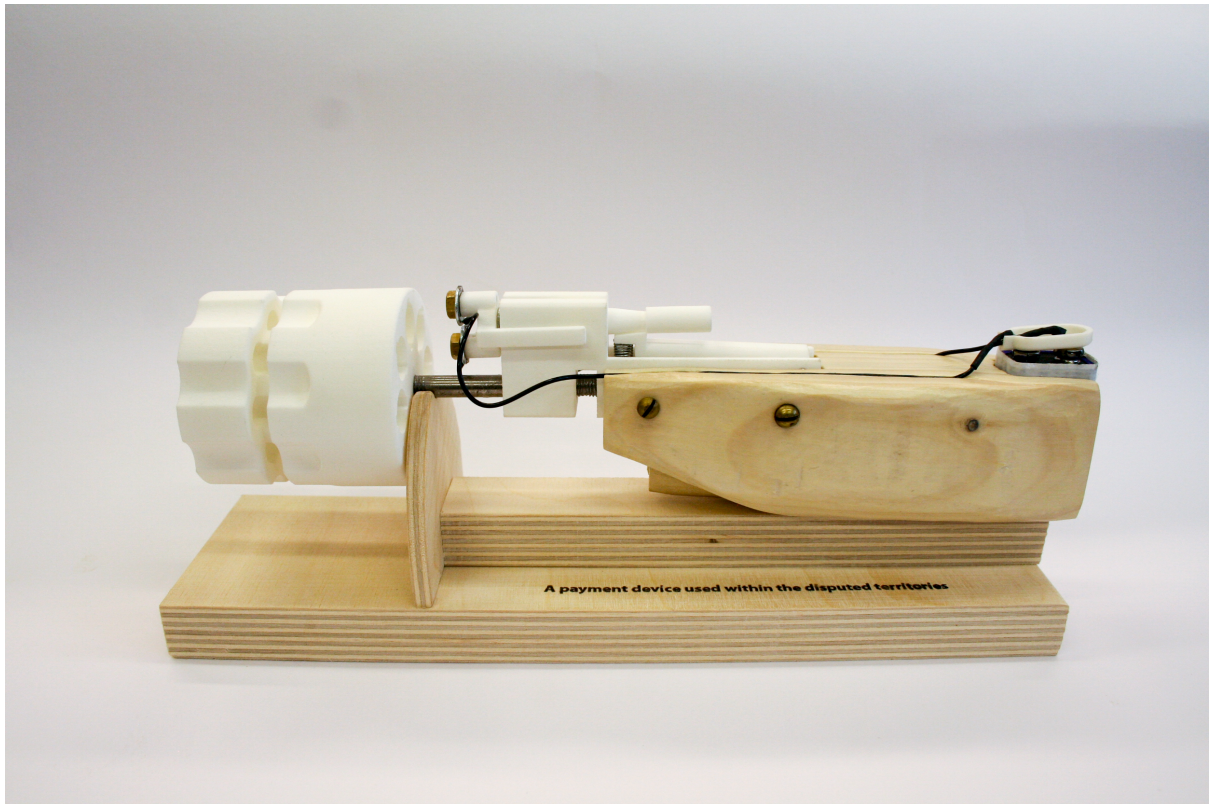


Fig.88: Prototype payment gun #1

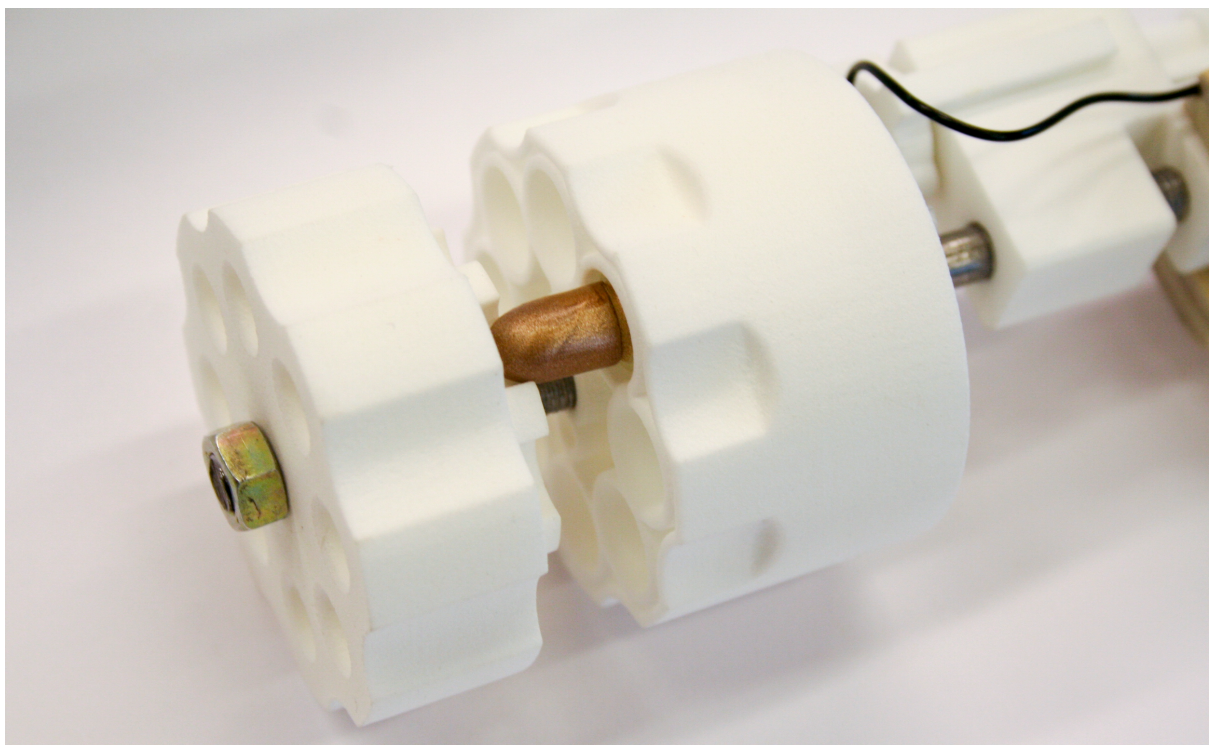


Fig.89: Prototype payment gun #2.

Unfortunately, the artefacts did not gain much attention from the delegates. I believe this was in part due to the unconvincing nature of the prototypes. Hence for the next iteration, I decided to revert to the same approach I took in the Walden note-money project, and make the design proposal palpable through the creation of believable prototypes.

The materials that I would use to create the payment gun were informed by the manufacturing policies of the super-state Oceania, as the inhabitants of the disputed territories reappropriated the super-states weapons. These weapons would have been created under the '*...Ministry of Plenty, which was responsible for economic affairs.*' (Orwell, [1949] 2004, p.6). The Ministry of Plenty in the novel often presents economic information as if the economy was booming, while hiding the truth:

'...the Ministry of Plenty had issued a promise (a "categorical pledge" were the official words) that there would be no reduction of the chocolate ration during 1984. Actually, as Winston was aware, the chocolate ration was to be reduced from thirty grammes to twenty.' (Orwell, [1949] 2004, p.41)

Thus, if the Ministry were to create weapons, these weapons might appear well made and of high quality, although in fact the opposite was true. For this reason, the next iteration of the monetary artefact from this project was an electroplated plastic version of the payment gun (Fig.90). Also, the stock of the gun was carved from blackwood, a wood found in Africa, and hence a material to which the inhabitants of the disputed territories would have access.



Fig.90: Payment gun



Fig.91: Payment gun in context #1



Fig.92: Payment gun in context #2



Fig.93: Payment gun in context #3

5.37 Discussion

In Case Study A, I highlighted two general audiences for subsequent investigation: an informed audience and a lay audience. This case study focuses on communicating to the informed audience. Hence in this section I discuss how I moved the conversation beyond the familiarity of academic audiences and designers towards the financial and payments sector.

What didn't work, why?

The issue in presenting to an informed audience is that they are already engaged with the subject matter, whereas with a lay audience, there is an opportunity to widen the interest surrounding a subject.

What worked and why?

In general, the best method of communicating the large amount of information, rationale and thinking behind projects like Wealth Beyond Big Brother is via a talk. The audience can be taken through the background and design without any aspects being lost or overlooked.

Regarding Wealth Beyond Big Brother, I had the opportunity of presenting the project at two

conferences. The first was a Finance IT-Day organised by Copenhagen FinTech in September 2016.⁷⁷ This particular conference was for fintech start-ups, thus a business-focused audience, which was perhaps more conservative than those found in an art and design context. Nevertheless the project received positive feedback from the delegates (see Figs.94–96).

The second talk was at a conference in Amsterdam called Money Lab, held on December 1st and 2nd 2016.⁷⁸ This conference was positioned as an alternative, grass roots money conference, intended to widen the debate surrounding money beyond the usual mainstream payments conferences, like money 2020. Although the audience was from a different demographic, the project also received positive feedback from the delegates (see Figs.97–100).

Thus, the least problematic approach to communicating incongruous Redefinition Design projects like Wealth Beyond Big Brother is via a lecture or talk, to an audience interested in the subject matter. This approach mitigates the problem of maintaining the audience's interest, as the delegates are attending the conference to engage with the subject matter.

⁷⁷ FinTech, Copenhagen. 2016. Finance IT-Day 2016 [Online].

Available: https://www.youtube.com/watch?v=b_GTSMKb7Qw

⁷⁸ Cultures, N. 2016. Moneylab 3 [Online]. Available: <http://networkcultures.org/moneylab/>.



David G.W. Birch @dgbirch · 15 Sep 2016

#FITD16 #CFIR Brilliant stuff from artist **Austin Houldsworth** - thinking about the future of money

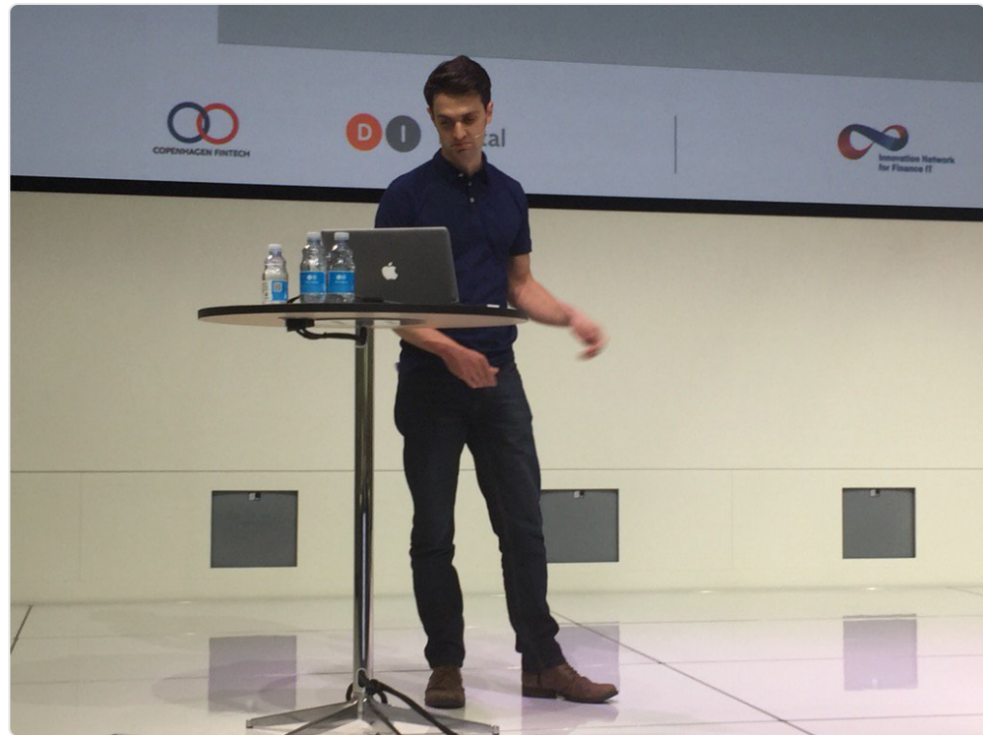


Fig.94: Twitter post (David G.W. Birch, 2016)



Sophie Wawro @sophiewawro · 15 Sep 2016

Cool presentation from **@AusHouldsworth** full of radical ideas for the future of money at #fitd16

Fig.95: Twitter post (Sophie Wawro, 2016)



Annine N. Bentzen @annine_b · 15 Sep 2016

First arts in finance. Now #viviennwestwood #identity #blockchain and #IoT . Entertaining afternoon at #fitd16 @dgbirch @AusHouldsworth



Fig.96: Twitter post (Annine N. Bentzen, 2016)



Fig.97: Twitter post (Inst. Network cultures, 2016)



Fig.98: Presentation of Wealth Beyond Big Brother (Inst. Network, 2016)

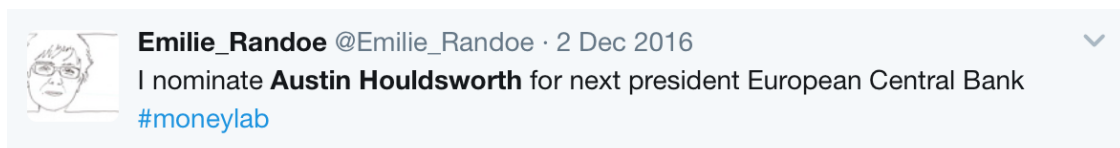


Fig.99: Twitter post (Emilie Randoe, 2016)

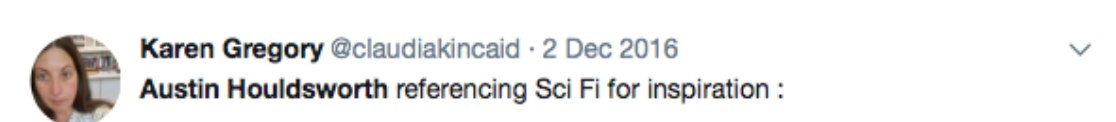


Fig.100: Twitter post (Karen Gregory, 2016)

Chapter 6 –

GENERAL DISCUSSION

Redefinition Design Beyond Money

Having discussed the specific case studies' outputs and impact, in this section I discuss the general case. Although money has been the vehicle for the development of Redefinition Design, the methods and approach can be utilised in any refractory design situation.

Firstly, I briefly summarise the Redefinition Design method by unpacking each level and reflecting on the approach I took within the thesis. Then I give two examples of where else the Redefinition Design approach might be applied.

The General Method:

The most applicable subject matter for the Redefinition Design method, is not a physically dependant system, but socially dependent systems that are bound / restrained by deeply held assumptions. Or to put it another way, dogmatic social contracts that are constraining design and development.

Axiom Identification (current state of culture):

5) a) Identify underlying and foundational Axioms, Assumptions, Beliefs

In the case of money, finding the foundational axioms was relatively straight forward as the functions of money were both historically inaccurate, and overly simplistic. Hence, the three functions that were used to define money appeared to constitute an assumption.

c) **Altering Axioms**

Alter the core axioms of money to create generalised cases by using a Lobachevsky-inspired method (see section 4.42). Often good candidates for change have historical inconsistencies. Operations include remove, oppose, extend, diminish and transform.

Altering the functions of money was a matter of selecting a function and changing it. The exact alteration is very much linked to the cultural context in which the altered form would be designed.

Context Identification:

6) Select sympathetic cultural context

Cultural recontextualisation. In my case I use a Counterfactual method (see section 4.43b), utilising social science fiction as an alternative cultural context, though in a more general case non-fictional cultural contexts can be used.

To choose a cultural resonant context for the altered axioms, I firstly determined what the specific function achieved within a standard currency system. I then found a cultural context in which that function would be redundant.

7) Analyse cultural levels within selected cultural context

Unpack cultural levels between Artefact, Sociofact and Mentifact, using 'Bidney's Definition of Culture,' (see section 4.44). Find pivotal interactions that provide potential opportunity for rich expression of altered axioms within the cultural context.

Using cultural contexts from social science fiction enabled the various cultural levels to be easily determined. Artefacts were objects described in the book. Sociofacts were the social structures described in the book, and Mentifacts the ideas / beliefs outlined in the book.

Generative Phase:

8) Iteratively design(ED????) artefact and interaction with altered axioms in the selected cultural context.

As each function and context had been carefully selected, I could now, intuitively design a currency system and the monetary artefacts within the given cultural context.

The Redefinition Design Method is not limited to money, but can be applied to any refractory design situation. However, the exact techniques and processes might need to be altered to fit the specific challenge. Over the next two pages, I show two examples; the constitution and education.

United States Constitution:

Axiom Identification (current state of culture):

- 1) A) Identify underlying and foundational Axioms, Assumptions, Beliefs.

For the US constitution the following are core principles: Separation of Powers, Division of Federal and State Power, Protection of Personal Liberty, Permanent Protections of a Constitution (Shapiro, 2001)

- B) Altering Axioms

Alter the core principles of the constitution using a Lobachevsky-inspired method. Methods of alteration could include operations like: remove, oppose, extend, diminish and transform. As there are five constitutional functions, there would be five case studies, each one altering one principle.

Context Identification:

- 2) Select sympathetic cultural context
Cultural recontextualisation. In this case study, existing and historic governmental structures from other nations might provide an interesting real-world context that would help determine what certain constitutional principles might manifest.
- 3) Analyse cultural levels within selected cultural context
Unpack cultural levels between artefact, sociofact and mentifact, using Bidney's definition of culture. Find pivotal scenarios that provide potential opportunity for rich expression of altered axioms within the cultural context.

Generative Phase:

- 4) Design sociofacts and artefacts informed by selected cultural context and altered fundamental principles, to generate new forms of government.

Education: Royal College of Art

Axiom Identification (current state of culture):

- 1) A) Identify underlying and foundational Axioms, Assumptions, Beliefs.
The Royal College of Art 1967 charter can be broken down into three basic principles and

three basic contexts.⁷⁹ The charter states that the objectives of the College are to:

advance learning
advance knowledge
advance professional competence

in principles and practice of art and design in relation to:

industrial
commercial processes
social developments

B) Altering Axioms

Alter the core principles of the charter using a Lobachevsky-inspired method.

As there are six aspects of the charter, there would be six case studies, each one altering one principle.

Context Identification:

2) Select sympathetic cultural context

The sympathetic cultural contexts in this project could be different educational institutions operating around the globe. There are 4,352 universities in the world; some of these institutions will likely be operating an altered version of the Royal College of Art charter.

3) Analyse cultural levels within selected cultural context

Unpack cultural levels between artefact, sociofact and mentifact, using Bidney's definition of culture. Find pivotal scenarios that provide potential opportunity for rich expression of altered axioms within the cultural context.

Generative Phase:

4) Design sociofacts and artefacts informed by selected cultural context and altered fundamental principles, to generate new forms and structures in the RCA.

⁷⁹ Found in the RCA 2009 *Annual Review*:

https://www.rca.ac.uk/documents/120/1RCA_Annual_Review_2009-10.pdf

In general the Redefinition Design methods can be applied to any subject matter. However, the approach is best suited to situations that are value-based and of a refractory nature. Or in other words, situations that operate predominantly in the realm of society and are thus governed by our own making, but are seen as unchangeable or sacrosanct.

Chapter 7 –
CONCLUSION

What's Next for Money and Redefinition Design

The general aim running through this thesis has been to focus on developing a new method for designers to step outside prescriptive culture and beyond deeply held assumptions, to facilitate the design of genuine alternatives. This section will be broken down into two parts – the first focuses on further money-related research and the second will focus on the development of Redefinition Design.

7.1 Culturally Harmonious Money (possible further research)

7.2 Redefinition Design (just the beginning)

7.3 Contributions

7.1 Culturally Harmonious Money (possible further research)

In general, what I have come to believe through the course of this thesis is that the current mainstream form of money is partisan and not an unbiased tool. Its functions enable/disable certain interactions and consequently help shape society through its application. Historically speaking, the intrinsic qualities found in commodity money like gold or silver have been replicated into new devices and systems. The longstanding monetary paradigm (including the functions of money), have in part acted as a mould into which new technologies and material have been poured. Thus, changes to the money have occurred, but its fundamental form has stayed the same (see section 2.5).

Due to the partisan nature of the prevailing monetary paradigm, further research into the design of new currency systems is needed. Specifically, the design and development of currency systems that have functions that gel and resonate with cultural principles that are currently neglected. The framing of such research would be, in the real world, a context where alternative principles exist but are being slowly overridden by the prevailing monetisation. For instance, how would a currency system specifically designed to gel with the principles of the NHS work, where would value be derived and what functions would encourage the principles that founded the NHS? Or in higher education, could a currency system be created that monetises principles associated with learning? This research would fit

into contemporary ideas from prominent monetary thinkers, like Bernard Lietaer⁸⁰ and David Birch,⁸¹ who have argued for multiple currency systems operating alongside one another.

A problem with money, highlighted by Bernard Lietaer as I mention at the start of this thesis, is *'Money is like an iron ring we've put through our noses. We've forgotten that we designed it, and it's now leading us around.'* (Lietaer, 1997). This is an issue when tools dictate what we can build. But with the creation of telecommunications, mobile computing, smartphones and a plethora of other technologies, money is no longer limited by technological knowhow or economic theory. As Nigel Dodd states, *'Money... is a process that is inextricably social, inherently dynamic, and complex, whose meaning is contested and unstable.'* (Dodd, 2014, p.393) Thus, just as hammers and nails don't govern what joiners can construct, as a plethora of other fixings have been created, similarly, money is a tool of our own making and therefore it would be foolish to let it decide the shape and fate of our society. Although it was once concrete, it is now abstract, a situation of our own making.

This thesis has proposed a method of stepping beyond the present monetary paradigm and designing culturally harmonious currency systems, which I personally think should become a key aim in future monetary development. However, the greater challenge is moving this approach into the real world, through implementation, which I leave to a more capable individual.

7.2 Redefinition Design (just the beginning)

In general, Redefinition Design acknowledges that designers usually use intuition when designing; consequently, projects often resonate with current notions in contemporary culture. Although this aspect of design thinking is often valued, it can prohibit the creation of genuine alternatives; thus intuition becomes an obstacle as assumptions can become intertwined in the design process. Redefinition Design addresses this issue by enabling the designer to recontextualise intuition within an alternative cultural context. This move, alongside the alteration of fundamental principles, allows the designer's intuition to be utilised without being bound by deeply entrenched assumptions, thus enabling the creation of completely redefined objects, services or devices, while maintaining meaning.

Redefinition Design and its associated methods have enabled me to mitigate my deeply held assumptions surrounding money. In the context of this thesis, the Redefinition Design approach has enabled the creation of three design proposals that fundamentally redefine money (chapter 5). However, in these projects the altered principles of money are incongruous when placed in a

⁸⁰ As mentioned in section 4.1., Lietaer advocates a complementary currency approach, which would constitute numerous currency systems operating alongside each other.

⁸¹ At the end of his book *'Identity Is the New Money,'* Birch suggests the future of money might consist of many currencies *'that embody different values.'* (Birch, 2014)

contemporary setting, thus becoming difficult to communicate effectively. This is because the entrenched assumptions that initially prevented the proposals' creation meets the same assumptions in the wider world. Overcoming this issue could form part of another research project; however, for now the issue remains a limiting factor of the approach.

The usefulness of Redefinition Design, beyond the realm of an academic exercise, is one aspect that needs attention. The creation of incongruous design proposals could be useful in certain contexts; however, at this point it remains untested. But I could imagine that one possible use of the Redefinition Design approach might be as a scoping tool during early-stage product development, to facilitate a wide-reaching examination of fundamental principles. Also, it could be useful as an educational tool, to teach designers about the influence of culturally derived assumptions and the value of contextualisation.

At first glance, redefining objects/services within an alternative cultural context to facilitate the creation of incongruous design proposals appears to be a pointless, self-indulgent exercise. What is the benefit to the 'real' world? I believe the best answer to this question comes from acknowledging that incongruity can be both a symptom of irrelevance and also of originality.

7.3 Contributions:

Pre-Redefinition Design output:

2013

Publication – 28/01 (Crime Pays) We-make-money-not-art

Exhibition – 22/01 (Crime Pays), Disruption, Royal College of Art research show, London

Interview – 10/03 (Crime Pays) Artists in Laboratories, Resonance FM, London

Workshop – 14/05 (Crime Pays) British Computer Society

Award – 15/05 (Crime Pays) Output award ‘selected’

Paper – 01/09 (Crime Pays) Critical Design to Envision Cyber Security Futures, Baltic, Gateshead

Talk – 22/09 (Crime Pays) Cash is dead, Truman Brewery, London

2014

Talk – 18/03 (Crime Pays / FOM), Future of money, Protein Forum, London

Post-Redefinition Design output:

Exhibition – 01/01 (Walden note-money), RCA, London

Publication – 01/02 (Walden note-money), We-make-money-not-art

Exhibition – 01/06 (Walden note-money), Airspace Gallery, Stoke-on-Trent

Paper – 10/05 (Walden note-money), Memories of the Future, Senate House, London

Award – 23/06 (Walden note-money), Core77 Awards ‘notable’

Workshop – 01/08/2014 (Wealth Beyond Big Brother), Royal Geographical Society, London

Talk – 07/10 (Walden note-money) White Building, London

Exhibition – 25/10 (*WE* money), Longbridge Light Festival, Longbridge

2015

Talk – 14/03 (*WE* money), Nesta FutureFest, London

Exhibition – 05/14 (Wealth Beyond Big Brother) Research show, RCA, London

Publication – 18/05 (Wealth Beyond Big Brother), We-make-money-not-art

2016

Talk – 15/09 (Wealth Beyond Big Brother), IT Fintech day, Copenhagen, Denmark

Talk – 1/12 (Wealth Beyond Big Brother), Money Lab 3, Amsterdam, Netherlands

2017

Exhibition – 31/03 (Walden note-money) V & A Late, Victoria & Albert Museum, London

Publication – 10/05 (Walden note-money) (Chapter) Memories of the Future: On Countervision, published by Peter Lang

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