EXPLORING BUSINESS MODELS TO PROVIDE A FOUNDATION FOR ENHANCING EYE CARE SERVICES IN HIGH STREET OPTOMETRIC PRACTICE

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Thesis Summary

High street optometric practices are for-profit businesses. They mostly provide sight testing and eye examination services and sell optical products, such as spectacles and contact lenses. The sight testing services are often sold at a vastly reduced price and profits are generated primarily through high margin spectacle sales, in a loss leading strategy. Published literature highlights weaknesses in this strategy as it forms a barrier to widening the scope of services provided within optometric practices. This includes specialist non-refraction based services, such as shared care. In addition this business strategy discourages investment in advanced diagnostic equipment and higher professional qualifications.

The aim of this thesis was to develop a greater understanding of the traditional loss-leading strategy. The thesis also aimed to assess the plausibility of alternative business models to support the development of specialist non-refraction services within high street optometric practice.

This research was based on a single independent optometric practice that specialises in advanced retinal imaging and offers a broad range of shared care services. Specialist non-refraction based services were found to be poor generators of spectacle sales likely due to patient needs and presenting concerns. Alternative business strategies to support these services included charging more realistic professional fees via cost-based pricing and monthly payment plans. These strategies enabled specialist services to be more self-sustainable with less reliance on cross-subsidy from spectacle sales. Furthermore, improving operational efficiency can increase stand-alone profits for specialist services. Practice managers may be reluctant to increase professional fees due to market pressures and confidence. However, this thesis found that patients were accepting of increased professional fees.

Practice managers can implement alternative business models to enhance eye care provision in high street optometric practices. These alternative business models also improve revenues and profits generated via clinical services and improve patient loyalty.

Keywords: UK Optometry
Shared care
Activity-based costing
Monthly payment plans
Customer loyalty

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Contents

List of Abbreviations

ABC: Activity-Based Costing

ACLM: Association of Contact Lens Manufacturers

ANOVA: Analysis of Variance

AOP: Association of Optometrists

AS: Additional Supply

BS: Best Sphere

CA: Clinical Assistant

CCG: Clinical Commissioning Group

CL: Contact Lens

CLO: Contact Lens Optician

DLC: Direct Labour Cost

DLH: Direct Labour Hour

DO: Dispensing Optician

EASE: Enhancing the Approach to Selecting Eyewear

ECP: Eye Care Practitioner

EHEW: Eye Health Examinations Wales

FS: Floor Space

GOC: General Optical Council

GOS: General Ophthalmic Services

GPERS: General Practitioner Eye Referral Scheme

GRR: Glaucoma Referral Refinement

HES: Hospital Eye Service

IP: Independent Prescribing

KTP: Knowledge Transfer Partnership

LOC: Local Optical Committee

LOCSU: Local Optical Committee Support Unit

LVSW: Low Vision Service Wales

NICE: National Institute for Health and Care Excellence

NHS: National Health Service

OCT: Optical Coherence Tomography

PAL: Progressive Addition Lenses

PCT: Primary Care Trust

PEARS: Primary Eye Acute Referral Scheme

POM: Prescription Only Medicine

RGP: Rigid Gas Permeable

SD: Standard Deviation

SP: Supplementary Prescribing

UK: United Kingdom

USA: United States of America

VAT: Value Added Tax

WECS: Wales Eye Care Services

WEHE: Welsh Eye Health Examination

WOPEC: Wales Optometry Postgraduate Education Centre

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Chapter 1: Introduction

1.1 General overview of UK Optometry

Optometry in the UK is regulated by the Opticians Act 1989. An optometrist's role is to examine eyes, test sight and prescribe spectacles and contact lenses for those who require them (General Optical Council (GOC), 2015a). In addition optometrists may fit spectacles and contact lenses and provide advice on visual concerns. Optometrists in the UK are also trained to detect ocular disease and abnormalities and will refer patients to a medical practitioner if necessary. Optometrists have a significant role within primary eye care in the UK. Davey et al (2011) illustrated that optometrists are responsible for the majority (72%) of referrals to the hospital eye service (HES).

There are around 14, 354 optometrists registered in the UK (General Optical Council, 2015) and most are based in primary care practices as opposed to secondary care hospital eye departments. Primary care optometry mostly consists of high street optometric practices, and also includes practices based in supermarkets and shopping centres. These practices typically comprise of consulting room(s) for sight testing and eye examination purposes and also a prominent commercial/retail aspect. The retail elements of high street optometric practices are often centred on the sales of spectacles and contact lenses primarily via large shop floor and display areas.

1.1.1 Optometric market in the UK

High street optometric practices can be part of large national chains, smaller regional chains or exist as an independent practice. In recent years the UK optometric market has increasingly become dominated by large national chains, while the independent sector continues to slowly decline (figure 1.1). The key national chains in the UK market are Specsavers, Boots Opticians and Vision Express. Specsavers has been the market leader for some years, dominating with 23% of the market share in 2009 and rising to 35% in 2014 (figure 1.1). Boots Opticians merged with Dollond & Aitchison, another large multiple chain, in 2009 and now hold 15% of the market (figure 1.1). Vision Express has also gained market share by acquiring smaller regional chains during 2013 to 2014 and now has 12% of the market share (figure 1.1). The market share for independent practices and small chains has reduced over recent years, from 41% in 2009 to

around 29% in 2014 (figure 1.1). Optometric practices based in supermarkets and online retailers also have a presence in the UK market. However, there has been little growth in market share for this sector.

Figure 1.1 Distribution of the UK optometric market by value in 2009 (left) and 2014 (right) (Mintel Group Limited, 2010; Mintel Group Limited, 2015)

Market research by Mintel Group Limited (2015) indicated that the UK optometric market has been steadily growing. The total market value is now around £2.92 billion and is expected to reach around £3.5 billion by 2019 (Mintel Group Limited, 2015). The demand for optometric services and optical goods has been steady and growth has generally been attributed to increased contact lens sales and greater spend on spectacles (Mintel Group Limited, 2015). The market for high street optometric services and goods is extremely competitive. The sector is flooded with promotional offers, special deals and discounts to entice patients to switch. However, it appears that the majority of patients remain loyal, taking advantage of special offers at their existing practice rather than switching to local competition. Market research by Mintel Group Limited (2015) showed that special offers on eye examinations only persuaded 11% of patients to switch, while the majority remained loyal to their existing practitioner. Initially online retailers may have posed a threat to the market. However, the online trend has been confined with most patients continuing to purchase spectacles and contact lenses from their local optometric practice (Mintel Group Limited 2010, 2015). Also patients may prefer to

try spectacles before purchasing, which is often more convenient within high street practices rather than with online suppliers.

1.2 Optometric service provision in the UK

There were approximately 22.54 million sight tests and eye examinations conducted during 2014 (Optical Confederation, 2015). The majority (71.1%) were provided under the National Health Service (NHS) General Ophthalmic Services (GOS) (Optical Confederation, 2015). Almost all high street optometric practices in the UK have a contract with NHS England or an agreement with the appropriate Health Boards in Wales, Scotland or Northern Ireland allowing them to provide GOS sight tests. General Ophthalmic Service sight tests are provided 'free' to eligible patients and practitioners are reimbursed a fixed fee of £21.10 (April 2014-March 2015) in England, Wales and Northern Ireland. In England, Wales and Northern Ireland GOS sight tests are available to persons meeting any of the inclusion criteria associated with age (aged under 16 years, aged 16-18 years and in full time education or aged 60 years and over), diagnosis of a particular ocular or medical condition (e.g. glaucoma, diabetes mellitus or registered sight impaired or severely sight impaired), a family history of glaucoma or the receipt of various income-related benefits (NHS Choices, 2015). The provision of GOS has recently changed in Scotland allowing universal access, which is outlined further in section 1.2.2. Patients that are not eligible for a GOS sight test in England, Wales and Northern Ireland may visit a high street optometric practice for a private eye examination. In this thesis the term 'sight test' will refer to services provided under the GOS and 'eye examination' will be associated with private services.

General Ophthalmic Service sight tests must meet requirements as set out by the GOS mandatory service contracts, while private eye examinations must meet contractual duties according to the Opticians Act 1989. Both establish that a sight test or eye examination must include an internal and external ocular examination and carry out any additional examinations as appear to be clinically necessary to detect signs of injury, disease or abnormality in the eye or elsewhere (Opticians Act, 1989; General Ophthalmic Services Contracts, 2010). Therefore, the extent of sight tests and eye examinations is limited only to detection, and not to the scope of diagnosis, monitoring or managing ocular conditions. Prior to changes to the rules on referral in 2000, optometrists were obliged to refer all patients with signs of ocular disease or abnormalities to a medical practitioner. The GOC changes to the rules on referrals following the NHS Act of 1997, permitted optometrists to use their

own clinical judgement to refer only when necessary and to monitor and manage non-urgent eye conditions themselves. This amendment to the role of optometrists has led to the expansion and continued developments of community-enhanced services and care pathways (Konstantakopoulou et al, 2014).

1.2.1 Community-enhanced service pathways

Community-enhanced services are NHS funded services geared around improving the accuracy of referrals and enabling non-sight threatening ocular conditions to be managed within primary care optometric practices. They are locally commissioned to meet the needs of the local population and integrate with existing eye care pathways. Primary Care Trusts (PCTs) would commission community-enhanced services before changes to the NHS organisational structure in 2012. Since April 2012, community-enhanced services have been commissioned by Clinical Commissioning Groups (CCG). The service protocols are agreed by the Local Optometric Committee (LOC) and often local ophthalmologists and are beyond the scope of GOS sight tests. However, not all CCG's have commissioned such services and there is no national uniformity.

There are around 247 community-enhanced services and care pathways throughout England (LOCSU, 2015). The majority of community-enhanced services in England are geared around cataract and suspect glaucoma management (table 1.1). The UK Department of Health's Action on Cataracts (2000) paper suggested streamlining cataract care pathways to improve cataract surgery waiting lists. This resulted in the widespread development of direct cataract referral services and one-stop cataract surgery pathways across the UK (Park et al, 2009; Hawley et al, 2010). Other community-enhanced services include glaucoma repeat measures and glaucoma referral refinement services (Parkins and Edgar, 2011; Ratnarajan et al, 2013). These developed following guidance issued by the National Institute for Health and Care Excellence (NICE) for the 'diagnosis and management of chronic open angle glaucoma and ocular hypertension' in 2009, which, as an unforeseen circumstance, dramatically increased referrals for suspect glaucoma. Therefore many areas in the UK developed community-enhanced services enabling optometrists to repeat intraocular pressure measurements (using applanation tonometry) and re-assess suspect glaucoma findings before finalising the referral. Other widespread community-enhanced services include post-operative cataract assessments, co-management of stable ocular hypertension and management of minor eye conditions (LOCSU, 2015). Less common community-enhanced

services include co-management of stable glaucoma, low vision assessments, paediatric eye care and learning disabilities services (LOSCU, 2015).

Community-enhanced service type	Number of commissioned pathways in England
Cataract post-op	22
Cataract referral	55
Children's vision	12
Glaucoma referral refinement	10
Glaucoma repeat readings	61
Learning disabilities	5
Low vision	16
OHT monitoring	19
Ophthalmology referral triage	9
Minor eye conditions service	33
Stable glaucoma monitoring	5

Table 1.1 A list of community-enhanced services in England (LOCSU, 2015)

Most community-enhanced services and care pathways comprise of task substitution, which is defined as "allocating clinical responsibilities to lesser or more narrowly trained health professionals with or without medical supervision" (Yong, 2006). In these instances monitoring and assessment of specific eye conditions are undertaken by optometrists rather than by hospital ophthalmologists. In order for task substitution services to be viable, optometrists must be able to provide a comparable level of service. A number of studies have investigated this in terms of accuracy of measurements, clinical judgement and clinical management decisions. It has been widely reported that optometrists are well placed for task substitution shared care services (Gray et al, 1997; Gray et al, 2000; Azuara-Blanco et al, 2007; Sheen at al, 2009; Marks et al, 2012; Ratnarajan et al, 2013). Furthermore patients and community optometrists have experienced additional benefits. In The Bristol Shared Care Glaucoma Study (Gray et al, 1997) patients displayed greater satisfaction with certain aspects of care provided by community optometrists compared to HES, namely those associated with waiting times and travel. Care provided closer to home and reduced travelling distance for appointments are highly desired by patients (Bhargava et al, 2008) and can be achieved with community-enhanced services (Sheen et al, 2009). Sheen et al (2009) reviewed

the Primary Eyecare Acute Referral Service (PEARS) and Welsh Eye Health Examination (WEHE) service available in Wales and revealed that 87.4% of patients travelled less than 5 miles to an optometrist, which compares favourably to an average of 19.4 miles travelled by patients attending the HES in rural Northern Ireland (Smith, 2012). It has been confirmed that task substitution can reduce HES waiting lists and make better use of secondary care resources (Holtzer-Goor et al, 2010).

Another form of community-enhanced care pathway is referral refinement. These are intended to reduce the rate of false positive referrals from primary to secondary care, and allow for better use of secondary care resources. Ratnarajan et al (2013) found that a glaucoma referral refinement service using specially trained optometrists significantly reduced the first visit discharge rate at ophthalmology departments. Henson et al (2003) also revealed that a similar type of service was able to deflect 40% of suspect glaucoma referrals from the HES. The deflection of false positive suspect glaucoma referrals can be as high as 79.4% (Celinn and Lewitt, 2012). Implementing referral refinement services can also produce higher quality referrals. For instance referrals generated from community-based cataract assessments result in significantly greater operative rates, 86 - 98%, which is much improved compared to the operative rate (62 – 69%) for unrefined referral pathways (Sharp et al, 2003; Park et al, 2009). Providing higher quality referrals and reducing false positive referrals can in turn prevent unnecessary NHS, patient (travel, time) and psychological (anxiety) costs.

Community-enhanced services are intended to integrate into high street optometric practice and so do not often require investment in additional equipment, although further training or accreditation may be required to ensure uniformity amongst practitioners. For optometrists, community-enhanced services are an opportunity to further their professional development and widen their scope of practice (Konstantakopoulou et al, 2014). Spencer et al (1995) suggested that practitioners participating in community-enhanced services could gain new customers as patients may choose to see these optometrists for regular sight tests or eye examinations in addition to shared care. Participating optometrists may also benefit from additional spectacle sales (Gray et al, 2000).

Optometrists in the UK may also offer specialist services on a private basis. These are often oriented around enhancing the level of eye care. Private specialist services can be a stand-alone service as well as supplementary procedures to a

GOS sight test or private eye examination. Stand-alone services include contact lens services and dry eye assessments, while supplementary services mostly consist of retinal imaging. A survey conducted by the College of Optometrists and Medix UK (2008) suggested that 42% of high street practices charge GOS eligible patients for supplementary specialist procedures as a private arrangement, mainly fundus photography. A more recent study shows a greater percentage (66%) of supplementary services offered on a private basis, again mostly retinal imaging (Hawley et al, 2010a).

1.2.2 Optometric service provision in Scotland

A new GOS contract was implemented in Scotland in April 2006 with the intensions of improving access to primary eye care and reducing inappropriate referrals to the HES. The new contract in Scotland discards eligibility criteria allowing universal access to GOS sight tests. Furthermore the service provision is more comprehensive than the traditional GOS sight test and includes compulsory visual field assessments and dilated indirect fundoscopy for patients aged over 60 years. Optometrists have greater flexibility to use their clinical judgement to determine appropriate tests required to assess the patients' symptoms and concerns. The new framework also allows optometrists to conduct NHS funded supplementary examinations. These can be for the purpose of repeat tests or monitoring eye conditions and may include applanation tonometry, dilated indirect fundoscopy and threshold automated perimetry. The fees reimbursed for conducting optometric services under the Scottish GOS system are greater than for the rest of the UK, ranging from £37 - £45 for sight tests and £21.50 for supplementary examinations. Optometrists must have additional accreditation, beyond entry level competence, in order to provide GOS sight tests in Scotland. In addition high street optometric practices have access to an equipment grant of £10, 000 to aid the purchase of a fundus camera, pachymeter or gonio-lens.

Ang et al (2009) investigated the impact of the new GOS contract on glaucoma referrals in Scotland. The new Scottish system has improved the quality of glaucoma referrals, increasing the number of true-positive referrals and decreasing the number of false-positive referrals (Ang et al, 2009). Furthermore there is evidence to suggest the GOS framework in Scotland encourages more people to have sight tests, although, challenges continue to exist in engaging people from lower socio-economic groups to have regular sight tests (Dickey et al, 2012).

1.2.3 Optometric service provision in Wales

General Ophthalmic Services in Wales are similar to the GOS in England and Northern Ireland. However, accredited optometrists are also able to offer services as part of the Wales Eye Care Services (WECS). The Wales Eye Care Services has a three-tiered structure for eye examinations (band 1), further assessments (band 2) and follow-up examinations (band 3):

1) The Eye Health Examinations Wales (EHEW) replaces the Primary Eyecare Acute Referral Scheme (PEARS) and Welsh Eye Health Examination (WEHE), which were introduced in 2003. The service allows NHS funded eye examinations for patients with acute eye conditions, those at risk of developing sight threatening ocular disease and those who would find losing their sight particularly difficult (e.g. patients with hearing impairment). The service also encompasses referrals from Diabetic Retinopathy Screening Service Wales, dry age-related macular degeneration monitoring and post-operative cataract assessments (NHS Wales, 2014).
2) The second band of the WECS is provision for further investigations. This enables optometrists to investigate initial findings following a GOS sight test or private eye examination before referral to a medical practitioner. Further investigations may include cycloplegic refraction, wide field perimetry and repeat intraocular pressure and visual field assessments for patients with suspect glaucoma (NHS Wales, 2014).
3) The EHEW follow-up examination allows optometrists to review patients initially seen for an assessment under EHEW band 1 due to presentation of an acute eye problem. For instance an optometrist may wish to re-assess a patient that initially presented with a marginal keratitis, corneal abrasion or red eye.

Optometrists must be accredited and re-accredited every 3 years by the Wales Optometry Postgraduate Education Centre (WOPEC) in order to provide WECS. In addition optometric practices must have a minimum level of equipment including contact tonometer and eyelash and foreign body removal instrumentation (NHS Wales, 2014). Also community optometrists and dispensing opticians are able to offer low vision assessments and low vision aids to patients under the Low Vision Service Wales (LVSW) if accredited to this service.

1.3 Recent advances in UK optometry

Technology and equipment have advanced over the years enabling greater diagnostic ability and improved means for monitoring ocular disease (Myint et al, 2011). The College of Optometrists' 'Guidance for professional practice' provides a list of suggested equipment required to perform routine sight tests and eye examinations. Recent surveys indicate that high street optometric practices are increasingly investing in specialist equipment, which is beyond the scope of this rudimentary list (College of Optometrists and Medix UK, 2008; Smith, 2012; Dabasia et al, 2014). Multiple chain practices are tending to invest in non-contact tonometers and autorefractors, while independent practices focus on applanation tonometers and optical coherence tomography (OCT) (Dabasia et al, 2014).

The most prominent piece of specialist equipment adopted by high street optometric practices is the fundus camera. In 2001, fundus cameras were used by around 11% of practices (College of Optometrists and Medix UK, 2008) and are now used by almost three-quarters of practices in the UK (Smith, 2012; Dabasia et al, 2014). Figure 1.2 illustrates the significant growth in the use of fundus cameras in high street optometric practices over the last decade or so. From 2010 onwards the trend begins to plateau indicating a saturation point (figure 1.2). However, there is evidence that other retinal imaging techniques may be increasing in popularity. For instance, the use of OCT imaging in high street optometric practice has risen from 2% in 2008 to 15% in 2014 (Myint et al, 2011; Dabasia et al, 2014). Furthermore, 43% of practitioners who were looking to invest in equipment were interested in acquiring OCT (Dabasia et al, 2014).

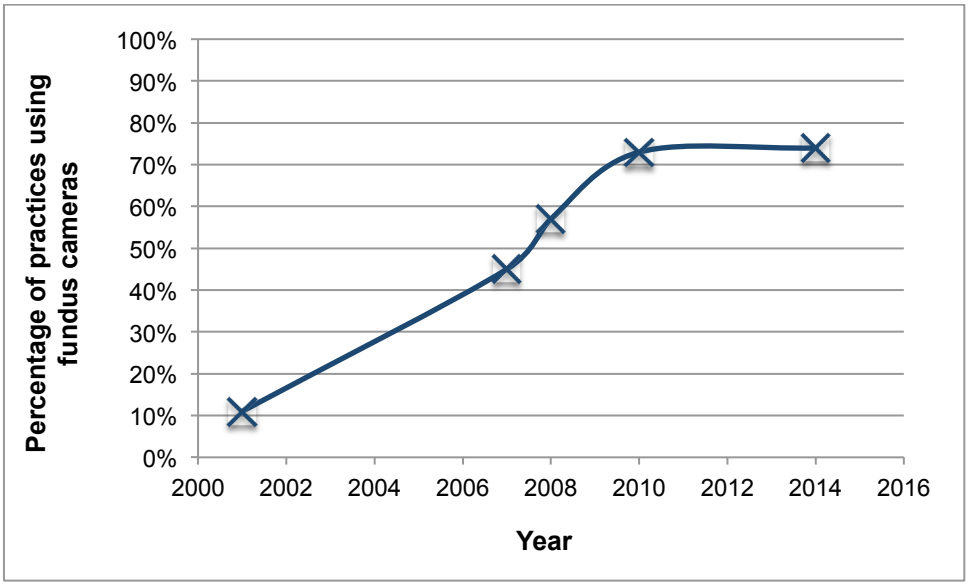


Figure 1.2 The percentage uptake of fundus cameras amongst high street optometric practices in the UK. Data has been extrapolated from recent surveys conducted by the College of Optometrists (2008), Smith (2012) and Dabasia et al (2014).

There are a number of benefits to investing in specialist equipment, including enhanced clinical care, widening the scope of clinical services, allowing increased involvement in community-enhanced services and promoting the practice (Dabasia et al, 2014). The industry is highly competitive and so offering an enhanced scope of clinical care may help practices stand out from competition. Smith (2012) investigated factors that were important to practice managers when considering investment in new equipment. The most important factors were found to be ease of use, patient friendly and good quality (Smith, 2012). The following factors were regarded as the least important: cheapest, aesthetic design and brand (Smith, 2012). However, barriers to purchasing new equipment are associated with ensuring cost effectiveness of the investment (Dabasia et al, 2014).

1.3.1 Therapeutics practice

Therapeutic practice in UK optometry is a relatively recent advancement. Since 2005, Additional Supply (AS) and Supplementary Prescribing (SP) optometrists have had access to a wider range of prescription only medicines (POMs). Further developments in 2008 enabled optometrists to train and register as independent prescribers (IP) and the first IP optometrists were registered in 2009. Therapeutic practice amongst optometrists has numerous benefits including effective use of

existing skills, improved access to advice and treatment and enhanced inter-professional relationships (Mason and Mason, 2002).

Mason and Mason (2002) and Needle et al (2008) illustrated that many optometrists in the UK would be interested to train as independent prescribers. In 2015 the General Optical Council (2015) reported that there were 304 registered independent prescribing optometrists in the UK (169 in England, 114 in Scotland, 14 in Northern Ireland and 2 not specified). The majority of independent prescribing optometrists are based in community practice, with many prescribing on a daily or weekly basis (Loffler et al, 2011). The role of independent prescribing optometrists within the wider NHS provision is not yet established. Relatively few independent prescribing optometrists have frequent access to NHS prescribing pads, with around 70% of practitioners relying on other medical professionals (Loffler et al, 2011). However, independent prescribing optometrists are able to issue private prescriptions and may charge a fee for this specialist service. There is no funding available for specialist therapeutics services (e.g. red eye clinics) within the GOS framework in England, Wales and Northern Ireland. Needle et al (2008) found that the lack of remuneration would be a barrier against optometrists training to become independent prescribers. The survey indicated that optometrists would welcome remuneration in the form of a fee per consultation or a more complex NHS structure encompassing a fee schedule. Other barriers included the cost and time required for training and fear of litigation (Needle et al, 2008).

1.4 High street practice business model

Market research suggests that spectacle sales represent around 60% of the entire market value, while contact lens sales account for 19% (see figure 1.3). Income from clinical services represents a relatively small portion, around 16% of the total income (Mintel Group Limited, 2015). Therefore it is evident that the industry relies on the sales of optical appliances, mostly spectacles, as the major source of income. This has been the trend for a number of years (Mintel Group Limited, 2010) and is well established within the industry.

Figure 1.3 An estimated spend on optical goods and services in the UK in 2014 (Mintel Group Limited, 2015)

The traditional business model adopted by high street optometric practices in the UK is to offer clinical services at a reduced fee and rely on the sales of optical appliances to compensate for service costs. It is widely accepted that the GOS sight test remuneration of £21.10 is far below the cost of providing a sight test. The average private eye examination fee in the UK (£26.00) is also considered to be below the cost of service delivery (Optical Confederation, 2015). However, following an eye examination or sight test the patient will often go on to change or update their spectacles. In 2012 it was estimated that approximately two-thirds of sight tests resulted in the issue of a new or changed spectacle prescription (Optical Confederation, 2013).

High street optometric practices have limited options and usually provide GOS sight tests at a loss. Practices face the perceived dilemma of accepting the low GOS sight test remuneration fee or losing patients to other practices. However, practice managers can freely set prices for private eye examinations. Hence low-priced private examination fees are a tactic used to attract patients for an eye examination in the hope that the patient will go on to purchase high-margin spectacles. This business strategy is known as ‘loss leading’. It is mostly a marketing tool to initially attract customers to the business in order to stimulate other more profitable sales. The loss leading strategy may have developed in this industry for a number of reasons. For instance the highly competitive environment makes it difficult for practice managers to price their private eye examinations above their competitors. Furthermore the public may find it difficult to discern the

worth of an eye examination, particularly since previously eye examinations were free (pre 1989).

The traditional loss leading business model revolves around a high volume of sight tests and eye examinations and high spectacle dispensing figures. Practice managers will implement different targets depending upon their unique selling propositions and strategies. Typical targets are 15 to 20 sights tests/eye examinations per full day clinic, a spectacle conversion rate (the percentage of sight tests/eye examinations that result in a spectacle dispense) of 62% - 75% and average spend on spectacles around £104 to £136 (Brogan, 2011).

1.4.1 Concerns about loss leading

Patients must, under the GOC rules, be issued with their prescription following an eye examination or contact lens consultation. Patients are entitled to take their prescriptions and have them dispensed where they choose. The Health and Social Security Act 1984 deregulated advertising and the supply of spectacles to increase competition. Therefore patients may take their prescriptions to other competing practices or online retailers. This can undermine the traditional business model because whenever a patient takes their prescription elsewhere, the cost of the sight test/eye examination must then be subsidised by another person's spectacle dispense. The same applies whenever the sight test or eye examination outcome does not result in a changed or new spectacle prescription or when a patient chooses not to update their optical appliances. The College of Optometrists (2015) encourages patients to have spectacles dispensed at the same practice that issued the prescription to avoid problems if non-tolerance to prescriptions occurs. Market research by Mintel Group Limited (2015) showed that although patients are able to 'shop-around' the majority (69%) remain loyal to their existing practice.

Heavily relying on the sales of spectacles may create commercial pressures on high street optometric practices, particularly as competition remains fierce. There are concerns that the loss-leading model may increase pressure on optometrists to meet high conversation targets. This may result in using 'pushy' sales tactics or, more seriously, by misprescribing prescription changes (Europe Economics, 2013). Misprescibing is when an optometrist recommends a change of spectacles following non-clinically significant changes in spectacle prescription. Additionally the loss-leading model discourages optometrists from widening their scope of clinical services (Konstantakopoulou et al, 2014). Konstantakopoulou et al (2014)

found that the key reason for non-participation in community-enhanced services was the perceived lack of alignment with the traditional business model. Therefore practitioners and practice managers are valuing community-enhanced services as less profitable than traditional loss leading services, presumably due to an assumption that community-enhanced services have lower spectacle conversion rates. Other reasons for non-participation included concerns regarding how well community-enhanced services would fit with existing appointment booking systems, appointment durations, equipment levels and lack of time (Hawley et al, 2010a; Konstantakopoulou et al, 2014).

Optometrists are reserved when considering investment in new equipment and higher qualifications due to concerns regarding the cost-effectiveness within the traditional business model (Dabasia et al, 2014). New innovative equipment can be expensive and so often it is only affordable if professional fees are associated with its use. However, optometrists and practice managers are more accustomed to undercharging for services and feel that 'patients are not always willing to pay' (Dabasia et al, 2014). Smith (2012) noted that the rising popularity of fundus cameras in high street optometric practice resulted in increased competition and consequently a reduction in the average fee charged for retinal photography. This may be a concern for late adopters of specialist equipment causing difficulties in implementing a realistic fee, although late adopters are also likely to pay less for the equipment as prices reduce with increased competition amongst distributors and greater sales volumes. Legislative changes now enable a wider scope of therapeutic practice within primary eye care. However, a lack of remuneration for providing specialist therapeutic management deters optometrists from training to become independent prescribers (Needle et al, 2008).

1.4.2 Public perceptions

The dominant retail aspect of high street optometric practices has also impacted the public's perception of primary eye care in the UK (Shickle et al, 2013). The public are acutely aware of the role high street practices have in the sale and supply of optical appliances rather than the clinical services and expertise. A number of recent studies have illustrated the lack awareness of eye health amongst the general public (McLaughlan and Edwards, 2010; Shickle et al, 2013; Leamon et al, 2014; Shickle and Griffin, 2014). Many people believe that the primary purpose of a sight test or eye examination is to renew spectacles or to address visual symptoms (Cross et al, 2007, McLaughan et al, 2010, Shickle et al,

2013; Leamon et al, 2014; Shickle and Griffin, 2014). Therefore people tend not to have regular sight tests and eye examinations as a preventative measure.

Poor uptake of sight tests is particularly prominent within socio-economically deprived areas, despite entitlements to a 'free' GOS sight test (Shickle and Farragher, 2014). The recent changes to the GOS system in Scotland were intended to improve access to primary eye care and encourage people to have more regular sight tests. Dickey et al (2012) reported that the free eye care policy in Scotland has had a positive influence on the number of people having sight tests. However, the policy has had a much lower impact on socio-economically deprived groups (Dickey et al, 2012). Dickey et al (2012) explained that this could be associated with the high cost of spectacles and pressures to purchase spectacles following a sight test. Interestingly, Calver (2010) illustrated that the cost of spectacles has actually declined over the last two decades following changes to the Health and Social Security Act 1984, which introduced greater competition. However, there is consistent literature illustrating the public's concerns over pressure to buy expensive spectacles following a sight test or eye examination (Cross et al, 2007; Awobem et al, 2009; McLauglan and Edwards, 2010; Shickle et al, 2013; Leamon et al, 2014; Shickle and Griffin, 2014). This has led to distrust in high street optometric practices and sometimes a fear of costs when having regular sight tests and eye examinations (Shickle et al, 2013; Shickle and Griffin, 2014). Consequently, high street optometric practices are viewed as expensive places where it is difficult to control spending (Shickle and Griffin, 2014).

Therefore it can be argued that the traditional loss leading business model negatively impacts the public's view of primary eye care in the UK. Shickle et al (2015) investigated whether an alternative not-for-profit optometric practice could exist and be self-sustainable. A not-for-profit practice would offer clinical services only, mainly GOS sight tests, and would have no retail elements. The study concluded that a not-for-profit practice was not sustainable. Subsidies to the practice operating costs or a higher examination fee would be required to ensure a not-for-profit practice was financially viable. However the level of subsidy required could be lowered by using any spare resources to supply community-enhanced services as these generally have a higher remuneration fee compared to a standard GOS sight test.

1.5 Summary and research aims

Primary eye care in the UK has advanced significantly over recent years. The roles and responsibilities of optometrists have been expanded via community-enhanced services, modern technology and legislative changes towards therapeutic management. However, there is a recurring barrier preventing these advancements from being fully supported in high street optometric practices. This barrier is rooted in the traditional loss leading business model that has evolved in the UK. Furthermore, there is evidence to suggest that the traditional loss leading business model of high street optometric practices forms an undesirable perception of primary eye care to the public.

High street optometric practices are the largest provider of primary eye care in the UK. It is therefore vital that the profession ensures that advancements in eye care enter the primary care arena and ensure long-term sustainability. A better understanding of the present high street optometric business model may help identify adaptations and potential alternative business models to support the provision of enhanced clinical care within UK high street optometric practice.

The aims of this research are to form an in-depth understanding of the contribution of different optometric services (GOS, eye examinations, private specialist services and community-enhanced services) to the traditional high street optometric business model. This research will also attempt to determine if community-enhanced services and specialist services within the traditional loss leading business model are financially viable. Furthermore, operational adaptations to improve the profitability of optometric services were identified and assessed. Audits and analyses of financial figures were conducted.

Practice managers often refrain from raising professional fees to support investment such as advanced diagnostic equipment or higher qualifications. This is likely due to the perception that patients will perceive greater professional fees negatively. This research therefore evaluated the impact of higher professional fee structures on patients' expectations and perceptions of optometric services. Large increases in professional fees can be made affordable via monthly direct debit instalments. This research investigated the tangible benefits of implementing higher professional fees as part of fixed-term direct debit plans.

To the author's knowledge there is very limited research on these topics within peer-reviewed literature. However, the nature of these topics is compelling to

optometric business owners, practice managers and key opinion leaders and so various aspects are often discussed within industry magazines and articles.

1.5.1 Data selection

Recent studies indicate that independent optometric practices in the UK are more likely than national chains to partake in community-enhanced services and provide specialist services beyond the boundaries of GOS (Hawley et al, 2010a; Dabasia et al, 2014). Although the majority of UK practices offer some form of retinal imaging, the newer modalities of retinal imaging are more commonly found at independent practices, for instance OCT imaging (Dabasia et al, 2014). Hence advancements in optometric service provisions are more likely to be offered at independent practices. Data for this research was therefore based on a single independent optometric practice, called BBR Optometry Ltd. Ethics approval for this research was provided by Aston University Ethics Committee.

1.5.2 BBR Optometry Ltd

BBR Optometry Ltd is based in Hereford, which has a population of 73,000 residents (Herefordshire Council Research Team, 2013). The majority of residents (64%) are aged 16 to 64 years old, 18% are aged less than 16 years and 18% are 65 years old or over (Herefordshire Council Research Team, 2013). BBR Optometry Ltd is a large practice with five consulting rooms, two patient waiting areas, a pre-screening room, an imaging room and a large shop floor area for spectacle and sports eyewear dispensing. The practice is situated in Hereford city centre on a street comprising other small businesses. The practice is easily accessible via public transport, located 0.5 miles from the county bus station and 0.8 miles from Hereford railway station. Although the practice does not have car parking, there are three pay-and-display public car parks located nearby. BBR Optometry Ltd is also located nearby the County Hospital Eye Department, which is around 0.5 miles away.

BBR Optometry Ltd actively implements advancements in community optometric service provision and was named the winner of the ‘Enhanced Services Award’ at the Opticians Awards 2015. BBR Optometry Ltd offers a range of optometric services including GOS sight tests, private eye examinations, specialist private services and community-enhanced services. BBR optometry Ltd participates in all local community-enhanced services. Specialist services offered include OCT

imaging, ultra wide-field retinal imaging, therapeutic management and specialist contact lens fitting. The directors of BBR Optometry Ltd developed the practice in these areas due to personal interest and also to differentiate the practice from local competition. However, there is a lack of knowledge regarding the financial viability and long-term sustainability of specialist services, advanced diagnostic equipment and community-enhanced services.

BBR Optometry Ltd implements the traditional loss leading business model. In order to compete in the market BBR Optometry Ltd has additional processes in place. For instance, the practice offers longer consultation durations than usual. Other unique selling points include professionally qualified staff, for instance all spectacle dispensing in conducted by dispensing opticians rather than optical assistants. The helps distinguish BBR Optometry Ltd from local competitors, which at the beginning of this research included five national and regional chain practices and one independent practice (within a 10 kilometre radius). Towards the end of this research project local competition reduced, with only three national chain practices remaining in the area. BBR Optometry Ltd operates differently to typical high street optometric practices in that BBR Optometry Ltd concentrates on generating a higher spend per patient (via professional fees and optical product sales) rather than high activity. Hence the business model applied by BBR Optometry Ltd is orientated around a lower volume of sales but higher average revenue per patient.

This research was part of a Knowledge Transfer Partnership (KTP) project between BBR Optometry Ltd and Aston University's Business Partnership Unit. The KTP project aimed to grow BBR Optometry Ltd as a business by applying knowledge and insights gathered through this research directly into the operational and strategic functions of the business. The outcomes of the KTP project are discussed in the final discussions and conclusions chapter.

Chapter 2: Sales performance of community-enhanced services in the traditional high street optometric business model

2.1 Introduction

The Hospital Eye Service (HES) is becoming overworked due to an ageing population requiring greater ophthalmic care. As a result resources are being stretched and waiting lists for ophthalmic care lengthened. Optometrists in the primary care arena possess skills and expertise that can be used via community-enhanced services to help reduce the burden on secondary care resources. Practitioners and practice managers have a choice to partake in local community-enhanced services. Dabasia et al (2014) suggested that most optometrists (73%) in the UK participate in locally commissioned enhanced services. Many optometrists feel that participating in enhanced services furthers their professional development (Konstantakopoulou et al, 2014). However, Konstantakopoulou et al (2014) found that the lack of alignment of community-enhanced services with the retail-oriented business model of high street optometric practice was the key reason for practitioners opting not to participate in these services. This presents a barrier to ensuring widespread enhanced and consistent clinical care within the primary care arena.

2.1.1 Community-enhanced services

The benefits of community-enhanced services from a healthcare, patient and societal perspective have been well explored. These include improved accuracy of referrals and better use of secondary care resources (Henson et al, 2003; Sharp et al, 2003; Park et al, 2009; Ratnarajan et al, 2013). Furthermore, the efficient pathways help reduce waiting times for urgent HES appointments. Patients may also prefer this provision of service as optometrists in the community are often easily accessible in terms of location and offer greater appointment availability, for instance weekend appointments. Community-enhanced services should also, theoretically, produce financial cost savings for the NHS, as substitute fees received by high street optometric practices are often less than those for the HES (Association of Optometrists, 2008a). Henson et al (2003) estimated that the refinement of glaucoma referrals over a 3-year period would produce NHS cost savings of £53, 733, the equivalent to £17 per patient. Another study compared two types of glaucoma services and reported a repeat intraocular pressure service to render a cost saving of 62% (Parkins and Edgar, 2011). However this study also

revealed that a comprehensive glaucoma referral refinement service would approximately be cost neutral; although, the later service did incur administrative/triage costs and offered a greater fee to optometrists, £50 to £75 compared to £10 to £20 (Parkins and Edgar, 2011).

However, literature demonstrates mixed findings on the cost efficiency of community-enhanced services in primary care. Some studies indicate cost savings (Henson et al, 2003; Parkins and Edgar, 2011), while other studies suggest otherwise (Spencer et al, 1995; Coast et al, 1997; Gray et al, 2000; Sharma et al, 2012). Some studies advocate that a community-enhanced services in replacement of secondary care creates a cost deficit rather than a saving (Coast et al, 1997; Sharma et al, 2012). Coast et al (1997) investigated costs related to the Bristol Shared Care Glaucoma Study and found that HES care varied from £14.50 to £59.95 per appointment as opposed to a community-enhanced service, where costs varied from £68.98 to £108.98. The cost of community care was greater due to a more frequent follow up interval, an average of six months compared to ten months for hospital ophthalmologists (Coast et al, 1997). Sharma et al (2012) estimated the cost of community glaucoma clinics to be more than double the cost of running a hospital clinic, £145.62 and £63.91 per patient respectively. The community-enhanced service costs included opportunity costs (lost spectacle dispensing) and are far greater than those presented by Coast et al (1997). The costs reported by these two studies are not comparable as the first calculated annual costs for patient follow up visits and the other is derived by estimated costs associated with delivery of a half-day glaucoma clinic. However, both studies imply that the cost efficiency of community-enhanced services in high street optometric practices is weakened by high overhead costs and high opportunity costs (Spencer et al, 1995; Sharma et al, 2012). Other factors include re-referral rates, number of patients seen and follow up intervals (Coast et al, 1997; Gray et al, 2000; Sharma et al, 2012). Furthermore Holtzer-Goor et al (2010) and Sharma et al (2012) suggests that there are no significant patient cost savings for community or hospital based shared care.

High street optometric practices generally offer eye examination services and optical products. As discussed in Chapter 1, the traditional optometric practice business model is to offer eye examinations cheaply, often at a loss, and rely on product sales (namely spectacles) to generate a profit. Hence high street optometric practices heavily rely on spectacle sales. This business model can

experience shortcomings should a patient choose to dispense elsewhere or should an examination not result in the need for spectacle dispensing. The nature of community-enhanced services is to monitor and assess eye conditions and so may not result in many spectacle sales.

NHS enhanced service type	Average remuneration
Acute eye disease triage service	£40-£50
Glaucoma monitoring	£40-£50
Low vision	£40-£60
Cataract pre-operative assessment	£40
Cataract post-operative assessment	£20
Paediatric	£25

Table 2.1 A list of typical community-enhanced services and the fees paid to optometrists for providing services (Association of Optometrists, 2008a)

Funding for community-enhanced services is separate to the GOS and is usually based on local budgets. Consequently the remuneration for providing community-enhanced services varies across the UK. The average fees for community-enhanced care pathways are listed in table 2.1, and range from £20 to £60, which is far greater than the average private and NHS sight test fee, £26,00 (Optical Confederation, 2015) and £21.10 respectively. Spencer et al (1995) calculated that traditional sight test and eye examination services generate an average of £81 (range £64 - £91) income per optometrist per hour as a result of opportunistic spectacle sales. Therefore, despite a greater professional fee, it is difficult to judge how community-enhanced services bode against traditional services in terms of total income generation. Spencer et al (1995) found that practitioners would accept a lower than cost fee for community-enhanced services. The study assessed community glaucoma monitoring; the cost of providing the appointment was calculated as £34.72 (not including opportunity cost) and the minimum fee accepted by participating practitioners was £26.03. However, optometrists would expect a more realistic fee for increased patient numbers, £43.16 for up to 100 patients per annum (Spencer et al, 1995). This perhaps indicates that optometrists' value the intangible benefits of providing community-enhanced services, such as enhanced professional development and improved care pathways (Konstantakopoulou et al, 2014), but financial viability soon diminish with increased

numbers of patients. It also suggests that community-enhanced services are currently subsidised by other business activity.

2.1.2 Aims

There are many benefits associated with community-enhanced services. Published literature focuses on clinical outcomes of such services and cost efficiency for the NHS. However, community-enhanced services may not always be cost effective from a practice perspective (Coast et al, 1997), perhaps indicating that high street optometric practices draw the short straw in the provision of these services. Although, many practitioners continue to willingly participate in delivering community-enhanced services due to other intangible benefits (Konstantakopoulou et al, 2014). It is vital to understand the impact of community-enhanced services on high street optometric practices, as the demand is likely to continue to rise and long-term sustainability will be required. There is limited research exploring the impact of community-enhanced services on the business model of optometric practices. To the authors knowledge there is only one major study to have investigated this, the Bristol Shared Care Glaucoma Study (Spencer et al, 1995).

Businesses and organisations tend to assess their performance by focusing on four key areas; total sales/revenue per outlet or team, the efficiency of sales effort, the efficiency of operations, and service quality (Wilson, 2000). Practice managers often place more emphasis on sales efficiency and closely monitor the number of examinations conducted, the conversion of examinations to spectacle sales and the sales value per spectacle dispense (Wilson, 2000). This study will consider these three key performance indicators to assess and compare the performance of community-enhanced services in the traditional high street optometric business model.

2.2 Methods

Community-enhanced services in Herefordshire are well developed (LOCSU, 2015). Community optometrists are able to provide pre- and post-operative cataract assessments, low vision assessments, refinement of suspect glaucoma referrals and a non-acute GP triage referral service. More recently the Herefordshire Clinical Commissioning Group (CCG) commissioned a stable ocular hypertension monitoring service and a children's school screening service.

BBR Optometry Ltd is an independent practice based in Hereford city centre and is an established provider of all local community-enhanced services. In addition BBR Optometry Ltd offers a range other traditional optometric services including GOS sight tests, private eye examinations and contact lens services. Contact lens services refer to conducting contact lens fittings, trials and consultations rather than the sales of any contact lens products.

A 12-month retrospective audit was conducted at BBR Optometry Ltd from May 2013 to April 2014. The study was based around 12 services offered at BBR Optometry Ltd, which can be categorised into 4 principle groups (table 2.2). The study included two GOS sight tests, three types of private eye examinations and two forms of contact lens consultations. The NHS extended examination at BBR Optometry Ltd is partly NHS and privately funded, whereby the GOS eligible patient is charged for supplementary procedures, namely retinal imaging, which is beyond the scope of a GOS sight test. In this study the NHS extended examination was categorised as a private eye examination. The NHS extended examination is offered to all GOS eligible patients and patients are made aware of the supplementary procedures and associated costs when booking the appointment. BBR Optometry Ltd encourages contact lens wearers to have combined appointments whereby an examination and contact lens check are conducted in the same appointment. This appointment type is represented in this audit as the 'combined contact lens and eye exam' (Table 2.2)

This audit included seven traditional optometric services (GOS sight tests, private eye examinations and contact lens services) and five community-enhanced services (table 2.2). This would allow a suitable comparison of the performance of community-enhanced services against more traditional services. Other miscellaneous services (e.g. re-test and follow up appointments) were excluded from the study, as they were not identified as major drivers of the business.

Type	Service	Professional Fee
General Ophthalmic Service (GOS)	Adult sight test	£20.70
	Child sight test	£20.70
Private eye examinations	NHS extended exam	£58.70
	Private eye exam	£59.00
	Private U25 exam	£32.00
Contact lens services	Combined contact lens and eye exam	£79.00 (average)
	Contact lens aftercare	£32.00
Community enhanced services	Low vision assessment	£42.00
	GP eye referral service (GPERS)	£40.00
	Glaucoma referral refinement (GRR)	£45.00 (average)
	Post-operative cataract assessment	£30.00
	Pre-operative cataract assessment	£40.00

Table 2.2 Services included in the 12-month audit; two GOS services, three private eye examination services, two contact lens services and five community-enhanced services

The audit assessed the key performance indicators related to sales and income generation for each service. This included

- The number of appointments conducted
- The percentage conversion of appointments into spectacle sales
- The average spend on spectacles (£)

Ethical approval for a retrospective audit was received by Aston University Ethics Committee. All data was collected using auditing facilities available via i-Clarity (Topcon Great Britain Ltd, UK), the practice management software used by BBR Optometry Ltd. All data were analysed at the practice site. Results were tabulated and analysed using Microsoft® Excel® (Microsoft, Redmond, Washington, USA) and statistical analysis was conducted using IBM® SPSS® Statistics 22 (IBM Corporation, Armonk, New York, USA).

2.3 Results

In this study, each attended appointment and each completed spectacle sale from May 2013 to April 2014 was considered as an individual data entry. Therefore a

patient attending more than one appointment or purchasing several spectacles would account for multiple data entries. This study consisted of a total of 3970 attended appointments, the majority (62%) of which were by female patients. The mean age for patients attending appointments was 56.3 ± 12.5 years and the age range was 2 to 100 years. The study also audited a total of 2265 spectacles sales. Female patients generated around 59% of spectacle sales. The mean age of patients purchasing spectacles were 54.2 ± 13.9 years and the age range was 4 to 96 years.

2.3.1 Service uptake

The majority of services (42%) provided during the study period were private eye examinations (figure 2.1). Community-enhanced services formed the smallest number of services conducted at only 8% of all appointments (figure 2.1). This indicates a greater demand for private eye examinations and the least demand for community-enhanced services. Figure 2.2 shows that the most frequently booked service type was the NHS extended exam, followed by the GOS adult and child sight test. This indicates a higher demand for traditional eye examinations and sight tests rather than contact lens or community-enhanced services. Demand for community-enhanced services and the private U25 examination were low at 5% or less (figure 2.2). Of all community enhanced services the post-operative cataract assessment services had the greatest demand (figure 2.2).

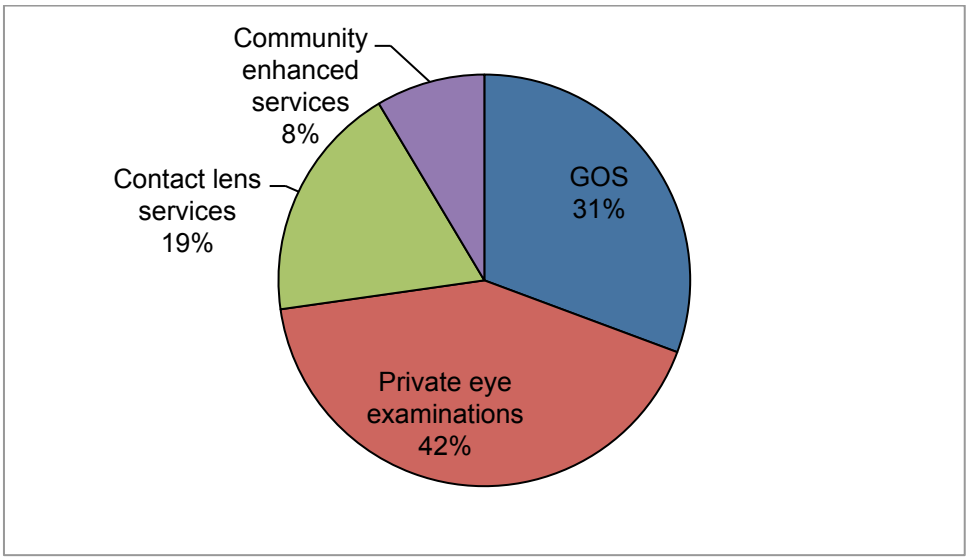


Figure 2.1 The distribution of services (by service category) conducted from May 2013 to April 2014

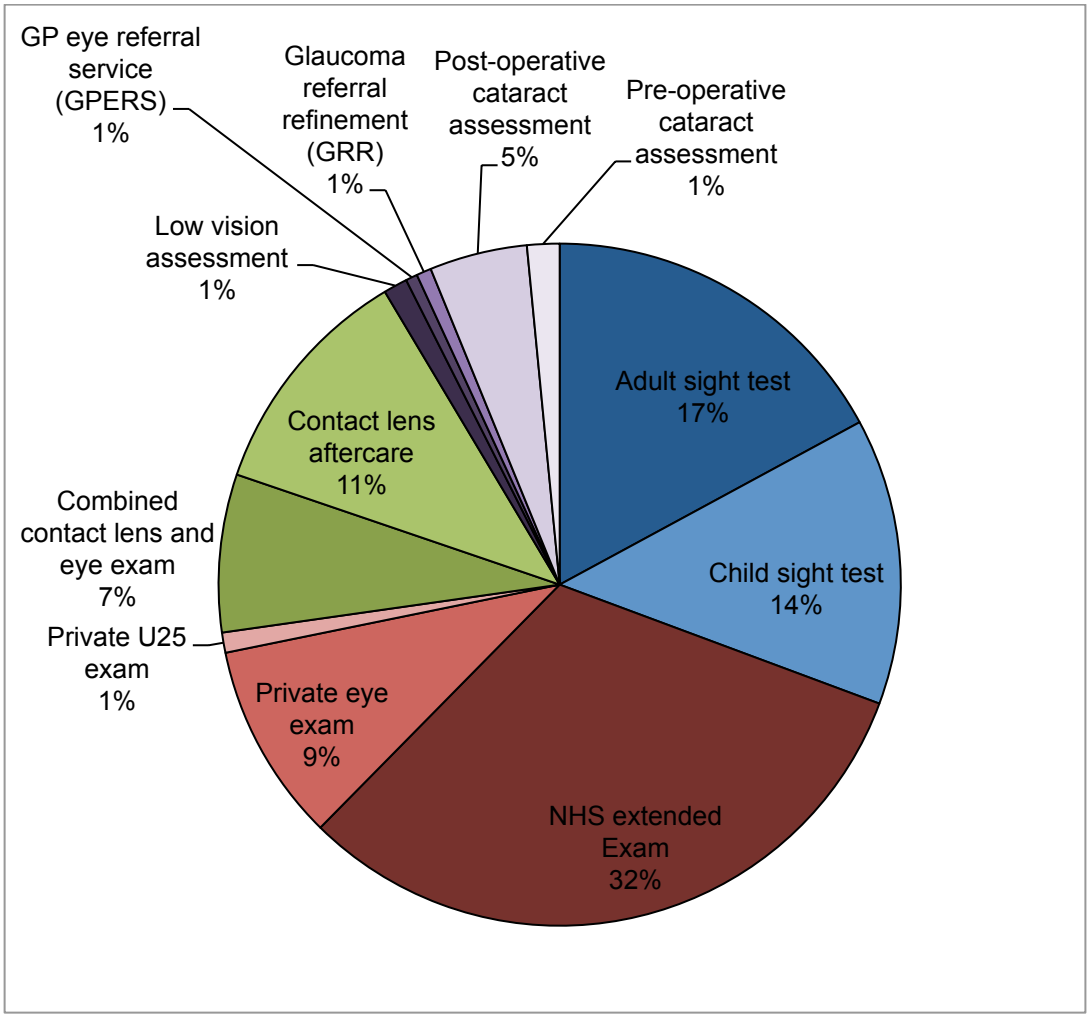


Figure 2.2 The distribution of services conducted at BBR Optometry Ltd from May 2013 to April 2014

The mean age demographics of patients attending each service type are illustrated in figure 2.3. The service with the youngest mean age (11 ± 4.0 years) was the child sight test, as expected, followed by the private U25 exam (21 ± 3.6 years), which is a private examination for young adults aged 19 to 25 years old. The service with the greatest mean age was the low vision assessment service (77.6 ± 19.1 years). The mean age for the four service categories, GOS, private eye examinations, contact lens services and community-enhanced services, were 44.2 ± 32.5, 64.9 ± 15.3, 41.3 ± 11.4 and 76.3 ± 11.4 years respectively. The distribution of patient age in each service category was found to be non-normally distributed using a Kolmogorov-Smirnov test ($P<0.001$). A Kruskal-Wallis H test showed a statistically significant difference in median age scores between the four groups ($P<0.001$). Pairwise comparisons were conducted using Mann-Whitney U tests.

The mean age of patients attending community-enhanced service was statistically significantly greater than for patients attending traditional services (GOS, private eye examination or contact lens services) (P<0.001). Additionally the age of patients attending private eye examination services was greater than those attending GOS (P<0.001) or contact lenses services (P<0.001). There was no difference in age between patients attending GOS or contact lens services (P=0.811).

Therefore it is evident that community-enhanced services attract an older patient base compared to traditional optometric services. The GOS and private eye examination services have age criteria, for instance the GOS child sight test is intended for children aged below 16 years, and children aged 16 to 18 years in full time education. Whereas the private eye exam service is aimed at adults aged between 25 to 60 years. However, community-enhanced services and contact lens services have no age criteria.

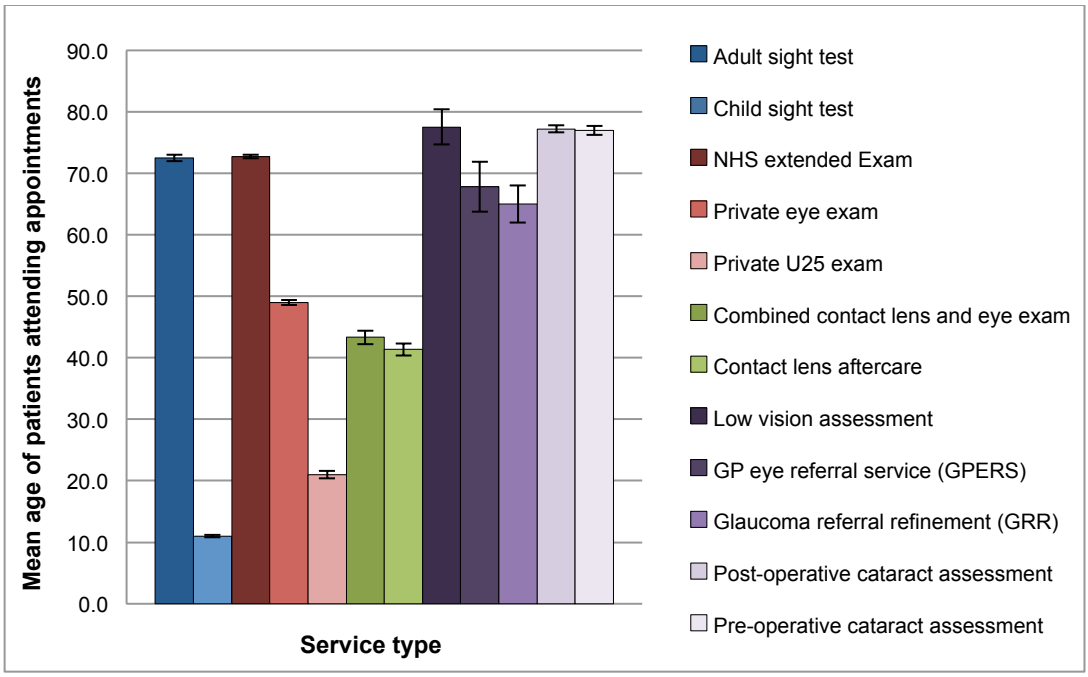


Figure 2.3 The mean age of patients attending appointments at BBR Optometry Ltd from May 2013 to April 2014

There was generally a greater ratio of females to males attending appointments (figure 2.4). The services with more males to females are the GP eye referral service (GPERS) and glaucoma referral refinement services (GRR), both of which are community-enhanced services (figure 2.4).

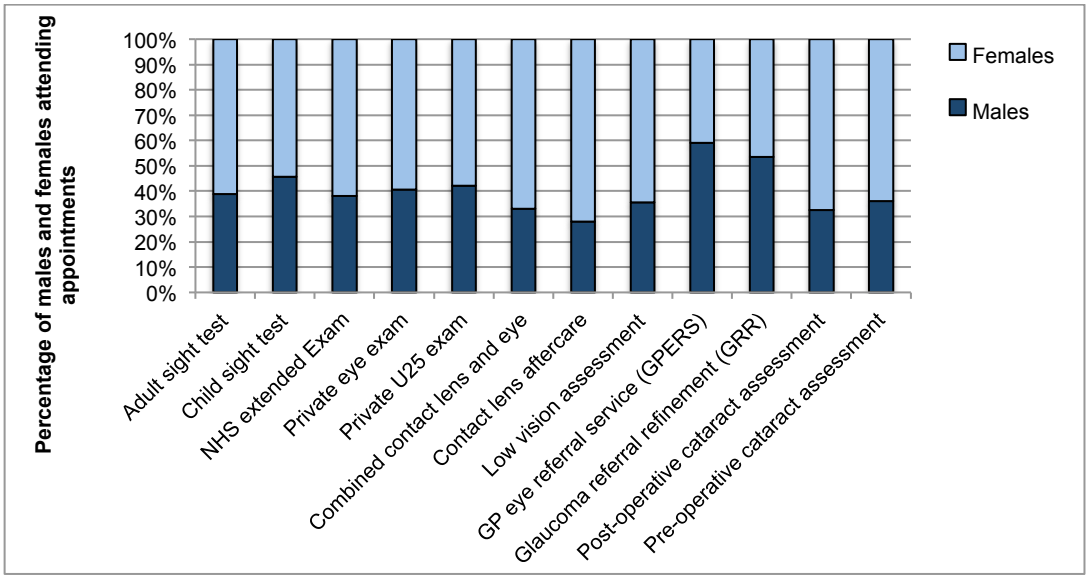


Figure 2.4 A graph to show the proportion of males and females attending appointments for the principle 12 optometric services

2.3.2 Conversion rate

The percentage of attended appointments that resulted in a spectacle sale is known as the conversion rate. The conversion rate of each individual service type is shown in figure 2.5. The private eye exam and the post-operative cataract assessment service have the highest conversion rates at 84.5% and 74.5% respectively. The lower conversion rates are amongst the community-enhanced services and contact lens services (figure 2.5). The mean conversion rates for each service category, GOS, private eye examinations, contact lens service and community-enhanced services were 63.4%, 71.6%, 22.6% and 28.5% respectively (figure 2.6). Therefore patients attending GOS and private eye examinations tended to generate more spectacle sales compared to patients attending contact lens and community-enhanced services. This highlights the distinctive trends in spectacle purchase behaviour among patients attending different types optometric services.

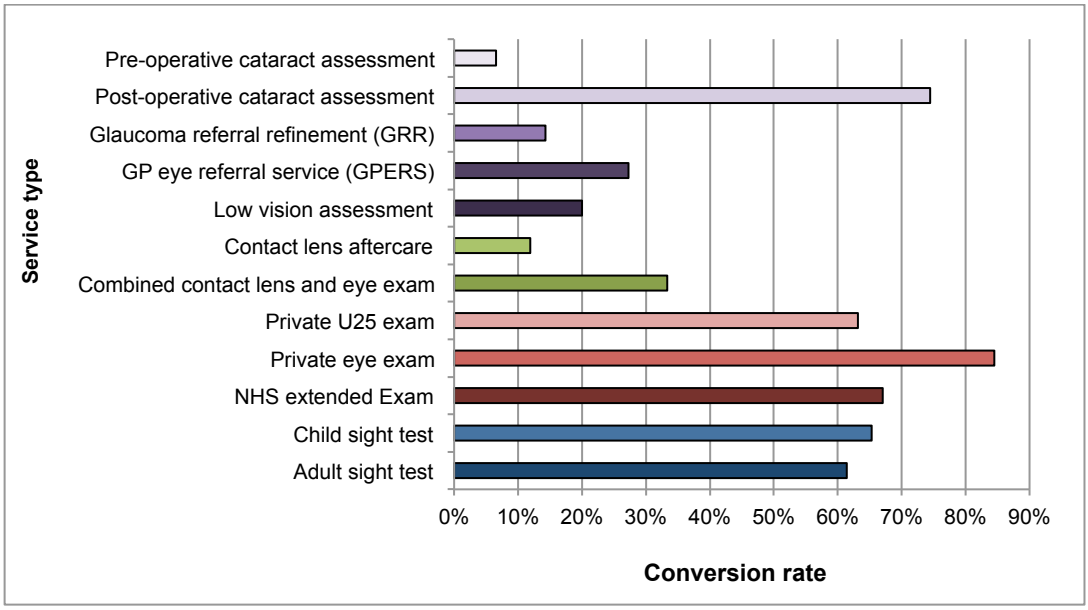


Figure 2.5 The percentage of appointments that resulted in spectacle sales from May 2013 to April 2014

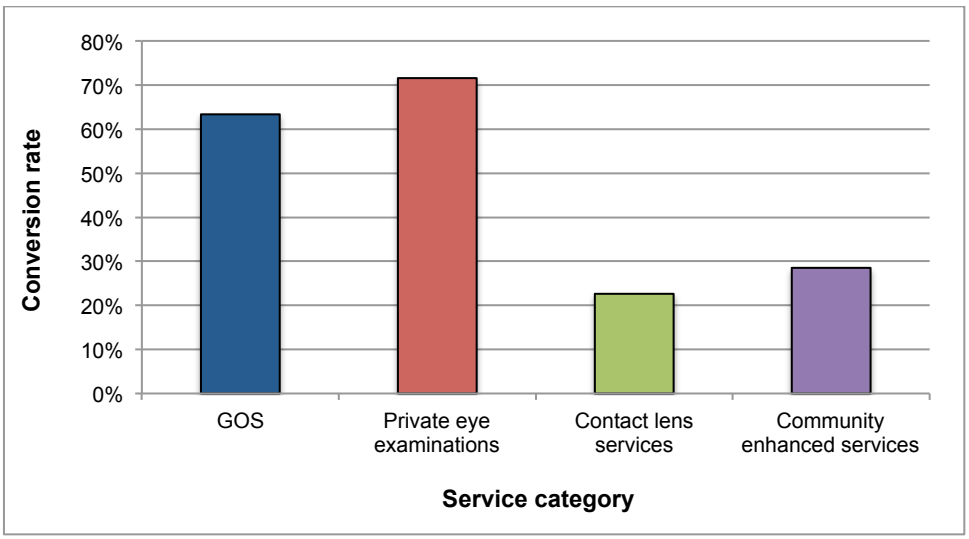


Figure 2.6 A graph to show the conversion rates for principal service categories

Further analyses were conducted to explore other contributing factors such as age and gender on spectacle purchase behaviour. The mean age of patients attending appointments and subsequently purchasing spectacles was 57.1 ± 25.5 years. While the mean age of patients attending appointments and not purchasing spectacles was 56.0 ± 25.6 year. A Kolmogorov-Smirnov normality test shows the age of patients purchasing and not purchasing spectacles to be non-normally distributed ($p<0.001$). A Mann-Whitney U test was conducted to determine the

significance of the age difference between patients that purchased spectacles and those that did not. Distributions of age for both groups were similar as assessed by visual inspection. The median age was not statistically significantly different between the two groups (p=0.265). Therefore age is not a factor for conversion rate. The percentage of males and females purchasing spectacles were 61.0% and 54.6% respectively. A Chi-square test shows a very weak association between gender and conversion to spectacle sales ($\chi^2(1) = 10.501$, $\varphi = -0.049$, p=0.001) implying that females are slightly more inclined to purchase spectacles than males.

2.3.3 Average spend per dispense

Each spectacle sale during the study period was audited. Figure 2.7 illustrates the average spend on a pair of spectacles for each individual service type. The NHS extended exam has the highest mean spend of £326.57 ± £185.97. The service with lowest mean spend per spectacle sale is the child sight test at £77.14 ± £52.80. NHS vouchers often supplement children's spectacles and so can limit the average spend. The average spend per spectacle dispense for each service category is shown in figure 2.8. The private eye examinations have the largest mean spend (£319.56 ± £179.43), while the GOS has the lowest mean spend (£172.50 ± £161.32). The mean spend of the GOS category has likely been impacted by the low mean spend of child sight test services as the two services in this category have very different mean spends per spectacle dispense (figure 2.7). Figure 2.8 shows the community-enhanced services to have a relatively low mean dispense value at £196.56 ± £139.92.

Spends on spectacles for each service category was non-normally distributed (P<0.001), with all groups displaying positive skewness (figure 2.9). In addition the distribution of spends per spectacle dispense for the GOS and community-enhanced services had a positive kurtosis, compared to private eye examinations and contact lens services, which displayed negative kurtosis (figure 2.9). A Kruskal-Wallis H test demonstrated a statistically significant difference in mean spend per spectacle dispense between the four groups (P<0.001). Pairwise comparisons were conducted, using Dunn's (1964) technique with a Bonferroni correction, in order to identify which group(s) are significantly different to which other group(s). Multiple pairwise comparisons can increase the risk of incorrectly rejecting the null hypothesis and so a Bonferroni correction was used to minimise the risk of Type 1 error(s). This post hoc analysis illustrated that the mean spend on spectacles by patients attending private eye examinations was significantly

greater than for patients attending other appointment categories (adjusted P<0.001). Additionally the mean spend on spectacles by contact lens patients were significantly greater than those for GOS (adjusted P<0.001) or community-enhanced services (adjusted P=0.004). However, patients attending GOS and community-enhanced services tended to purchase spectacles of a similar value (adjusted P=0.056). Therefore patients attending private services (private eye examination and contact lenses services) generated higher value spectacle sales than NHS funded services (GOS and community enhanced services).

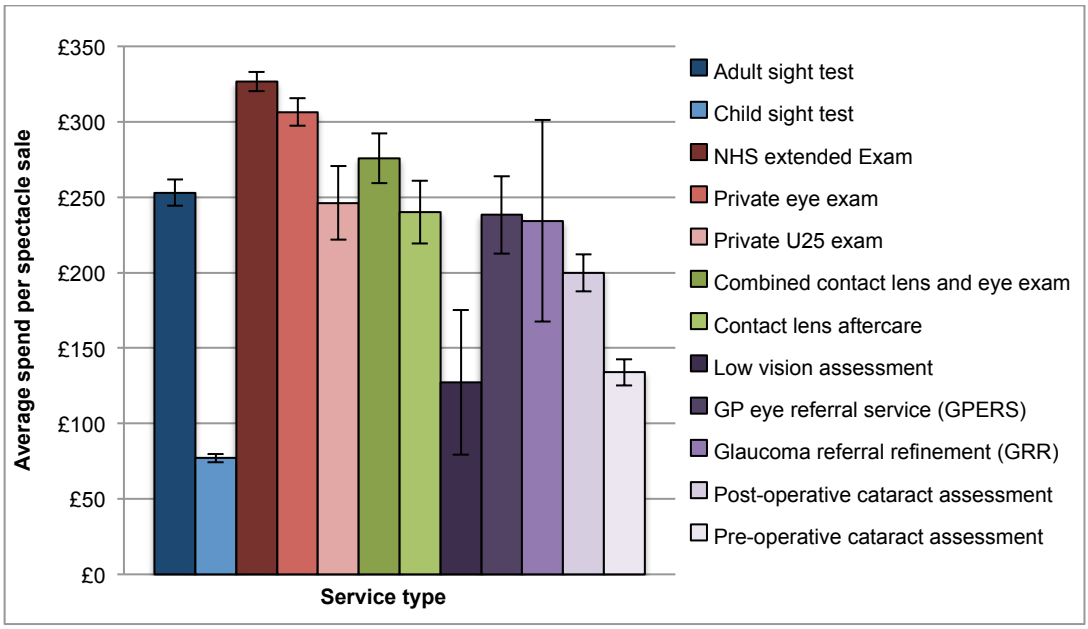


Figure 2.7 The mean spectacle dispense value for each clinical service

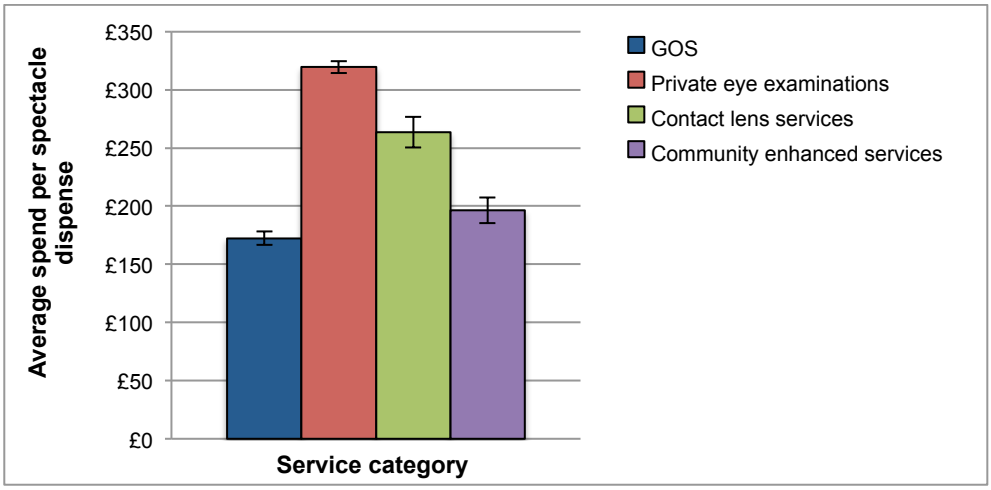


Figure 2.8 The mean spend per spectacle dispense for each service category from May 2013 to April 2014

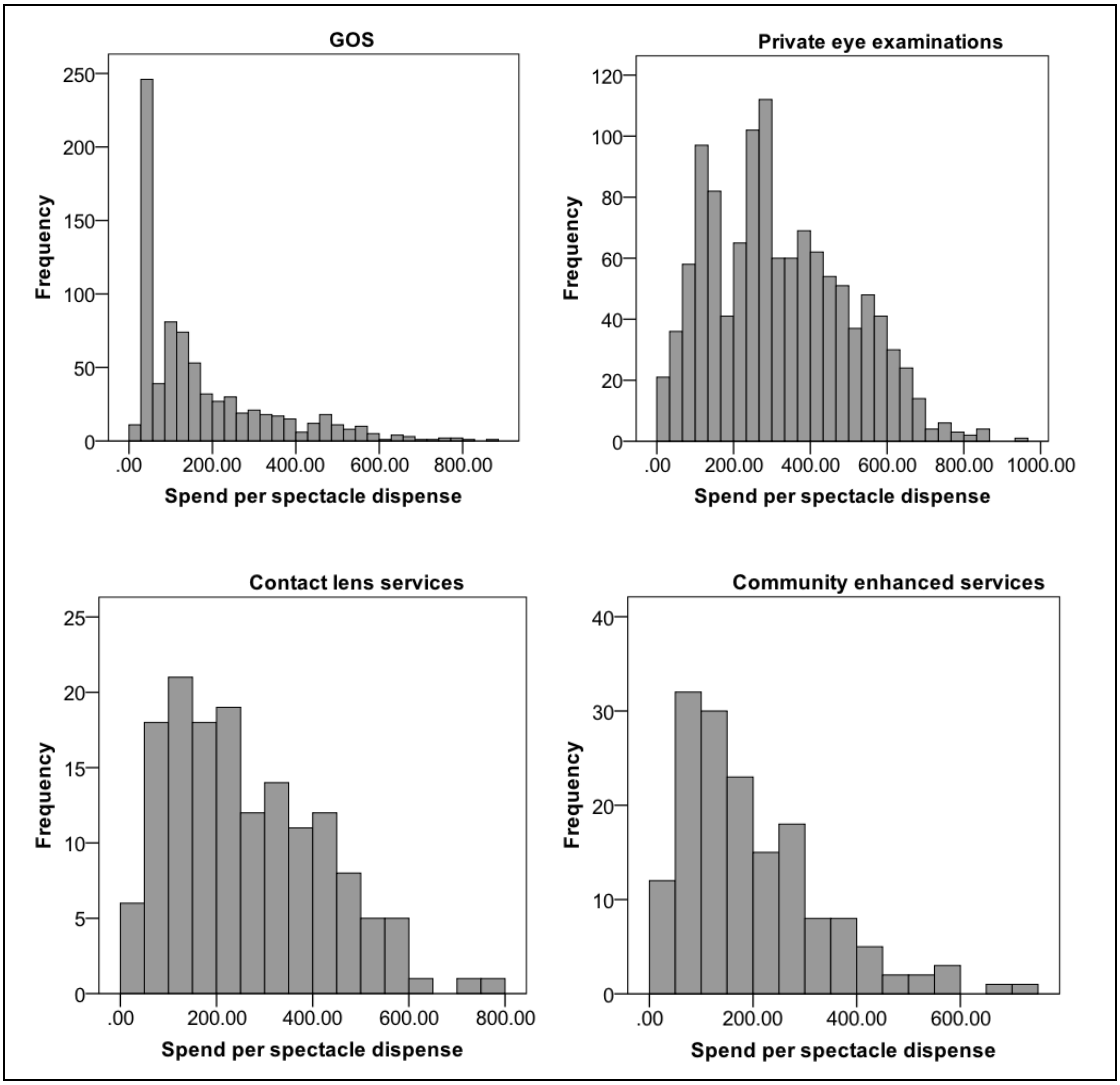


Figure 2.9 Histogram plots to display the distribution of spends per spectacle dispense for each service category

Additional analyses was conducted to identify any association between average spectacle dispense value with other factors including age and gender. The patients' age and spectacle dispense values for spectacle sales during the study period were non-normally distributed ($p<0.001$). A Spearman's rank-order correlation was conducted to assess the relationship between age and spend on spectacles. There was a weak positive correlation between age and average spend per spectacle sale ($r_s = 0.268$, $P<0.001$) as shown in figure 2.10.

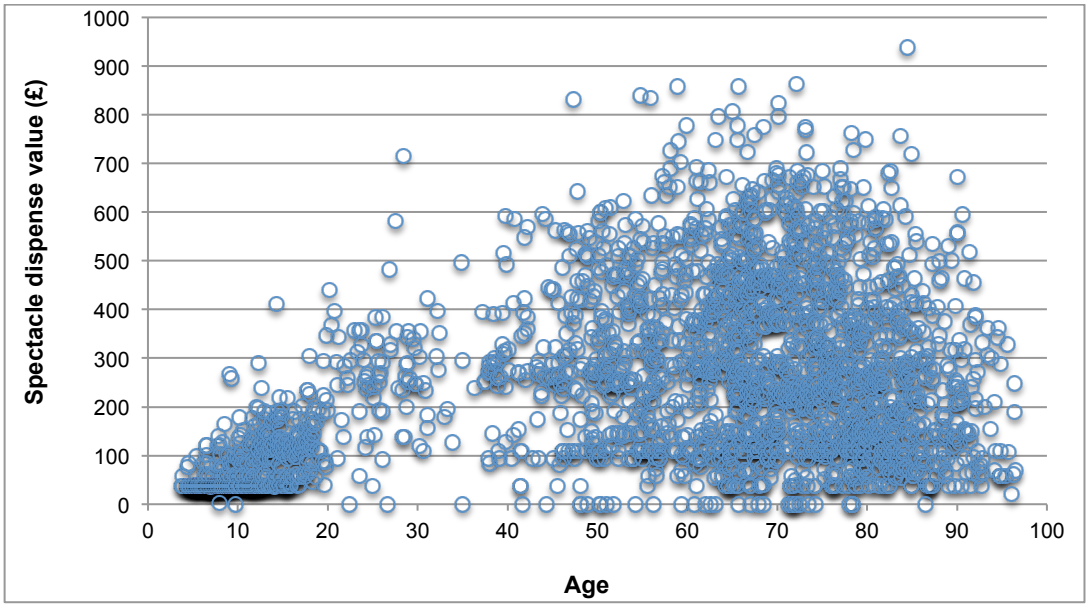


Figure 2.10 A scatter graph to show the relationship between age and the spectacle dispense value for patients whom purchased spectacle from May 2013 to April 2014

The mean spend for males and females were £246.73 ± £182.24 and £264.30 ± 183.22, respectively. The spectacles dispense values for male and female subjects were non-normally distributed (P<0.001) and so a Mann-Whitney U test was conducted to determine any significant difference in average spend on spectacles between the two groups. The distributions of spectacle dispense values between males and females were similar. The median spectacles dispense value for females (£236.53) were statistically significantly greater (P=0.017) than for males (£216.45). Therefore the average spend on spectacles is influenced by gender and weakly associated with age.

2.4 Discussions

This study assessed the sales efficiency of community-enhanced services within the traditional high street optometric business model. This study was based on a single independent practice, BBR Optometry Ltd, in Hereford. The mean age of patients attending appointments and purchasing spectacles was 56.3 ± 12.5 and 54.2 ± 13.9 years respectively. This was greater than the mean age of 43 years for the population of Herefordshire (Office for National Statistics, 2013), implying that BBR Optometry Ltd generally attracts a slightly older age group. Additionally this study consisted of a greater percentage of female patients to males and was

greater than the local population average of 50.7% females (Office for National Statistics, 2012).

2.4.1 Service uptake

The uptake and sales of optometric services varied depending on the service category and the service type (figures 2.1 and 2.2). In general the traditional eye examination and GOS sight testing services achieved a higher uptake than contact lens or community-enhanced services (figure 2.1). The greatest uptake was for private eye examinations, particularly the NHS extended examination (figure 2.2). The NHS extended examination at BBR Optometry Ltd provides GOS eligible patients the option of having supplementary procedures such as retinal imaging. This is common practice in UK high street optometric practice where approximately 42% of practitioners charge GOS eligible patients for supplementary procedures (College of Optometrists and Medix UK, 2008). However, other sources indicate a larger uptake of GOS (71.1% of all eye examinations) compared to private eye examinations (Optical Confederation, 2015), which contrasts with the findings of this study. This contrary finding may have occurred due the classification of the NHS extended examination in this study as a private eye examination rather than a NHS funded examination.

Some services had age criteria, which may have restricted uptake. For instance the private U25 exam is only offered to patients aged 19 to 25 years and so has a narrow target audience compared to other services. The private U25 exam had a very low uptake of around 1% of all attended appointments (figure 2.2). All GOS and private eye examination services had age criteria, with some services including additional eligibility criteria. Interestingly the contact lens services and community-enhanced services imposed no age criteria, yet had the least uptake (figure 2.2). This suggests other influencing factors for the uptake of optometric services. The target audience for some services are narrower than others, which can impact the demand for those services. Community-enhanced services are established to assess and monitor particular eye conditions, whereas GOS and private eye examinations are intended to provide a routine assessment of refractive error and ocular health. Therefore traditional services will have a larger target audience than community-enhanced services and so demand will be greater. Additionally all of the community-enhanced services in this study required a referral to initiate the appointment booking, further narrowing the target audience for these services. This

is a feasible explanation for the relatively low uptake of community-enhanced services as shown in figure 2.1.

The community-enhanced services attracted a significantly older age group compared to other optometric services (figure 2.3). This supports that notion that the demand for community-enhanced services will increase with an ageing population. Each community-enhanced service comprised of around 1% of all attended appointments, bar the post-operative cataract assessment service, which comprised of around 5% of all attended appointments (figure 2.2). This shows that the demand for post-operative cataract assessments is greater than other community-enhanced services. This is plausible considering that cataract surgery is the most common surgical procedure performed in England. The 'hospital episode statistics' generated by the Department of Health indicate that over 300,000 cataract surgery procedures are performed annually. Figures 2.1 and 2.2 also shows relatively low uptake of contact lens services compared to GOS and private eye examination services. Again this is likely to be associated with the demand for such services as the majority of patients requiring refractive error correction opt for spectacles rather than contact lenses (Keynote Ltd, 2014; Mintel Group Limited, 2015).

2.4.2 Conversion rate

The percentage of patients purchasing spectacles fluctuates among service types and categories as shown in figures 2.5 and 2.6. Overall patients attending for traditional eye examination services (GOS and private eye examinations) had a higher conversion rate compared to patients attending contact lens services and community-enhanced services (figure 2.6). A typical conversion rate is considered to be around 62% to 75% (Brogan, 2011), which was achieved by all the GOS and private eye examination services except the GOS adult sight test, which had a conversion rate of 61.4% (figure 2.5 and 2.6). The conversion rates for contact lens services and community-enhanced services were far less than this at 22.6% and 28.5% respectively. Aslam (2013) reported that 80% of contact lens wearers in the UK are 'dual wearers', who also wear spectacles, and purchase spectacles at a similar frequency to spectacle only wearers. However, this study disagrees and found that contact lens wearers are less likely to purchase spectacles than patients that only wear spectacles (i.e. those attending for GOS and private eye examinations) (figures 2.5 and 2.6). This study does assume that all contact lens wearers booked combined contact lens and eye exam appointments (as

encouraged by BBR optometry Ltd) as opposed to booking a GOS sight test or private eye examination separate to the contact lens aftercare, which would distort findings.

The conversion rates for services within the same category varied noticeably (figure 2.5). For instance the conversion rates for community-enhanced services varied from 6.6% (pre-operative cataract assessment) to 74.5% (post-operative cataract assessment). Patient age was not deemed to be a factor influencing conversion rates, however there was a very weak association with patient gender, suggesting that females have a higher conversion rate. However, this is unlikely to be the cause of variance in conversion rates amongst services, as there is no obvious link between services with a higher percentage of female patients and conversion rates. For example, the contact lens aftercare service had the highest percentage (71.9%) of female patients (figure 2.4) yet rendered the second lowest conversion rate of 11.9% (figure 2.5).

Conversion rates are governed by the outcomes of the optometric services. For instance if a change is found in the patients' refractive error or the patient requires new spectacles, then the optometrist will advise to update spectacles. An audit conducted by the Optical Confederation (2013) found that 63.5% of GOS sight tests resulted in a changed or new spectacle prescription being issued. Hence GOS sight tests are likely to have a high conversion rate as demonstrated in figure 2.6. In this study contact lens services produced a lower conversion rate indicating that these services may put more emphasis on ocular health and ensuring contact lenses are up-to-date as opposed to spectacles. All community-enhanced services displayed low conversion rates except for the post-operative cataract assessment service. A patient's refractive error can change significantly following cataract surgery and so an element of the post-operative cataract assessment service is to measure the patients 'new' refractive error, and advise on spectacles accordingly. Therefore it is understandable for this service to render a high spectacle conversion rate. However, other community-enhanced services may not encompass any refraction element, such as the glaucoma referral refinement (GRR) service, which is focused on assessing the patient's risk for glaucoma. The services that do not strictly include refraction are contact lens aftercare, low vision assessment, GPERS, GRR and pre-operative cataract assessments, which coincides with low conversion rates achieved by these services (11.9% to 27.3%). Theoretically these services would be expected to have zero conversion rates, as a

spectacle prescription would not be generated as part of these services. However, as a matter of convenience the clinician may have conducted refraction during these appointments. Alternatively the patient may have coincidently purchased spectacles following their appointment using a previous spectacle prescription.

The key factor influencing spectacle conversion rates is associated with the nature of the optometric service and whether refraction is a key element. This study did not consider other factors influencing spectacle conversion rates such as patient wealth and social status. Additionally this study did not factor patients purchasing spectacles elsewhere. Other barriers to purchasing new spectacles may have impacted the results of this study, such as patients not wishing to change their spectacle frame, concerns about not seeing clearly in new spectacles, concerns about a change in appearance and the reactions of friends and family (Fylan et al, 2005).

2.4.3 Average spend per dispense

The mean spend on spectacles was significantly greater for patients attending private services such as private eye examinations and contact lens services compared to those attending NHS funded services (GOS and community-enhanced services). The 'enhancing the approach to selecting eyewear' (EASE) study reported the mean spend on spectacles to be greater than £200 (Atkins et al, 2009). The EASE study consisted of patients aged 18 to 60 years and so it is likely that the majority of those patients were attending private services (Atkins et al, 2009). This study concurs that patients attending private eye examinations and contact lens services, on average, spend more than £200 per spectacle dispense. Patients attending GOS and community-enhanced services displayed statistically similar average spend on spectacles, which was less than £200 (figure 2.8).

Patients attending GOS sight tests displayed the least spend (£172.50 ± £161.32) of all service categories (figure 2.8). This may have been associated with the utilisation of NHS optical vouchers towards the cost of spectacles. In this study the average spend on spectacles was measured as income received from spectacle sales and was inclusive of NHS optical vouchers. Children aged less than 16 years, children aged 16 to 18 and in full time education and adults receiving income support and particular government benefits are eligible for NHS optical vouchers. NHS optical vouchers range from £38.30 to £211.30 and almost all practices, including BBR Optometry, stock spectacles within these values for

children and adults (Optical Confederation, 2015). Some eligible patients' may opt for a spectacle frame or lenses outside of the NHS optical voucher value and will simply pay the difference. In this study some patients attending the GOS adult sight test may have been eligible for NHS optical vouchers. This may have limited spends, unless those patients chose products outside of the voucher value range, although this was not audited. However, all patients attending the GOS child sight test will have been eligible. Additionally children are less likely to require complex and more expensive lenses such as progressive lenses, which also reduces the mean spend compared to other optometric services. Therefore it is plausible for the child sight test service to display the lowest mean spend on spectacles (figure 2.7). Community-enhanced services displayed a relatively low mean spend (£196.56 ± £139.92) on spectacles (figure 2.8), however the use of NHS optical vouchers by this group was not audited.

Spends per spectacle dispense for each service category were found to be non-normally distributed. Figure 2.9 visually illustrates the distribution patterns for spends per spectacle dispense and shows that each group displayed positive skewness. This may be associated with popular products falling within a particular price range, or possibly associated with BBR Optometry Ltd's individual pricing structure. The distribution of spends on spectacles by patients attending GOS services showed positive kurtosis. This may have been associated with the use of NHS optical vouchers by patients in this group as the majority will have been eligible. However, patients attending community-enhanced services also displayed a positive kurtosis distribution, although the use of NHS optical vouchers by this group was not audited.

Patient age appears to be associated with the mean spend on spectacles, and was also reported by Atkins et al (2009). This study revealed a weak positive relationship, while Atkins et al (2009) illustrated a stronger relationship. However, the sample size of this study was far greater and also compromised of a wider age range of 4 to 96 years. Figure 2.10 shows the average spends on spectacles to increase with patient age, although this trend diminishes as the age increases. This relationship may be associated to the cost of different lens types. Multifocal lenses required by presbyopic patients tend to be more expensive. However, patients attending community-enhanced services displayed significantly greater mean age compared to other services (figure 3.2), yet the mean spend is not the greatest amongst this group (figure 2.8). This indicates other ruling factors influencing mean

spend on spectacles. Atkins et al (2009) suggested the average spend on spectacles is related to the importance of spectacles and level of disposable income. However, other factors such as wealth and social status may also be implicated. Additionally this study did not audit the type of spectacle dispenses. For instance progressive addition lenses (PAL) and higher index lenses are inherently dearer. Also whether the spectacle dispenses recorded were for an entirely new pair of spectacles or for re-glazing. This study also suggests that gender influences the average spend on spectacles, with females generally spending more.

2.5 Conclusions

A summary of this study is provided in table 2.2, which shows the sales efficiency for various optometric service categories. Table 2.2 illustrates that community-enhanced services have a low uptake and generate relatively few spectacle sales. Additionally the value of spectacle sales generated via community-enhanced services is relatively low compared to other traditional optometric services. Therefore this study illustrates that community-enhanced services do not perform well in the traditional high street optometric business model.

	Service uptake	**Conversion rate**	**Average spend per spectacle dispense**
GOS	31%	63%	£173
Private eye examinations	42%	72%	£327
Contact lens services	19%	23%	£263
Community-enhanced services	8%	29%	£197

Table 2.3 A summary of the key performance indicators for sales efficiency for each service category

The remuneration for performing community-enhanced services is generally greater than typical fees received for private eye examinations and GOS sight tests. However, the high street optometric business model is centred on generating high volume and high value spectacle sales and so community-enhanced services become relatively displaced within this model. With an ageing population the demand for community-enhanced services is envisaged to rise. A concern is that community optometrists may be reluctant to provide these services due to the

negative impact on the commercial side of their businesses (Konstantakopoulou et al, 2014). Moreover, greater uptake of community-enhanced services may have to be compensated by increased commercial pressure on traditional services. In their study Shickle and Griffin (2014) reported that the public do 'not trust the veracity of some optometrists' due to pushy spectacle sales and instances of a hard sell. An increased uptake of community-enhanced service may amplify this public perception of optometrists.

On the other hand providing community-enhanced services allows community optometrists to provide more clinically orientated services and may provide an opportunity to re-establish optometrists as professional clinicians (Hawley et al, 2010). Community-enhanced services offer broader benefits by improving care pathways, access to HES and providing better care locally. Therefore there is a need for further research to establish a means of ensuring community-enhanced services are sustainable within high street optometric practice without hindering and pressurising existing income streams.

This study provides an insight to the performance of community-enhanced services within 'for-profit' high street optometric practices. However, the study was based on a single optometric practice only. It would be beneficial to expand this study to a wider range of high street practices and different locations. Additionally it would be useful to explore other tangible practice benefits associated with providing community-enhanced services (e.g. attracting new patients). The uptake of services was dependent on demand and conversion rates were dependent on the outcome and tests conducted. However, further research could be conducted to understand the variability of average spends on spectacles between patients attending private and NHS funded services.

Finally, this study highlights the differences in sales efficiency achieved by different optometric services and associations with patient age and gender. This study may encourage practitioners to set more appropriate sales targets for different services, and more appropriate sales targets depending on specific patient demographics. For instance a practice predominantly providing optometric services for children would realistically have a lower average spend on spectacles compared to a practice seeing adult patients. A practice specialising in contact lenses may expect a lower conversion rate compared to other practices. Therefore this study may encourage practices to set more realistic and achievable sales targets.

Chapter 3: Calculating the cost of optometric service delivery

3.1 Introduction

High street optometric practices typically implement a loss leading strategy. This pricing strategy works well for traditional eye examinations, which are refraction based (Chapter 2), but the scope of high street optometric services is changing with optometric practices now offering a wider range of clinically orientated specialist services. A survey conducted by the College of Optometrists and Medix UK (2008) revealed that more than half of optometrists (55%) claimed to be involved in dry eye management. Furthermore, 23% were involved in the co-management of patients with stable glaucoma or ocular hypertension. In Chapter 2 it was demonstrated that community-enhanced services do not generate many spectacle sales when compared to traditional sight tests and eye examinations. Interestingly contact lens services were also found to generate poor spectacles sales. Therefore non-traditional services are unlikely to generate profits in a loss leading business model, and this actually forms the most common reason for practitioners choosing not to offer clinically orientated specialist services (Konstatakopoulou et al, 2014). Hence, an alternative pricing strategy is required to enable non-traditional services to be self-sustainable without the need to subsidise costs. This will ensure improved profitability and should provide sufficient financial incentive for delivery of specialist clinical services in high street optometric practice.

3.1.1 Pricing objectives and strategies

Prices for community-enhanced services range from £20 to £60 and are generally higher than the average private sight test fee of £26.00 (Optical Confederation, 2015) or NHS sight test fee of £21.10. The price of community-enhanced services is sometimes determined by making comparisons to traditional loss leading services and also by making comparisons to similar services in neighbouring regions. This may form a biased foundation for determining the price and may underestimate the prices for specialist and community-enhanced services. Additionally the price for community-enhanced services is negotiated between Local Optical Committees and health care authorities (such as CCG's) and so compromises are often made.

Pricing objectives are intended to provide direction for a company's pricing decisions and strategies. These objectives can be quantitative objectives such as

seeking profit, sales or cost coverage (Avlonitis and Indounas, 2005; Lovelock and Wirtz, 2008). Alternatively qualitative objectives may be more appropriate and are associated with customers, competitors, building a demand or building a user base (Avlonitis and Indounas, 2005; Lovelock and Wirtz, 2008). While some pricing objectives are complimentary to each other, others may have conflicting outcomes (Indounas and Avlonitis, 2007). For instance gaining new customers may also improve the company's overall profitability. However seeking maximum sales will often lead to reduced profit margins and so profit and sales maximisation are opposing pricing objectives. Quantitative objectives, particularly those related to profit, are thought to be the most important in the services sector (Avlonitis and Indounas, 2005). This objective would also appear fitting for community-enhanced services, as qualitative objectives of building demand and a user base is somewhat limited as these services are intended for patients suspected or diagnosed with particular eye conditions (Chapter 2). However qualitative pricing objectives may be more appropriate for other specialist services, such as contact lenses, retinal imaging and dry eye services as a larger target group exists.

The pricing objectives will influence the final price set, however there are a number of other factors that will also govern the final price (Moss, 2005; Avlonitis and Indounas, 2007). These are categorised as internal and external factors (Indounas and Avlonitis, 2009). Internal factors relate directly to the product or service and the company, and include the cost of providing the service/product, the marketing strategy and marketing objectives (Avlonitis and Indounas, 2007; Indounas and Avlonitis, 2009). Whereas, external factors relate to the market and customers, for instance competition and the customers price elasticity (Indounas and Avlonitis, 2009). Of the numerous factors associated with setting prices for services the most significant factors are cost, competitors pricing and value to the customer (Meidan and Chin, 1995; Zeithaml et al, 2006; Avlonitis and Indounas, 2007, Lovelock and Wirtz, 2008). Lovelock and Wirtz (2008) describe the 'pricing tripod' as an analogy for the key influencing factors for the pricing of services. In the pricing tripod, the cost of providing and delivering the service determines the minimum price and creates the 'floor' of the pricing tripod. The maximum price or 'ceiling' of the tripod is based on the customers' price elasticity and perceived value of the service. The price of competing companies will fall somewhere in the middle of the pricing tripod. Therefore, the pricing tripod analysis provides a realistic range for the final price of the service, which is a compromise between the three key pricing factors (Avlonitis and Indounas, 2007; Lovelock and Wirtz, 2008).

The various factors influencing pricing decisions give rise to different pricing strategies. For instance there are cost-based pricing strategies, which include cost-plus pricing, break-even analysis and contribution analysis (Avlonitis and Indounas, 2005). There are also competition-based methods and customer-value based methods (Avlonitis and Indounas, 2005). Competition-based methods are associated with making pricing decisions based on competitors' prices, and so the final price may be set above, below or equal to either the competitor's price or market average price (Avlonitis and Indounas, 2005; Moss, 2005). Additionally the final price may be governed by the dominant price in the market (Avlonitis and Indounas, 2005). Customer-value based pricing is associated with matching the customers value of the service to the monetary price (Lovelock and Wirtz, 2008). A literature review suggests that cost is the dominant factor for setting prices for services and has subsequently resulted in a dominance of cost-based pricing methods (Zeithaml et al, 1985; Morris and Fuller, 1989; Meidan and Chin, 1995; Avlonitis and Indounas, 2005, 2007). The cost-plus approach is most frequently used (Paleologo, 2004; Avlonitis and Indounas, 2005, 2007) and is a simple method often requiring less market research and understanding than competition-based and customer value-based methods.

3.1.2 Cost of optometric services

Setting prices of optometric services using the cost-plus approach would require a thorough understanding of the costs associated with running a high street optometric practice. Expenses related to running a business can be categorised as fixed or variable costs (Tracy and Barrow, 2008). Fixed costs remain relatively stable regardless of the sales activity and include expenses such as rent, insurance, utilities, taxes and interest payments (Lovelock and Wirtz, 2008). Variable costs are those that change proportionally with the level of activity and may include materials and labour costs (Lovelock and Wirtz, 2008). Costs may also be categorised as direct or indirect costs (Tracy and Barrow, 2008). Direct costs are those that can be directly attributed to a specific product, organisational unit or source of revenue (Tracy and Barrow, 2008). Indirect costs are those that cannot easily or accurately be traced to a specific output of the business as they contribute towards the business as a whole or to multiple areas (Tracy and Barrow, 2008). Therefore, direct costs include labourer's wages and raw materials, whereas indirect costs comprise of marketing and advertising and general business supplies e.g. stationary and administration. Direct and indirect costs can be both fixed and

variable. For example, a receptionist and optometrist salary are fixed costs, as they will not vary depending on the number of product or service sales. The optometrist's salary is directly traceable to the provision of optometric services, whereas the receptionist salary expense is attributed to all patient and customer episodes including those related to retail. Variable costs include spectacle frame and till roll stock. Spectacle frame stock is directly related to spectacle sales, while the till roll expense is related to all sales.

Optometric practices have two key aspects to the business; the provision of clinical services and the dispensing and sale of optical retail products. Therefore, to determine the cost of clinical service delivery the associated service delivery costs must be extrapolated from the inclusive cost pool. Direct costs of service delivery, such as optometrist's salary, can be allocated with ease. However, allocation of indirect costs is more challenging (Tracy and Barrow, 2008). Indirect costs such as administration apply to both departments and so a method is required to fairly and accurately divide this cost between the two departments. Simply dividing the cost equally may render inaccurate cost information, as one department may consume more administrative resources than the other. Various methods exist to allocate indirect costs to different products, sources of sales revenue and organisational units (Snyder and Davenport, 1997; Tracy and Barrow, 2008). Methods of indirect cost allocation are discussed in the following section.

3.1.3 Indirect cost allocation

Costing methods exist to help allocate indirect overhead expenses to separate sales revenue sources. They are formed around estimating the approximate indirect cost usage by a particular department or business activity, based on single or multiple independent variables (Snyder and Davenport, 1997). The independent variables are known as allocation bases. Typical allocation bases include direct labour hours, direct labour costs, machine hours, floor space area, and customer/patient contact time (Snyder and Davenport, 1997; Lovelock and Wirtz, 2008). The appropriate allocation base is determined by identifying a cost driver that either causes or co-varies with the indirect overhead cost.

Simple or traditional allocation methods pool all relevant indirect overhead costs together and distribute them via a single allocation base, usually direct labour hours (Snyder and Davenport, 1997; Chea, 2011). Therefore, it is assumed that a single variable such as direct labour hours can reasonably predict the distribution

of all indirect overhead expenses. This is often implemented by manufacturing companies, where labour may represent the greatest costs and product value. However, modern service organisations now typically have a greater ratio of other indirect overheads to labour costs (Snyder and Davenport, 1997; Lovelock and Wirtz, 2008; Chea, 2011). Therefore relying on direct labour hours to predict other indirect cost allocations are likely to generate large inaccuracies and distortions in cost calculations.

An increasingly common approach to indirect cost allocation is activity-based costing (ABC). This method overcomes some of the problems of the traditional method to produce more precise cost allocations (Baird et al, 2004). Activity-based costing can be applied to many service industries (Adams, 1996; Brignall, 1997; Innes and Mitchell, 1997; Cagwin and Bouwman, 2002; Chea, 2011;). The ABC method distinguishes between different indirect overhead costs and applies multiple allocation bases. Each individual indirect overhead is assessed and an appropriate allocation base is applied to that particular cost rather than applying a blanket allocation base to all indirect costs. For instance, the rent and utility expenses are likely to vary depending on floor space; therefore this cost would be allocated to different departments depending on the percentage of floor space occupied by each department. Whereas staff training expenses will vary depending on the number of employees in each department and so costs are distributed according to the percentage of employee hours or staff in each department. Many indirect costs can be associated with a cost driver and allocation base. However, there may be some indirect costs that bare no relationship to a cost driver or allocation base, such as insurance. These remaining costs must arbitrarily be distributed using a standard allocation base, such as labour hours (Snyder and Davenport, 1997). This may skew the cost allocations but not as significantly as the simple cost allocation method.

The ABC method is complex and vastly more time consuming than the simple cost allocation methods. However, it provides more accurate cost allocations and facilitates better managerial and pricing decisions. An additional benefit of the ABC method is that it allows business expenses to be dissected in many different ways e.g. by individual service, groups of services or whole departments. This can be used to compare costs from various services, product lines and departments and provide an in-depth understanding of profitability. Understanding the profitability will also provide opportunities for cost savings and identify non-value added activities

within the business. Furthermore, assessing the allocation base associated with particular costs will identify cost drivers, from which the cost per driver can be derived.

3.1.4 Professional fee models

Published literature and articles suggest that the cost of providing a single eye examination can range from £50 to £150 (Sheinman, 2006; Russ, 2008; Llewellyn, 2012) and the cost of running a practice per hour is £130 to £300 (Association of Optometrists, 2008; Russ, 2008). The costs will alter significantly depending on the size, location, activity and resources of a practice. There are guides and templates available to help practice managers calculate the cost of service delivery in their own practice (Russ, 2008). One widely recognised example is the 'CIBA Vision Professional Fee Template' (Russ, 2008). The Association of Optometrists (AOP) also provides an 'Optometric Practice Costs Model for Shared Care Schemes'.

The CIBA Vision Professional Fee template and AOP Optometric Practice Costs Model are available as Microsoft® Excel® spreadsheets. Various data specific to an individual practice is entered into the spreadsheet. Formulae within the spreadsheet then use this information to derive the calculated cost per appointment. The AOP Practice Costs Model was developed to help Local Optical Committees (LOC) to assess the financial viability of community-enhanced services. Whereas the CIBA template was developed to encourage practitioners and practice managers to calculate appropriate professional fees for contact lens services and eye care direct debit payment plans. Additionally the tool demonstrates how to competitively mark up contact lens products (Russ, 2008).

Figure 3.1 The CIBA Vision Professional Fee Template. This example represents a single consulting room practice. Professional fees and product prices are calculated using information that has been entered into the dark blue boxes at the top of the spreadsheet.

Figure 3.2 The AOP Optometric Practice Costs Model for Shared Care Schemes. This is the AOP's example for a glaucoma referral refinement community-enhanced service. Practice information is entered into the white cells. The information is used to provide the calculated cost per appointment shown in the green cells.

Both models essentially apply the same method for calculating the cost of service delivery. The formulae divides the practice's annual gross profit (£) by the annual number of clinic hours available for appointment bookings. This sum derives 'the cost per clinic hour', which can be further subdivided to provide a cost of an appointment. For instance, the cost per clinic hour (60 minutes) would need to be divided in half to provide the cost of a 30-minute appointment and divided by 1/3rd to provide the cost of a 20-minute appointment. Each model has additional features to improve the precision of costs calculated. For instance the CIBA calculator also compensates for unattended and empty appointments and additional profit requirements (Russ, 2008). The AOP model considers the additional equipment cost that may be associated with particular community-enhanced services. Differentiated costs for different clinicians (e.g. optometrists and clinical assistants)

are also considered in the AOP model, although the method is largely arbitrary (Frampton, 2011).

The professional fee calculators described above represent relatively simple methods of calculating the cost of service delivery. Both examples have flaws and make a number of assumptions. Firstly, both models are based on the use of gross profit, which is described as total turnover less the cost of resale goods (Russ, 2008). Gross profit actually represents the profitability before accounting for operating costs, interest payments and taxes. Hence it is not a measure of costs or budgets associated with optometric service delivery (Frampton, 2011). Gross profit is normally used to calculate the gross profit margin and indicate the success and competitive edge of a business. A positive gross profit can be a feature of both successful and unsuccessful businesses. For instance a business may have a good gross profit margin, but expensive operating costs will consume the gross profit and may render an overall net loss.

Secondly, both models calculate the cost per appointment by dividing the annual gross profit. The gross profit consists of all fixed and variable costs, other than the cost of goods, and also includes the net profits. The costs encompassed within this figure are for the entire practice as a whole. Most optometric practices have two distinct departments; retail of optical products and provision of optometric services. Therefore, the AOP and CIBA models treat practices as a single department whereby the gross profit not only represents service operating costs, but also encompasses those directly associated with maintaining the retail aspects including shop floor, displays, equipment, advertising and sales staff salaries. Hence the model incorrectly assumes that all fixed and all variable operating costs are directly associated with service delivery only and that all net profits are to be generated through service provision. This will erroneously inflate the calculated cost per appointment.

The CIBA and AOP model then divides the gross profit evenly amongst the number of clinic hours. The cost per appointment is solely dependant on the total number of clinic hours. There is no flexibility for differing levels of resources that may be applied to each service. For instance some services may require the use of additional equipment or further qualified optometrists. These features of a particular service would inflate the cost of service provision. This is not considered in the CIBA model and is absorbed across the business as a whole. The AOP model does account for clinical expertise and equipment. However the AOP model

determines the cost of a clinical assistant appointment to be 50 - 75% of the cost of an optometrist appointment, which is an arbitrary assumption (Frampton, 2011).

Finally, the methods described assume that all revenues generated though optical product sales should only cover the cost of goods. Hence it is assumed that spectacle sales do not contribute to other practice costs or generate a profit margin. Therefore the models establish spectacle dispensing as a purely retail activity, whereby products are sold at cost price. In reality the dispensing of spectacles actually includes an element of professional expertise by a registered (or supervising) optometrist or dispensing optician. The professional service associated with spectacle dispensing includes professional advice and measuring and fitting of spectacles. This element is considered a service and can be charged separately to qualify for VAT exemption. Hence neither professional fee model takes this into consideration when allocating practice costs.

The CIBA Vision Professional Fee Template and the AOP Optometric Practice Costs Model for Shared Care Schemes attempt to provide a means of calculating cost of service delivery. However, both models have numerous flaws, which will inevitably render inaccurate costs for the basis of pricing. These models are based around the traditional cost allocation method, whereby a single volume-based cost driver has been identified (total number of clinic hours).

3.1.5 Aims

Understanding the cost of service delivery will allow practice managers to apply appropriate pricing strategies for specialist non-refraction based clinical services, which are unlikely to generate spectacle sales and align well with the traditional loss leading business model. This will encourage the growth of specialist services within primary care, without causing detriment to existing traditional services and optical product sales. Additionally understanding the cost-basis for delivery of optometric services provides a means of assessing the profitability of each service and the level of cross subsidy with optical retail products. Existing models for calculating the cost of optometric services are grossly inadequate and are likely to distort true costs. The aims of this study were to develop a more precise model for calculating the cost of service delivery within high street optometric practice. The study applied concepts of cost allocation to reasonably allocate direct and indirect costs to key business activities of a high street optometric practice.

3.2 Methods

This study was piloted at BBR Optometry Ltd. The cost model was constructed by auditing BBR Optometry Ltd's profit and loss accounts from 2011/12, 2012/13, and 2013/14 tax years. This provided year-on-year comparisons to assess the rational and robustness of the model.

Firstly cost objectives for BBR Optometry Ltd were identified. Cost objectives are defined as products or services for which costs are gathered about (Snyder and Davenport, 1997). BBR Optometry Ltd offers a vast range of different products and services, which can be collectively categorised into two departments, optical product retail and clinical services. Therefore these two departments formed the cost objectives for this study. Each cost objective can be further subdivided to calculate the cost per unit i.e. dividing the clinical services department costs can provide the cost per clinical service.

Direct costs were allocated to each department. The study applied the ABC method for allocating indirect costs. Each indirect cost was assessed to determine if an appropriate allocation base existed. As described in section 3.1.3, some costs may not be related to a specific allocation base. Therefore any remaining indirect costs with no discernable allocation base were apportioned using a standard allocation base e.g. direct labour hours, direct labour costs or floor space. Direct labour hours were the most appropriate for this study, as direct labour hours highly corresponds to the level of business activity at BBR Optometry Ltd. Whereas floor space and labour costs are not significant variables to BBR Optometry's business activity levels.

The indirect costs were allocated to each department using the respective allocation base. The ABC is a precise method for allocating costs. However, the method consumes significant time and resources to gather cost information and to successfully implement. The simple cost allocation method is less complex but can render inaccuracies in cost calculations. This study also applied the simple cost allocation method in order to establish the significance of discrepancies compared to the ABC method. Typical allocation bases used in the simple method include direct labour hours, direct labour cost and floor space distribution (Lovelock and Wirtz, 2008). Therefore each of these allocation bases was applied to render three sets of simple cost allocation data. The ABC and simple method costings for BBR Optometry Ltd were tabulated and compared.

The profitability of each department was calculated by subtracting the costs associated with each department from the revenues generated. The profitability of the clinical services and optical product retail departments were calculated to establish any level of cross subsidy that exists at BBR Optometry Ltd.

3.2.1 Unit cost of clinical service

The above method isolates the direct and indirect costs associated with the delivery of clinical services. BBR Optometry Ltd offers a total of 34 different clinical services (Table 3.1). Therefore the clinical service department costs must be further subdivided to render the cost of providing each single appointment or service, and hence requires further cost allocations.

	Appointment name	**Duration (minutes)**	**Clinician**
General Ophthalmic Services (GOS)	Adult NHS sight test	20	All optometrists
	New Adult NHS sight test	40	All optometrists
	Child NHS Sight test	20	All optometrists
	Low vision NHS sight test	40	All optometrists
Private eye exam	NHS extended exam	40	All optometrists
	Private eye exam	40	All optometrists
	Private U25 exam	20	All optometrists
	Child comprehensive	40	All optometrists
Community-enhanced services	Low vision assessment	40	Single optometrist and DO
	Low vision follow up	20	Single optometrist and DO
	General Practitioner Eye Referral Service (GPERS)	40	All accredited optometrists
	Glaucoma refinement (referred)	20	All accredited optometrists
	Glaucoma refinement (non-referred)	20	All accredited optometrists
	Post operative cataract assessment	20	All optometrists
	Pre operative cataract assessment	20	All optometrists
	Children’s school screening	60	All accredited optometrists
Contact lens (CL) services	Combined eye exam and CL aftercare (for new patient)	60	All optometrists
	Combined private eye exam and soft CL aftercare	40	All optometrists

	Combined NHS sight test and soft CL aftercare	40	All optometrists
	Combined private eye exam and RGP CL aftercare	40	All optometrists
	Combined NHS sight test and RGP CL aftercare	40	All optometrists
	CL aftercare	20	All optometrists and CLO
	CL collection	20	All optometrists and CLO
	CL teach	20	All optometrists, CLO and CAs
	CL trial (standard & toric)	60	All optometrists and CLO
	CL trial (complex & multifocal)	80	All optometrists and CLO
Other miscellaneous services	Cycloplegic refraction	20	All optometrists
	Optical coherence tomography (OCT)	20	All optometrists
	Emergency exam	40	All optometrists
	Colorimetry	40	2 optometrists and single DO
	Coloured overlay assessment	20	2 optometrists and single DO
	Follow up (20 min)	20	All optometrists
	Follow up (10 min)	10	All optometrists
	Recheck	20	All optometrists

Table 3.1 Clinical services offered by BBR Optometry Ltd categorised by appointment type. The table also demonstrates the variation in appointment duration and clinicians conducting the appointment, including optometrists, dispensing opticians (DOs), contact lens opticians (CLOs) and clinical assistants (CAs).

There are many variables that create challenges in identifying suitable allocation bases for direct and indirect costs of individual optometric services at BBR optometry Ltd. For instance, it is difficult to directly allocate each staff salary to a particular service as more than one optometrist may provide the same service (table 3.1). Additionally, appointments are not assigned to a specific consulting room; they can be conducted in any consulting room, all of which differ in size. Hence floor space cannot be used as an allocation base for costs associated with individual service delivery. Another common allocation base for indirect costs is direct labour costs. However, labour costs vary depending on the level of

experience (pre-registration, newly qualified, senior and specialist) and many appointments can be booked with any one optometrist (table 3.1). Thus the direct labour cost for a single service is not consistent and so direct labour costs cannot be applied either as an allocation base.

Consequently a single allocation base associated with clinical service activity was applied collectively to all direct and indirect expenses of the clinical service department. The key factor influencing clinical service activity is the amount of clinic time available for appointment bookings. Therefore, it seemed appropriate to designate clinic time as the allocation base for apportioning costs to individual services. Data was collected to identify the total amount of clinic time (in hours) available for each study year. Clinical service costs, as identified in section 3.2, were then divided by the annual number of clinic hours available for appointment bookings to provide a cost per clinic hour. This unit was then further subdivided to provide a cost per appointment, depending on the appointment duration. BBR Optometry Ltd operates 20, 40 and 60-minute appointments as demonstrated in table 3.1.

The cost for each service type, as outlined in table 3.1, was calculated. The profitability of key clinical services was also calculated by subtracting the cost of service provision from the respective professional fee charged. The profitability of individual services was calculated to establish the level of cross subsidy with optical retail products. All results were tabulated in Microsoft® Excel® (Microsoft Corporation, Redmond, Washington, USA). However, the nature of this study restricted scope for statistical analysis. Aston University Ethics Committee provided ethical approval for this research.

3.3 Results

BBR optometry Ltd provided profit and loss accounts for 2011/12, 2012/13, 2013/14 financial years. The profit and loss accounts outlined revenue generated, goods purchased, direct expenses, gross profit, overhead costs and net profit (table 3.2).

3.3.1 Revenue streams

Revenue was subcategorised as clinical service sales, optical product sales and consultancy sales (figure 3.3). Figure 3.3 illustrates that the majority of income (66% – 70%) was obtained by optical product sales. Clinical service sales provide

the second largest source of income, which was around 28% - 31% of the total revenue (figure 3.3). The cost of goods purchased was subcategorised as purchase of spectacles, contact lenses (CLs), optical equipment and sundries. Therefore the purchase of optical products (spectacles, contact lenses and sundries) was allocated as a direct expense to the optical product retail department. The cost of purchasing optical equipment was allocated to the clinical services department.

	Tax year		
	2011/12	**2012/13**	**2013/14**
Revenue	£1,226,504.42	£1,346,151.18	£1,325,717.07
Goods purchased	£350,450.44	£367,282.39	£373,806.27
Direct expenses	£351,969.59	£381,226.71	£376,444.75
Gross profit	£524,084.39	£597,642.08	£575,466.05
Overhead costs	£368,717.06	£407,507.13	£419,535.59
Net profit	£155,367.33	£190,134.95	£155,930.46

Table 3.2 A summary of BBR Optometry Ltd's profit and loss accounts for 2011/12, 2012/13 and 2013/14 financial years

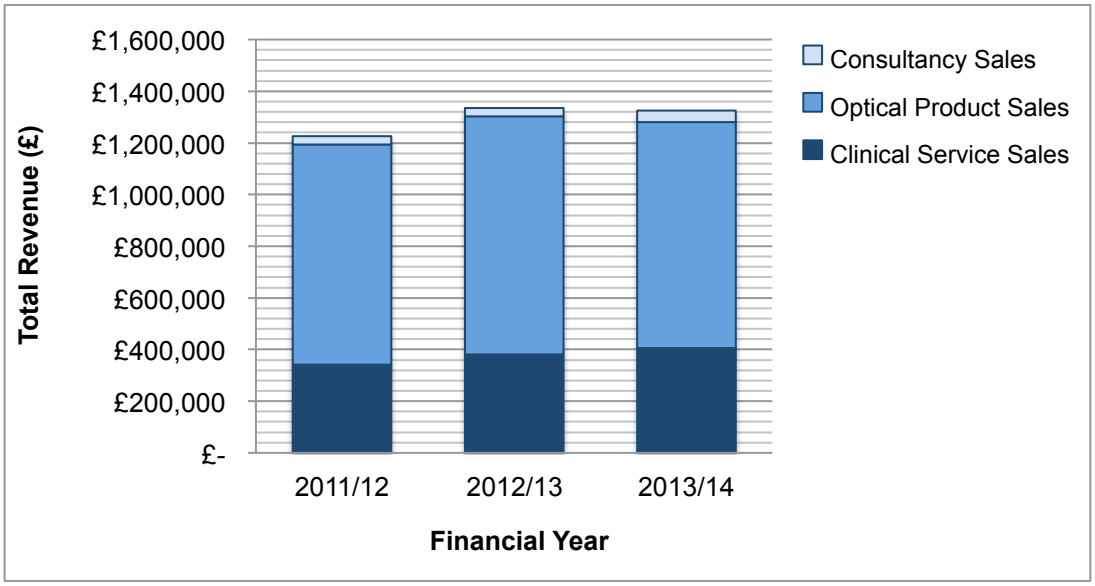


Figure 3.3 A stacked bar chart to illustrate the key sources of income at BBR Optometry Ltd for the last 3 financial years

3.3.2 Cost allocation

Direct expenses and overhead (indirect) costs were also further subcategorised to represent individual expenses. There were a greater number of subcategories for indirect expenses. The direct expenses comprised of wages and staff expenses. Staff wages were presented as a collective single figure and so could not be considered as a direct expense to either cost objective as different staff wages would correspond to each department. Therefore gross wages, casual wages, employers national insurance and other staff expenses were treated as an indirect expense in this study. The other costs listed under direct expenses included costs for locum optometrists and a graduate project called Knowledge Transfer Partnership (KTP), both of which can be directly allocated to the clinical services department.

Overhead indirect expenses were shared between the clinical service and optical product retail departments using an appropriate allocation base (table 3.3). There was no allocation of costs to other business activities such as consultancy as these are ad-hoc business activities and are not the key focus of the business. The allocation bases were chosen as the factor that drives that particular expense. For instance floor space is the driver for rent and so floor space percentage was used to distribute rent and premise costs between the clinical service and optical product retail departments. Other allocation bases included direct labour costs, direct labour hours, number of staff and number of terminals (table 3.3). Expenses with no apparent allocation base were shared using direct labour hours as the allocation base. Table 3.3 illustrates the allocation base used for each indirect expense and the percentage allocation to the clinical service and optical product retail department. The percentage allocation for the allocation bases was determined by assessing BBR Optometry Ltd's resources (e.g. staff, floor space, phone/computer terminals etc) and the distribution of resources to each department.

Indirect expense	Allocation base	Cost allocation (%)	
		Clinical service	Optical product retail
Gross wages	Direct labour cost	69%	31%
Casual wages	Direct labour cost	69%	31%
Employers national insurance (NI)	Direct labour cost	69%	31%
Extraordinary staff expenses	Direct labour cost	69%	31%
Directors remuneration	*Direct labour hours	70%	30%
Staff pensions	Direct labour cost	69%	31%
Other staff costs	Number of staff	67%	33%
Training courses	Number of staff	67%	33%
Rent	Floor space	40%	60%
Premises costs	Floor space	40%	60%
Motor vehicle costs	Number of staff	67%	33%
Mileage and expenses	Number of staff	67%	33%
Traveling and subsistence	Number of staff	67%	33%
Printing and postage	*Direct labour hours	70%	30%
Telephone/Internet	Number of terminals	50%	50%
Stationery and computer supplies	*Direct labour hours	70%	30%
Legal fees	*Direct labour hours	70%	30%
Audit and accountancy	*Direct labour hours	70%	30%
Consultancy and professional	*Direct labour hours	70%	30%
Local Optical Committee (LOC) Levy	n/a (directly associated with clinical services)	100%	0%
Leases/rentals/hire	*Direct labour hours	70%	30%
Repairs and renewals	Floor space	40%	60%
Storage space	*Direct labour hours	70%	30%
Staff bonuses	Number of staff	67%	33%
Cleaning and GTE (General Telephone and Electronics)	Floor space	40%	60%
Bank changes and Interests	*Direct labour hours	70%	30%
Bad debts	*Direct labour hours	70%	30%
Donations and subscriptions	*Direct labour hours	70%	30%

Other training costs	Number of staff	67%	33%
Insurance	*Direct labour hours	70%	30%
VAT unrecoverable	*Direct labour hours	70%	30%
Suspense	*Direct labour hours	70%	30%
Marketing and promotional cost	*Direct labour hours	70%	30%
Premises maintenance	Floor space	40%	60%
Sipps pensions	Direct labour cost	69%	31%
Other staff costs	Number of staff	67%	33%
Refit No40	n/a (directly associated with optical product retail)	0%	100%
Profit on disposals	*Direct labour hours	70%	30%

*Direct labour hours were assigned to costs with no discernable allocation base.

Table 3.3 A list of all indirect expenses and the allocation base assigned to each expense as described in the ABC method for allocating indirect costs. The final two columns illustrate how a particular expense will be distributed to the cost objectives according to the distribution of resources at BBR Optometry Ltd.

The revenue, direct costs and indirect costs were tabulated and allocated to each department (figure 3.4, 3.5 and 3.6) for each financial year. Therefore, figures 3.4, 3.5 and 3.6 show the cost allocations to the clinical services and optical product retail departments as derived using the ABC method. Each figure shows that the optical product retail department consumes a greater portion of direct expenses (78% – 83% of all direct expenses), whereas the clinical services department consumes a larger portion of the indirect expenses, 66% of all indirect expenses. Overall the optical product retail department consumes slightly more expenses than the clinical services department; 53% of the total expense for financial year 2011/12 and 52% of the total expense for financial years 2012/13 and 2013/14.

2011/12		Clinical services	Optical product retail	Other sales / VAT refund	Consultancy	Total
Revenue		£342,355.98	£852,560.79	£0.87	£31,586.78	£ 1,226,504.42
Direct costs	Locum salary	£83,268.25	£0.00			£ 83,268.25
	KTP	£11,641.68	£0.00			£ 11,641.68
	Purchase of spectacles	£0.00	£242,697.26			£ 242,697.26
	Purchase of CLs	£0.00	£100,014.98			£ 100,014.98
	Optical equipment	£1,337.44	£0.00			£ 1,337.44
	Purchase of sundries	£0.00	£7,245.79			£ 7,245.79
	Opening stock	£0.00	£57,307.30			£ 57,307.30
	Closing stock	£0.00	-£58,152.33			-£ 58,152.33
Indirect costs	Gross wages	£174,247.89	£78,285.29			£ 252,533.18
	Casual wages	£842.91	£378.70			£ 1,221.61
	Employers National Insurance	£2,280.36	£1,024.51			£ 3,304.87
	Other staff expenses	£0.00	£0.00			£ -
	Directors Renumeration	£60,128.33	£25,769.29			£ 85,897.62
	Staff Pensions	£6,606.08	£2,967.95			£ 9,574.03
	Other staff costs	£9,747.77	£4,801.14			£ 14,548.91
	Training courses	£1,645.94	£810.69			£ 2,456.63
	Rent	£12,624.00	£18,936.00			£ 31,560.00
	Premises costs	£8,434.67	£12,652.00			£ 21,086.67
	Motor vehicle costs	£22.78	£11.22			£ 34.00
	mileage & expenses	£3,046.26	£1,500.40			£ 4,546.66
	Travelling & subsistence	£11,821.09	£5,822.33			£ 17,643.42
	Printing and postage	£11,263.48	£4,827.20			£ 16,090.68
	Telephone/internet	£5,024.07	£5,024.07			£ 10,048.14
	Stationary and computer supplies	£6,657.13	£2,853.06			£ 9,510.19
	legal fees	£94.50	£40.50			£ 135.00
	Audit and accountancy	£11,186.00	£4,794.00			£ 15,980.00
	Consultancy and Professional	£8,547.52	£3,663.22			£ 12,210.74
	Levies	£1,593.32	£0.00			£ 1,593.32
	Leases/rentals/hire	£15,632.14	£6,699.49			£ 22,331.63
	Repairs and renewals	£514.43	£771.65			£ 1,286.08
	Storage space	£133.95	£57.41			£ 191.36
	staff bonuses	£774.52	£381.48			£ 1,156.00
	cleaning and GTE	£4,549.16	£6,823.74			£ 11,372.90
	Bank charges & interests inc HP	£15,845.59	£6,790.97			£ 22,636.56
	Bad depts	£0.00	£0.00			£ -
	Donations & subscriptions	£6,976.05	£2,989.73			£ 9,965.78
	Other training costs	£0.00	£0.00			£ -
	Insurance	£1,806.11	£774.05			£ 2,580.16
	VAT unrecoverable	£14,301.77	£6,129.33			£ 20,431.10
	Suspense	£0.00	£0.00			£ -
	Marketing & Promotional costs	£21,052.68	£9,022.58			£ 30,075.26
	Premises Maintenance	£725.96	£1,088.94			£ 1,814.90
	Sipps Pension	£7,478.98	£3,360.12			£ 10,839.10
	Other staff costs	£2,893.64	£1,425.23			£ 4,318.87
	No40 refit	£0.00	£0.00			£ -
	Profit on disposals	-£16,239.06	-£6,959.60			-£ 23,198.65
Total costs		£508,507.41	£562,629.68			£ 1,071,137.09

Figure 3.4 Cost allocations for financial year 2011/12 using the activity-based costing method

2012/13		Clinical services	Optical product retail	Other sales / VAT refund	Consultancy	Total
Revenue		£380,758.50	£923,353.27	£3.44	£32,035.97	**£1,336,151.18**
Direct costs	Locum salary	£53,759.38	£0.00			£ 53,759.38
	KTP	£23,283.36	£0.00			£ 23,283.36
	Purchase of spectacles	£0.00	£247,736.24			£ 247,736.24
	Purchase of CLs	£0.00	£107,885.16			£ 107,885.16
	Optical equipment	£6,241.65	£0.00			£ 6,241.65
	Purchase of sundries	£0.00	£5,988.62			£ 5,988.62
	Opening stock	£0.00	£58,152.33			£ 58,152.33
	Closing stock	£0.00	-£58,320.51			-£ 58,320.51
Indirect costs	Gross wages	£194,995.76	£87,606.79			£ 282,602.55
	Casual wages	£1,829.15	£821.79			£ 2,650.94
	Employers NI	£13,062.03	£5,868.45			£ 18,930.48
	Other staff expenses	£0.00	£0.00			£ -
	Directors Renumeration	£61,217.37	£26,236.02			£ 87,453.39
	Staff Pensions	£0.00	£0.00			£ -
	Other staff costs	£17,145.76	£8,444.93			£ 25,590.69
	Training courses	£6,629.99	£3,265.52			£ 9,895.51
	Rent	£12,624.00	£18,936.00			£ 31,560.00
	Premises costs	£8,660.68	£12,991.01			£ 21,651.69
	Motor vehicle costs	£0.00	£0.00			£ -
	mileage & expenses	£3,639.86	£1,792.76			£ 5,432.62
	Travelling & subsistence	£10,311.91	£5,079.00			£ 15,390.91
	Printing and postage	£15,307.06	£6,560.17			£ 21,867.23
	Telephone/internet	£5,272.02	£5,272.02			£ 10,544.04
	Stationary and computer supplies	£6,707.42	£2,874.61			£ 9,582.03
	legal fees	£0.00	£0.00			£ -
	Audit and accountancy	£11,742.50	£5,032.50			£ 16,775.00
	Consultancy and Professional	£3,990.22	£1,710.10			£ 5,700.32
	Levies	£1,681.22	£0.00			£ 1,681.22
	Leases/rentals/hire	£13,501.97	£5,786.56			£ 19,288.53
	Repairs and renewals	£2,050.67	£3,076.01			£ 5,126.68
	Storage space	£157.77	£67.62			£ 225.39
	staff bonuses	£917.13	£451.72			£ 1,368.85
	cleaning and GTE	£4,180.28	£6,270.42			£ 10,450.70
	Bank charges & interests inc HP	£16,459.68	£7,054.15			£ 23,513.83
	Bad depts	£0.00	£0.00			£ -
	Donations & subscriptions	£6,821.71	£2,923.59			£ 9,745.30
	Other training costs	£0.00	£0.00			£ -
	Insurance	£2,094.58	£897.68			£ 2,992.26
	VAT unrecoverable	£18,269.07	£7,829.60			£ 26,098.67
	Suspense	£0.00	£0.00			£ -
	Marketing & Promotional costs	£19,475.01	£8,346.43			£ 27,821.44
	Premises Maintenance	£971.46	£1,457.18			£ 2,428.64
	Sipps Pension	£7,765.40	£3,488.81			£ 11,254.21
	Other staff costs	£2,981.10	£1,468.30			£ 4,449.40
	No40 refit	£0.00	£0.00			£ -
	Profit on disposals	£0.00	£0.00			£ -
Total costs		£553,747.18	£603,051.57			£ 1,156,798.75

Figure 3.5 Cost allocations for financial year 2012/13 using the activity-based costing method

2013/14		Clinical services	Optical product retail	Other sales / VAT refund	Consultancy	Total
Revenue		£406,189.40	£875,063.71	£0.00	£44,463.96	**£1,325,717.07**
Direct costs	Locum salary	£45,513.31	£0.00			£45,513.31
	KTP	£23,283.36	£0.00			£23,283.36
	Purchase of spectacles	£0.00	£231,662.67			£231,662.67
	Purchase of CLs	£0.00	£109,676.42			£109,676.42
	Optical equipment	£7,337.19	£0.00			£7,337.19
	Purchase of sundries	£0.00	£19,413.03			£19,413.03
	Opening stock	£0.00	£0.00			£0.00
	Closing stock	£0.00	£5,716.96			£5,716.96
Indirect costs	Gross wages	£193,758.47	£87,050.91			£280,809.38
	Casual wages	£247.41	£111.15			£358.56
	Employers NI	£15,511.30	£6,968.84			£22,480.14
	Other staff expenses	£2,760.00	£1,240.00			£4,000.00
	Directors Renumeration	£61,660.47	£26,425.91			£ 88,086.38
	Staff Pensions	£0.00	£0.00			£ -
	Other staff costs	£13,920.60	£6,856.41			£ 20,777.01
	Training courses	£7,588.53	£3,737.64			£ 11,326.17
	Rent	£12,663.91	£18,995.87			£ 31,659.78
	Premises costs	£8,065.71	£12,098.57			£ 20,164.28
	Motor vehicle costs	£0.00	£0.00			£ -
	Mileage & expenses	£3,195.77	£1,574.04			£ 4,769.81
	Travelling & subsistence	£12,270.07	£6,043.47			£ 18,313.54
	Printing and postage	£14,232.32	£6,099.57			£ 20,331.89
	Telephone/internet	£7,818.69	£7,818.69			£ 15,637.37
	Stationary and computer supplies	£7,880.36	£3,377.30			£ 11,257.65
	legal fees	£350.00	£150.00			£ 500.00
	Audit and accountancy	£11,049.50	£4,735.50			£ 15,785.00
	Consultancy and Professional	£6,166.13	£2,642.63			£ 8,808.75
	Levies	£1,916.06	£0.00			£ 1,916.06
	Leases/rentals/hire	£17,932.47	£7,685.35			£ 25,617.82
	Repairs and renewals	£383.13	£574.70			£ 957.83
	Storage space	£163.97	£70.27			£ 234.24
	staff bonuses	£791.44	£389.81			£ 1,181.25
	cleaning and GTE	£4,272.31	£6,408.46			£ 10,680.77
	Bank charges & interests inc HP	£15,675.51	£6,718.08			£ 22,393.59
	Bad depts	£0.00	£0.00			£ -
	Donations & subscriptions	£7,482.97	£3,206.99			£ 10,689.95
	Other training costs	£80.40	£39.60			£ 120.00
	Insurance	£2,947.97	£1,263.42			£ 4,211.39
	VAT unrecoverable	£20,290.96	£8,696.13			£ 28,987.09
	Suspense	£0.00	£0.00			£ -
	Marketing & Promotional costs	£21,605.03	£9,259.30			£ 30,864.33
	Premises Maintenance	£663.67	£995.50			£ 1,659.17
	Sipps Pension	£5,841.75	£2,624.55			£ 8,466.30
	Other staff costs	£2,772.57	£1,365.60			£ 4,138.17
	No40 refit	£0.00	£0.00			£ -
	Profit on disposals	£0.00	£0.00			£ -
Total costs		£558,093.30	£611,693.31			£ 1,169,786.61

Figure 3.6 Cost allocations for financial year 2013/14 using the activity-based costing method

The ABC method is an accurate method for allocating business expenses. For comparison, this study also calculated clinical service and optical product retail department costs using the simple allocation method. The simple allocation method was applied to the data using different allocation bases. The allocation bases used were direct labour hours (DLH), direct labour cost (DLC) and floor space distribution (FS). The percentage distribution for each allocation base was calculated as follows: direct labour hours, 70:30; direct labour costs, 69:31; and floor space distribution, 40:60 to the clinical services and optical product retail

departments respectively. Figure 3.7 illustrates how the simple cost allocation methods compare to the ABC method.

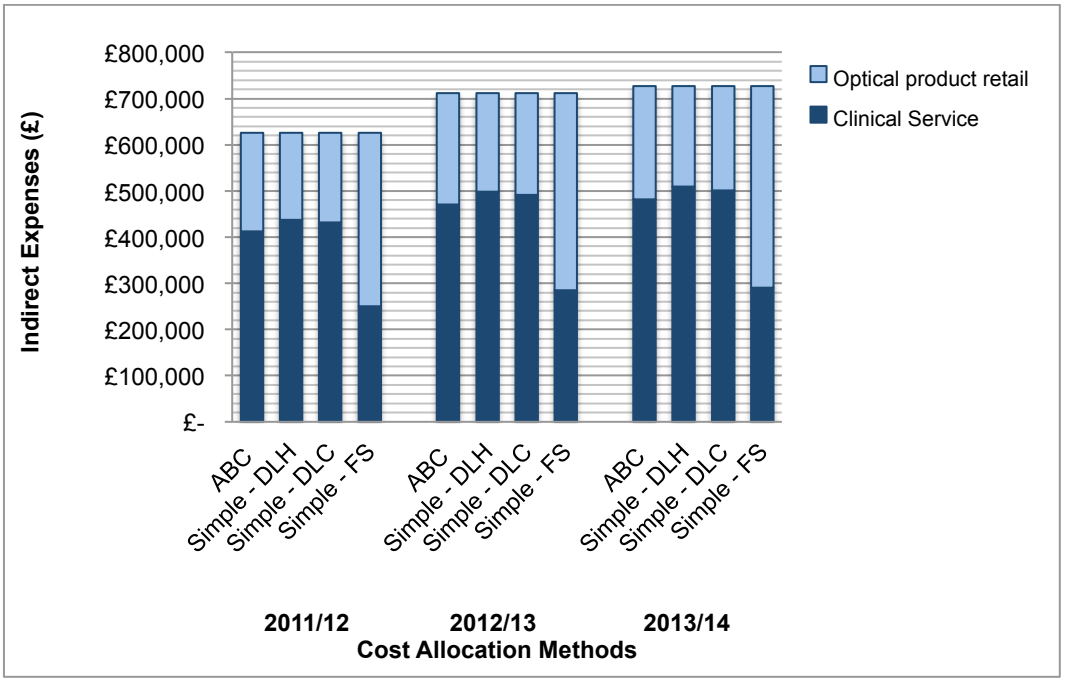
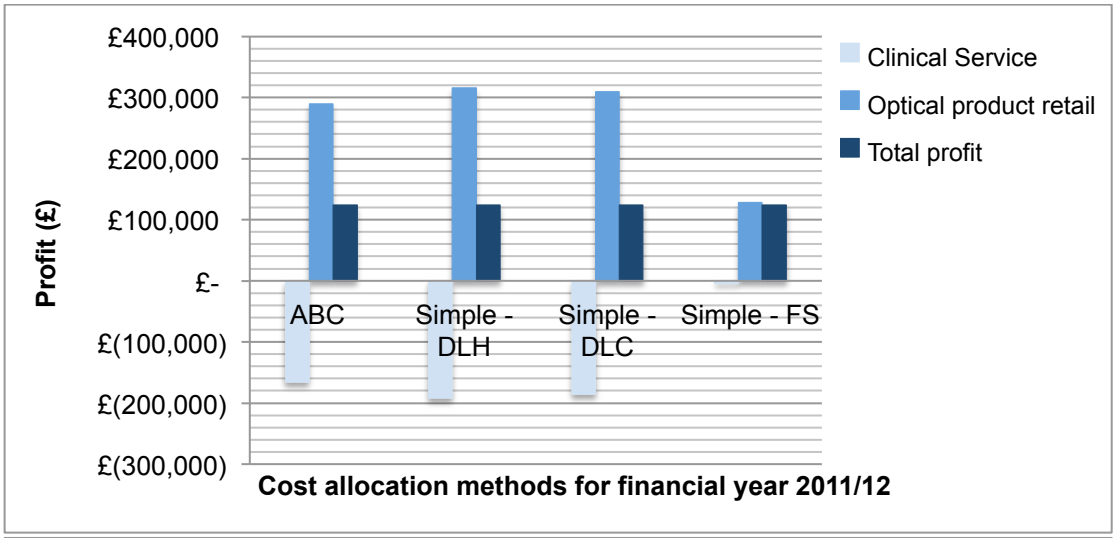


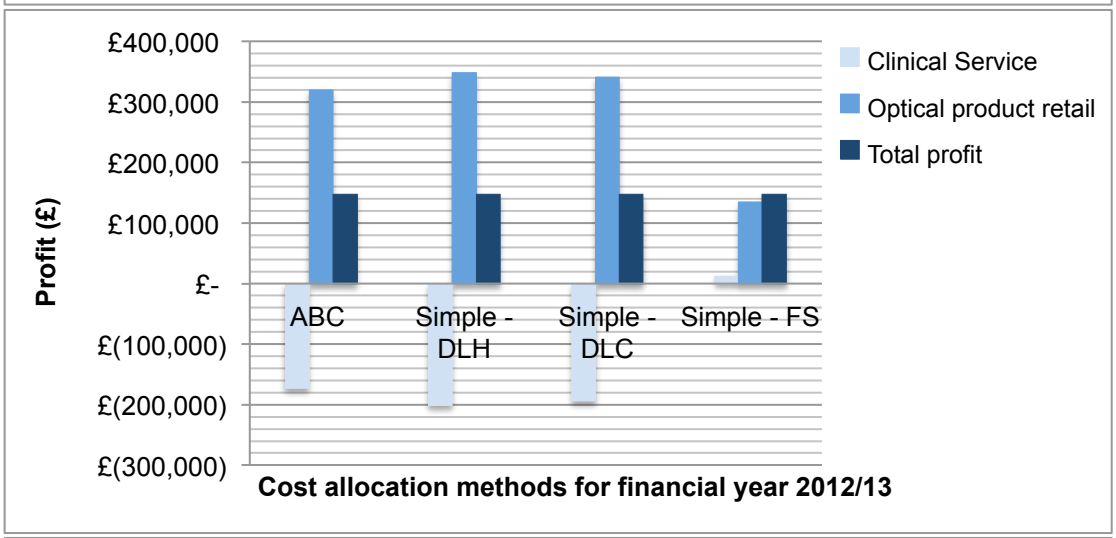
Figure 3.7 A stacked bar chart to show the distribution of indirect expenses to the clinical service and optical product retail department as calculated using the activity-based costing (ABC) method and simple cost allocation methods – direct labour hours (DLH), direct labour costs (DLC) and floor space distribution (FS)

Each method produces a different operating cost for delivering clinical services at BBR Optometry Ltd (figure 3.7). A Shapiro-Wilk normality test shows that the data was normally distributed (P=0.265 – 0.295). The clinical service cost estimations derived using the simple allocation methods were compared to the ABC method using a paired samples t test. The simple allocation methods DLH and DLC tend to overestimate the clinical service department costs (P=0.01 and P<0.01, respectively) compared to the ABC method, by around 5.92% and 4.41% respectively. This subsequently causes the optical product retail department costs to be underestimated. Whereas the simple allocation FS method significantly underestimated (P=0.002) the clinical service costs, by 39.47%, where clinical service costs were found to be on average £275,338 ± £21,884 as opposed to the more accurate ABC estimation of £454,895 ± £37,367 respectively.

3.3.3 Clinical service profitability

The cost estimations were used to derive the profitability of the clinical service and optical product retail departments during the three study years (figure 3.8). Figure 3.8 shows that the clinical services department produces a net loss each year (ABC method). The net loss ranges from around -£152K to -£173K over the three study years (ABC method). Whereas the optical product retail department tends to produce a net profit of £263K to £320K (ABC method). However the simple allocation methods produced different profitability results. The data sets were normally distributed (Shapiro-Wilk test, P=0.466 – 0.804) and so were statistically compared using a paired samples t test. Figure 3.8 indicates that the simple allocation methods DLH and DLC significantly underestimates (P=0.001 and P<0.001) the profits created by the clinical services department and overestimates the net profit generated through optical product sales. While the simple allocation FS method significantly overestimates (P=0.001) the net profit of clinical service delivery and underestimates the profitability of optical product sales (figure 3.8).





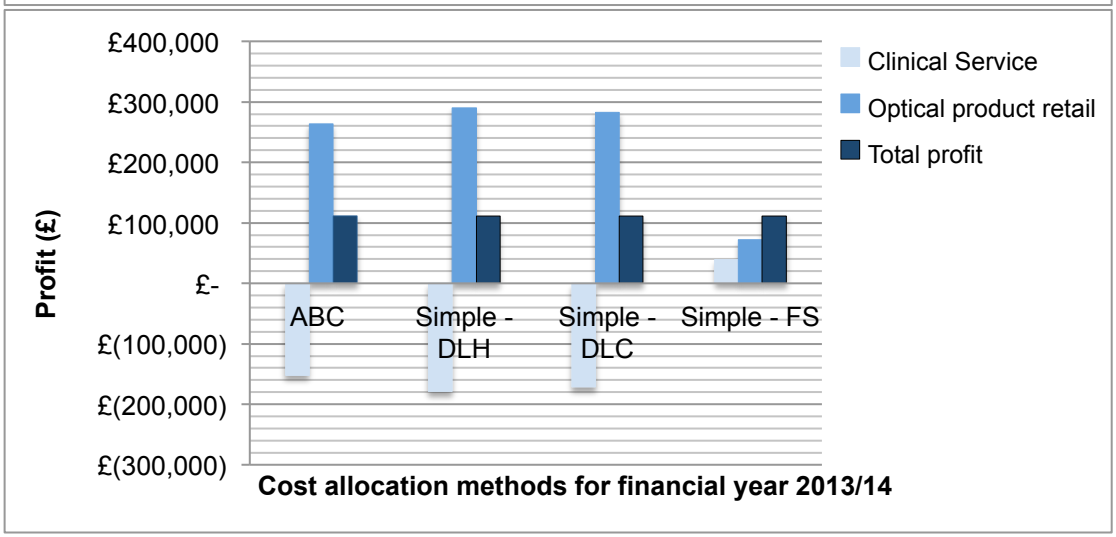


Figure 3.8 Bar charts to show the profitability of the clinical service and optical product retail departments as derived using the cost estimations from the four cost allocation methods

3.3.4 Unit cost per appointment

The unit cost per appointment was calculated as the total clinical service department costs divided by the total number of clinical service hours available. There were a total of 278, 277 and 278 calendar days for which BBR Optometry Ltd provided clinical services in financial years 2011/12, 2012/13 and 2013/14. In a given year there are a fixed number of appointments to generate clinical service income. The number of appointment slots available is dependent upon BBR Optometry Ltd's operating hours and the number of clinics per day. BBR Optometry Ltd operates on average 6.83 hours per day. An audit was conducted to determine the average number of clinics BBR Optometry Ltd offered per day (figure 3.9). Figure 3.9 shows that the average number of clinics per day increased year-on-year, from 2.30 ± 0.33 to 2.74 ± 0.49.

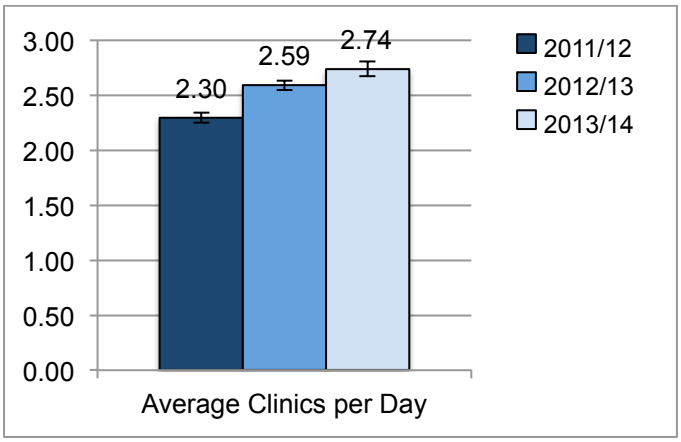


Figure 3.9 The average number of clinics BBR Optometry Ltd offers per day for each study year

The total number of clinic hours BBR Optometry Ltd offered per year was calculated by multiplying the average working hours per day, by the average number of clinics per day, and then multiplying this by the total clinic days per year (table 3.4). This figure was then used to divide the total clinical service department costs in order to obtain the cost per clinic hour, in other words the cost of a 60-minute appointment. Subsequently the cost per 60-minute appointment could be apportioned to provide the cost per 40-minute and 20-minute appointment (table 3.5), which are the most common appointment durations at BBR Optometry Ltd (see Methods table 3.1). Table 3.5 shows that the cost per appointment has reduced each year. The mean cost of a 60, 40 and 20-minute appointment over the 3 years is £112.24 ± £4.63, £74.83 ± £3.09 and £37.41 ± £1.54.

	2011/12	2012/13	2013/14
Average working hours per day	6.83	6.83	6.83
Average number of clinics per day	2.30	2.59	2.74
Total clinic days per year	278	277	278
Derived total clinic hours	4367.10	4900.05	5202.55

Table 3.4 A summary of the clinical service operating hours

	2011/12	2012/13	2013/14
Cost per 60-minute appointment	£116.44	£113.01	£107.27
Cost per 40-minute appointment	£77.63	£75.34	£71.52
Cost per 20-minute appointment	£38.81	£37.67	£35.76

Table 3.5 A summary of derived costs for providing clinical services at BBR Optometry

3.3.5 Profit per clinical service

The costs and fees per clinical service were compared to derive the profitability of key clinical services. Costs were allocated to each clinical service type according to the appointment durations (see Methods table 3.1). Figure 3.10 shows the profitability of key clinical services for financial years 2011/12, 2012/13 and 2013/14.

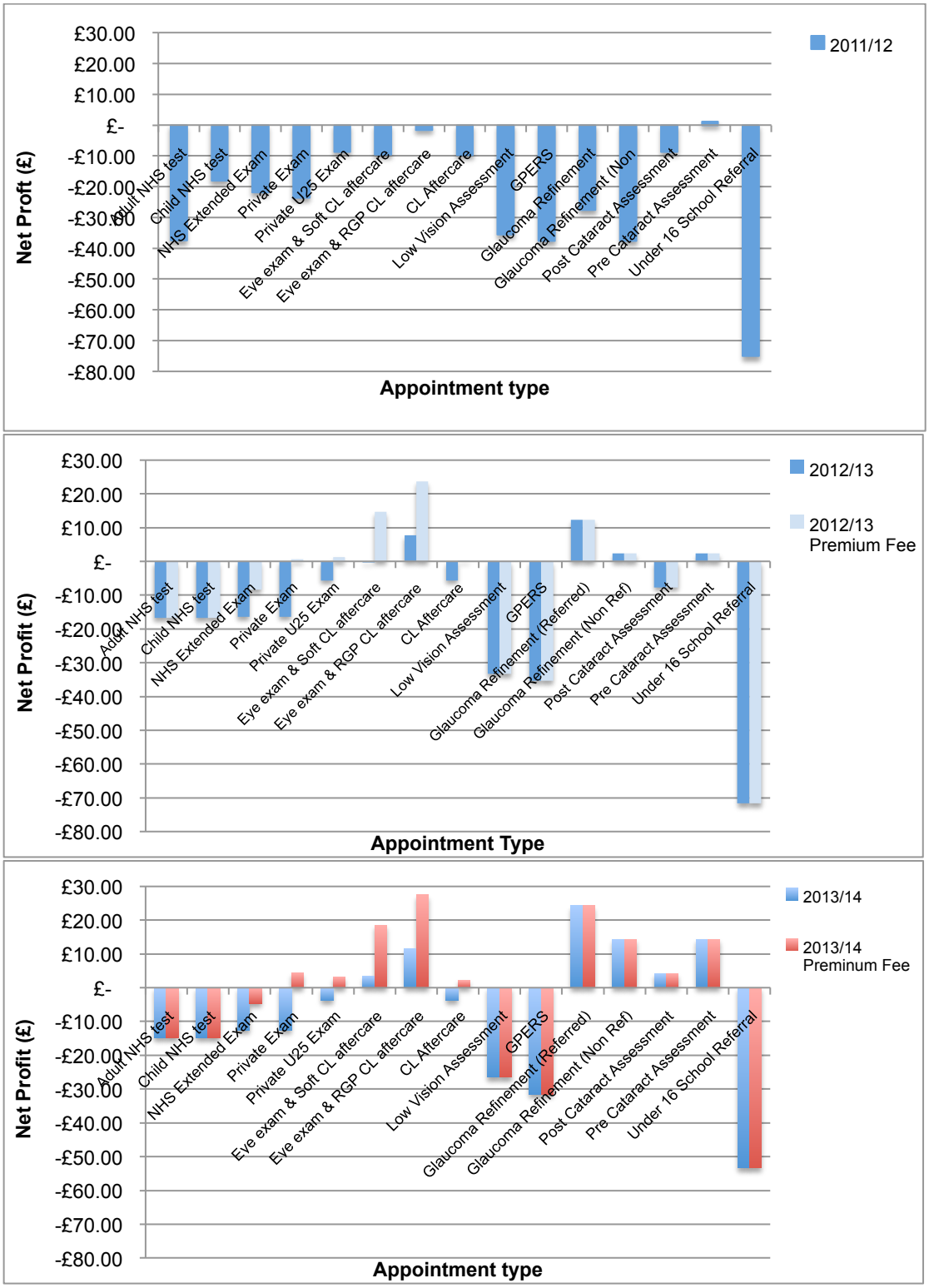


Figure 3.10 Bar charts to show the profitability of key clinical services offered at BBR Optometry Ltd. These include General Ophthalmic Service (GOS), private eye examinations, contact lens and community-enhanced services.

Figure 3.10 demonstrates that the majority of clinical services generated a net loss, with only a handful generating a profit. During financial year 2011/12 all GOS,

private eye examination and contact lens services created a net loss. Almost all community-enhanced services showed a net loss, with the exception of the pre-operative cataract assessment service producing a small net profit.

BBR Optometry Ltd increased the professional fees for private clinical services in October 2012 and additionally created a premium fee for appointments with the senior optometrist. Furthermore the GOS remuneration increased in 2013, from £20.70 to £20.90. There were also changes to community-enhanced service remuneration in 2013, the fee for each service increased by £10, except for the GPERS, low vision assessment and children's school screening service. There was no change to the GPERS fee. The low vision assessment and children's screening service increased by £3 and £12.60, respectively. Figure 3.10 shows that all clinical services had improved profitability in 2012/13 compared to the previous year. However, all GOS and standard fee private eye examination appointments continued to produce a net loss. The standard fee contact lens services showed mixed profitability. All premium fee private eye exam and contact lens services now generated a profit, except for the NHS extended examination. Enhanced-community services continued to show mixed profitability. The post-operative cataract assessment service now generated a profit as opposed to the previous year.

Financial year 2013/14 shows a greater proportion of clinical services producing a net profit and overall profitability is greater than the previous financial year (figure 3.10). The GOS sight tests and standard fee private eye examination service still generate a net loss. Standard fee contact lens services continue to produce mixed profitability, with the CL aftercare service making a small loss of £3.76 per appointment. All premium fee private eye examination and contact lens services were profitable, excluding the NHS extended examination as per the previous year. Enhanced-community services again displayed mixed profitability with the same services generating a net profit/loss.

The mean profitability per appointment for each clinical service category, GOS, private eye examination, contact lens and enhanced community services, were -£14.86 ± £0.00, -£4.30 ± £7.36, £9.90 ± £11.59 and -£7.76 ± £28.08 respectively for the 2013/14 financial year.

3.4 Discussion

This study focused on establishing the cost of clinical service delivery in high street optometric practice. The study applied concepts of cost allocation to determine the cost and profitability of individual clinical services. Understanding the existing cost base and profitability provides a foundation for pricing decisions and strategies (Lovelock and Wirtz, 2008) to ensure traditional and specialist non-refraction based services are economically viable to high street optometric practice.

3.4.1 Revenue streams

Optical product sales form the key source of income (66% – 70%) for BBR Optometry Ltd (figure 3.3). This encompasses the sales of spectacles, sunglasses, contact lenses, solutions and sundries. Clinical service sales only contribute 28% – 31% of the total revenue. Therefore BBR Optometry Ltd relies heavily on the success of the optical product retail department. Market research reports suggest this is typical for UK high street optometric practice (Key Note Ltd, 2014, Mintel Group Limited, 2015). Key Note Ltd (2014) reported that the sales of optical products account for 86.1% of the total UK market value for ophthalmic goods and services. The remaining 13.9% is generated though eye examination services. Whereas market research from Mintel Group Limited (2015) suggested that 84% of revenue is generated via optical product sales and 16% from clinical services.

Compared to the UK market average, BBR Optometry Ltd's clinical services provide a larger contribution to the total revenue. This could be due to a higher volume of sales compared to the average UK practice or due to a greater fee per service. There is no literature available stating the average number of clinical service sales per optometric practice. However, BBR Optometry Ltd's professional fees for private clinical services are greater than the UK average; the UK average fee for private eye examinations is £26.00 (Optical Confederation, 2015), whereas BBR Optometry Ltd charges from £32 to £76. BBR Optometry Ltd also offers consultancy services (figure 3.3), which forms around 2% – 3% of total revenue.

3.4.2 Cost allocation

Activity-based costing (ABC) analysis provides an accurate estimate for indirect overhead cost allocations (Cooper and Kaplan, 1991; Chea, 2011). The ABC analysis was applied to determine the costs associated with clinical service delivery at BBR Optometry Ltd. Figures 3.4, 3.5 and 3.6 illustrates that the clinical service

department consistently consumes 66% of indirect expenses every year. Whereas the optical product retail department tends to consume the majority of the direct expenses. The overall total cost distribution between the two departments is 52:48, respectively to the optical product retail and clinical service departments. Therefore the clinical service department overall costs a little less to run.

Many businesses continue to use traditional or simple cost allocation methods (Snyder and Davenport, 1997). However, this study shows that simple cost allocation methods are not comparable to results obtained using the ABC analysis (figure 3.7). The simple allocation methods were developed when direct labour costs accounted for the majority of costs and indirect costs were relatively insignificant (Chea, 2011). For this reason direct labour hours is the classic basis for simple cost allocations. Snyder and Davenport (1997) suggested it may be an appropriate method for service companies where labour costs account for the majority of expenses, as is the case at BBR Optometry Ltd (figure 3.4, 3.5 and 3.6). However, this study found the direct labour hours (DLH) and direct labour cost (DLC) simple allocation methods to significantly overestimate clinical service costs by around 6% and 4%, respectively. Likewise, floor space distribution was a poor predictor of cost allocations and significantly underestimated clinical service costs (figure 3.7). Hence this study agrees that traditional simple cost analyses distort cost allocations and adversely impact decision making (Snyder and Davenport, 1997; Chea, 2011). It is likely that the simple cost analyses were rendered unsuccessful due to the greater proportion of indirect costs compared to direct costs at BBR Optometry Ltd. BBR Optometry Ltd has a total of around £626K to £727K indirect costs as opposed to around £443K to £445K direct expenses. Simple cost analysis are more likely to render accurate estimations when indirect costs are relatively small (Chea, 2011).

Activity-based costing provides reasonably accurate cost estimations, which can be used to facilitate better managerial and economical decisions (Snyder and Davenport, 1997). However, it is important to remember that even the ABC method of allocating costs uses some arbitrary allocations bases (Tracy and Barrow, 2008). Cooper and Kaplan (1991) encouraged the use of ABC to assess and improve profits. The ABC analysis allows managers to compare the costs and profitability of different products or groups of similar products, by individual customer or client group or by distribution channels (Cooper and Kaplan, 1991). This study demonstrated that clinical services at BBR Optometry Ltd produced a net loss and

were subsidised by profits generated through sales of optical products (figure 3.8). Profits calculated using simple cost analyses were statistically different to those produced using the ABC method and were considered unreliable due to distorted cost allocations (figure 3.8). This study confirms that clinical service provision is a loss leading activity and also establishes the level of cross subsidy occurring in high street optometric practice; on average BBR Optometry Ltd annually cross subsidised the provision of clinical services by approximately £164K.

Activity-based costing identifies areas of resource consumption and cost drivers. Therefore profits can be improved by reducing spend on resources or by increasing the output those resources produce (Cooper and Kaplan, 1991), essentially controlling costs. Alternatively, re-pricing products can improve profits and is explored in Chapter 5. The greatest costs associated with the clinical services department are traced to staff salaries. Therefore the key cost driver of clinical service costs are staff salaries; particularly the ratio of direct labour costs. Whereas the key cost driver of the optical product retail department are direct costs associated with the purchase of spectacles, contact lenses and stock (figure 3.4, 3.5 and figure 3.6). Identifying cost drivers allows an insight to opportunities to control costs and better use resources. This cannot be achieved by simple cost analyses. Therefore although ABC is more time consuming and complex, it offers other advantages over simple cost allocation methods (Cooper and Kaplan, 1991; Chea, 2011). However it has been noted that ABC systems that are overly complex can be unsuccessful (Clarke and Mullins, 2001).

3.4.3 Cost per clinical service

The cost per clinical service was calculated by dividing the total clinical service department costs by the total chair-time (clinic hours). The Association of Optometrists (AOP) and CIBA (Russ, 2008) professional fee models (see Section 3.1.4) also use this method. The total chair time is calculated by multiplying 3 factors; average daily clinical service operating hours, average daily number of clinics and annual number of clinic days. In this study the average daily operating hours and annual number of clinic days remained relatively stable over the three study years. However, the daily number of clinics increased each year (figure 3.9). This subsequently caused the total chair-time available to also increase year-on-year (table 3.4). This implies that BBR Optometry Ltd was increasing capacity for clinical services each year and this is likely to account for the increase in clinical service department costs over the 3 study years (figure 3.4, 3.5 and 3.6). From

financial years 2011/12 to 2012/13 the clinical service department costs grew by around £45K and then by £4K the following year. However, the increased clinical service costs were offset by increases in clinical service revenue, which was approximately £64K over the 3-year period. Increases in revenue may have been due to increased capacity to conduct more clinical services, as suggested by the increase in chair-time availably (table 3.4), alternatively it may be the result of increases in professional fees, or a combination.

Table 3.4 shows the average daily number of clinics at BBR Optometry Ltd. By the end of the study, BBR Optometry Ltd was operating around 2.74 ± 0.49 clinics per day. A report from Europe Economics (2013) suggested that independent optometric practices tend to employ on average 1.5 optometrists, implying that on average 1.5 clinics are operated. This suggests that BBR Optometry Ltd supports more clinical service activity than the average UK independent optometric practice. On average multiple practices employ 2.5 optometrists, while franchises/joint venture practices employ 2 optometrists (Europe Economics, 2013). This infers that the level of clinical service activity at BBR Optometry Ltd is more comparable to that of a high street multiple practice.

As previously shown this study showed that the mean cost of a 60, 40 and 20-minute appointment at BBR Optometry Ltd is £112.24 ± £4.63, £74.83 ± £3.09 and £37.41 ± £1.54, respectively. Over the three study years the cost per appointment declined slightly (table 3.5), as a result of increased clinical chair-time allowing costs to be further spread out. Therefore although the overall cost of running the clinical services department had increased over the three years, this was more than offset by the increase in clinical service chair-time. The cost of clinical service delivery as derived by this study was found to be lower than costs produced by readily available professional fee models, namely the CIBA Vision Professional Fee Template (Russ, 2008) and The Association of Optometrists' (AOP) Optometric Practice Costs Model for Shared Care Schemes (http://www.aop.org.uk/practitioner-advice/business-practice/practice-cost-calculator). BBR Optometry Ltd's financial data was entered into the CIBA and AOP professional fee models. On average the cost of a 60, 40 and 20-minute appointment at BBR Optometry Ltd were shown to be £231.90, £154.60 and £77.30, respectively, by the CIBA model. The AOP produced slightly reduced costs at £208.10, £138.73 and £69.37. These costs were almost double the costs derived from this study's activity-based costing method. This confirms that the

method used by readily available professional fee calculators grossly overestimates the cost of providing clinical services in high street optometric practice and might encourage excessive professional service fees. However, this study has assumed that the total chair-time is allocated to providing appointments. Hence empty or otherwise booked appointment slots have not been accounted for. It is likely that the cost per appointment would inflate fractionally if this were incorporated into the chair time calculations.

3.4.4 Profit per clinical service

The profits generated per clinical service increased each year (figure 3.10). This is likely due to the declining cost per appointment (table 3.5) over the 3 study years and also due to the increased professional fees in 2013. Figure 3.10 also illustrates the greater profitability produced by the premium fees during 2012/13 and 2013/14. During the final year of this study, GOS sight tests and private eye examinations were producing a mean net loss of -£14.86 ± £0.00 and -£4.30 ± £7.36. Chapter 2 shows that these services tend to generate spectacle sales (of high volume and value) and so the net loss is subsidised by optical product sales. The contact lens services produced a net profit of £9.90 ± £11.59 in 2013/14. Therefore contact lens services at BBR Optometry Ltd are self-sustainable without the need to subsidise costs. This is ideal considering that contact lens services produce relatively few spectacle sales (Chapter 2). The community-enhanced services displayed mixed profitability ranging from -£53.27 to £24.24 in 2013/14. The mean profitability for community-enhanced services in 2013/14 was -£7.76 ± £28.08. Hence community-enhanced services overall generate a net loss. Additionally these services do not generate significant spectacle sales (Chapter 2) and so rely on private clinical services and private spectacle dispensing to subsidise costs. This study confirms the loss leading nature of traditional services in the UK and implies the need to improve profitability for community-enhanced services. These services are currently subsidised by other revenue streams and this is likely to create a significant impact on optometric practices should the uptake of these services increase in future.

Inadequate profitability of clinical services also poses other concerns (Europe Economics, 2013). The low profitability of clinical services may affect public health and safety as optometric practices shift focus from patient care to commercial interests (Europe Economics, 2013). Commercial pressure may influence practitioners' recommendations to purchase new spectacles (i.e. conversion rates)

through sales tactics or by recording minor changes in spectacle prescriptions (Europe Economics, 2013). It is also thought that focus on commercial aspects may also reduce the public's perception of primary eye care in high street optometric practice (Europe Economics, 2013, Shickle et al, 2013).

3.5 Conclusions

This study applied complex concepts of cost allocation to derive the cost of clinical service delivery in high street optometric practice. This study found that the costs of service delivery are not as large as those represented through readily available professional fee calculators (as described in section 3.4.3). Additionally this study illustrates that the activity-based costing method is most appropriate for high street optometric practices. The costs derived can be used as the foundation of pricing decisions for new and existing clinical services. Hence, a cost-plus pricing strategy can be applied. This study has limitations as it is based on a single independent practice. Therefore the figures represented in this study should not be interpreted as the average for a UK high street optometric practice. Rather this study represents an alternative method of calculating the cost of clinical service provision and encourages the use of these business concepts in UK high street optometric practice.

This study highlights the need to improve profitability of particular clinical services, namely community-enhanced services and private specialist services. Profits can be improved by controlling the consumption of resources to ensure maximum efficiency, which is explored in the following chapter. Alternatively profitability can be improved by applying a new pricing strategy, for instance increasing professional fees. There are a number of factors to consider when increasing professional fees (Moss, 2005; Lovelock and Wirtz, 2008). The market is highly competitive and so putting the price too high may deflect customers to local competition. However, a customer may be willing to pay a greater fee if the level of skill and service surpasses that of local competition (Moss, 2005). Additionally consideration must be made towards what the customer is prepared to pay. Therefore the customers' value of the service needs to be explored. Furthermore prices can have implications on the expectations a customer formulates (Kurtz and Clow, 1998) and the perceived image of the company (Urbany, 2001). The concerns over how patients may react to professional fee increases are explored in Chapter 5.

Chapter 4: Operational changes to improve the profitability of clinical services

4.1 Introduction

Chapter 3 showed that several high street optometric services generate a net loss for the business. This mostly applied to the GOS sight tests, private eye examinations and community-enhanced services. However, a report by the Optical Confederation (2013) showed that 63.5% of traditional sight tests resulted in a need for the patient to purchase new spectacles. Hence, losses generated through traditional services are often recovered through profitable spectacles sales. However, patients have the option to take their spectacle prescription and purchase spectacles from an alternative supplier. Furthermore, some patients may not require spectacle correction or may have a stable refractive error. These outcomes often undermine the loss leading strategy. The recent economic recession has caused patients' willingness to pay for new spectacles to decline resulting in patients switching to cheaper alternative suppliers (Europe Economics, 2013). A market survey by YouGov (2011) suggested that around 17% of patients shop around and 3% purchase spectacles online. Meanwhile, community-enhanced services produce a net loss of up to £53 per appointment (Chapter 3) and cannot be relied upon to generate as many spectacles sales (Chapter 2).

Practitioners and practice managers could choose not to provide such services that may put their business at risk. However, GOS sight tests and eye examinations have the greatest demand of all high street optometric services (Chapter 2). Hence, a practice would likely lose a considerable number of patients if it were no longer to provide traditional services. The provision of community-enhanced services is also associated with additional practice benefits, such as enhanced professional development, attracting new patients, enhancing reputation and avoiding referrals to competing practices (Konstantakopoulou et al, 2014). Therefore, despite the risks these services pose on the business, it may not be in the best interests to cease provision. An alternative approach would be to continue providing these clinical services, and aim to reduce the business risks by improving clinical service profitability.

4.1.1 Methods of improving profits

There are three key factors to improving profits; reducing fixed expenses, increasing sales volume and increasing the contribution margin (Tracy and Barrow, 2008).

Significantly reducing fixed expenses to improve profits is usually the last resort as it involves downscaling the business. This can impact the existing sales level and so is generally avoided (Tracy and Barrow, 2008). Another option would be to increase the sales volume. Increasing the volume of clinical service sales in high street optometric practice would involve increasing the capacity to conduct more clinical services (i.e. increasing available clinical chair time). This would depend on investment in further resources and likely result in additional expenses. Therefore only a portion of the increased revenue from a greater volume of sales would reach the 'bottom-line' profits. An alternative method to increasing the volume of clinical service sales whilst maintaining the existing chair time capacity would be to ensure maximum use of the existing capacity. Clinical service chair time is a perishable resource, in that unused or un-booked chair time cannot be inventoried for future use. Therefore optometric practices may want to increase demand for services to fill any unused chair time. To achieve this, practice managers may aim to improve patient satisfaction in the services to encourage existing patients to ensure they return for subsequent optometric services and recommend to others. The challenges of maximising chair time is well research within the healthcare industry, particularly in hospitals and general medical practices. The key obstacles arise from patients failing to attend booked appointments ('no-shows') and patients cancelling appointments (Moore et al, 2001; Denton and Gupta, 2008; Ratcliffe et al, 2012; Tang et al, 2014; Yan and Tang, 2014). Patients may 'no-show' despite reminders and financial penalties (Lacy et al, 2004). In addition to reduced income and profit generation, 'no-shows' and cancellations can impact staff satisfaction, staff productivity, timeliness of services, patients satisfaction and clinician idle time (Ratcliffe et al, 2012; Tang et al, 2014; Yan and Tang, 2014). To the author's knowledge there is no published research on clinical chair time use in high street optometric practice. Therefore there is a need to establish the clinical chair time utilisation in high street optometric practice and key factors preventing maximum utilisation.

Another option of increasing the volume of clinical service sales would be to reduce the time allocated to each clinical service. Gikalov et al (1997) found that reducing

the time allocated to eye examination services in an optometric practice increased the number of examinations conducted per hour. Furthermore reducing appointment duration may also reduce the cost per clinical service (Europe Economics, 2013). In Chapter 3 it was shown that appointment duration was directly related to the cost per clinical service (table 3.5). Hence reducing the time allocated to each clinical service may simultaneously increase total revenue and reduce the cost per clinical service. Both of which would attribute to increased clinical service profits. However, insufficient time to complete an optometric eye examination may result in inaccurate eye health assessment or incomplete testing (Europe Economics, 2013). The average time allocated to conduct an eye examination is around 25.8 minutes (ranging from 15 to 40 minutes) (Dutton, 2010). However, participants of the survey conducted by Dutton (2010) indicate that many optometrists feel the optimal time allocation should be greater at 29 minutes (ranging from 15 to 60 minutes). Hence, although reducing the duration of clinical services may improve profits, consideration needs to be made to ensure the ability to conduct relevant tests and adequate level of care is not impaired.

The final factor to improving profits is to increase the contribution margin. The contribution margin refers to the total revenue less the cost of goods and other variable expenses (Tracy and Barrow, 2008). It is a measure of profits before fixed expenses are deducted. The contribution margin can be increased by raising the sales price or by reducing variable expenses (Tracy and Barrow, 2008). In Chapter 3, it was illustrated that the only significant variable expenses to the provision of clinical services in high street optometric practice were associated with locum salaries. A reduction in locum salaries would likely impact the volume of clinical service sales. Therefore this may be counterproductive as the costs saved may also result in reduced revenue and profits. Furthermore the option of increasing professional fees for clinical services would be limited to private services, as the fees for other services such as GOS and community-enhanced services are governed by external organisations. The notion of increasing professional fees for private clinical services is explored in the following chapters.

Revenue management consists of techniques that aim to enhance and grow revenues without impacting the quantity of products or services sold (Bell, 2012). The concepts of revenue management could be used to increase the total revenue generated through clinical service sales and thus increase the overall contribution margin.

4.1.2 Revenue management

There are a number of strategies associated with the concept of revenue management (Huefner, 2011; Bell, 2012). One such strategy is known as differential pricing, which refers to setting different prices for the same products and services according to demand and supply (Huefner, 2011). Businesses may set differential prices to attract customers when business is quiet, for example restaurants may offer 'happy hour' and 'early-bird' specials and golf courses may offer discounted prices on particular days or hours (Huefner, 2011). Some high street optometric practices may also use differential pricing. For instance, due to high demand, BBR Optometry Ltd charges a premium fee for private clinical services booked with the senior and most established optometrist. Alternatively some practices may set lower prices for clinical services booked with less experienced or new clinicians, such as a pre-registration optometrist, to help 'fill up' their clinic diaries. Hence optometric practices may charge a variety of prices for ostensibly the same services.

Many optometric practices will employ a range of clinicians with overlapping clinical skills. For instance many practices will employ a contact lens optician alongside optometrists whereby the ability to deliver contact lens services overlaps. However, only the optometrist can conduct other services such as traditional sight tests and eye examinations. Therefore in an environment with varying clinical skills and varying professional fees, preferences for clinical service bookings could be set for the purpose of maximising income generation. The preferences would relate to assigning a particular clinician for certain clinical services. For instance, BBR Optometry Ltd offers 'contact lens teach' services to allow patients to learn how to competently and confidently remove and insert contact lenses; a service that is widely offered in high street optometric practice. There is no charge for contact lens teach services at BBR Optometry Ltd. Although the service can be performed by a variety of different clinicians (table 3.1), it is often prioritised to the clinical assistants diary. This releases clinical chair time in the optometrists' and contact lens opticians' diaries for other income generating services, such as eye examinations and contact lens services. The idea of setting clinician preference for clinical service bookings could be applied to all clinical services to ensure maximum revenue generations and most efficient use of staff resources and clinical skills.

4.1.3 Aims

There is a need to improve the profitability of clinical services offered in high street optometric practice. Improved clinical service profitability will help manage any threats imposed by competing businesses. Additionally it will ensure long term sustainability of specialist non-refraction based services that typically do not generate product sales. There are a variety of methods to achieving greater clinical service profits. This study aims to identify key factors influencing clinical service profitability, primarily focusing on clinical chair time utilisation, optimal time allocations for clinical services and assigning clinician preferences for appointment bookings.

4.2 Methods

This study was a continuation of the study presented in Chapter 3. A retrospective audit was conducted in order to establish factors associated with clinical service profitability. The audit was based on financial year 2012/2013 as relevant data was not available for prior financial years.

Firstly, a monthly audit was conducted to determine how efficiently clinical chair time was used. BBR Optometry Ltd uses an electronic practice management system, i-Clarity (Topcon Great Britain Ltd, UK) to manage appointment bookings and clinic diaries. The system displays appointment bookings for each clinic and highlights attended appointments in green and any unattended appointments in orange. Hence appointments highlighted in orange represent 'no-shows', where the patient has failed to attend a booked appointment. The diary also allows bookings of other non-clinical service activities such as meetings, training sessions and management time. Therefore each clinic from May 2012 to April 2013 was audited and the number of hours spent on non-clinical service activities was recorded. Non-clinical service activities were categorised as follows:

- Internal meeting – meetings held within the practice
- External meeting – meetings that took place away from the practice
- Management – time allocated for practice management responsibilities
- No-show – patient failed to attend a booked appointment
- Reserved – reserved chair time, which is intended to allow the clinician to catch up if running behind schedule. Alternatively reserved chair time may be used to conduct non-patient facing activities e.g. administrative tasks such as reports and referral letters

- Empty – empty appointment slots
- Training – chair time reserved for training sessions
- Consultancy – BBR Optometry Ltd provides a consultancy service and so clinicians may use chair time for consultancy purposes
- Networking/Bench marking – BBR Optometry Ltd also conducts networking and bench marking exercises, which may require clinicians' input
- Conference – conference attendance
- Supervision – time allocated for supervision of pre-registration optometrists
- Other – other non-clinical service activities that do not fit into the above categories

The total clinical chair time available each month was derived by auditing the number of clinics that took place each month. The monthly number of clinics was multiplied by the average number of hours available per day (established as 6.83 hours per day in Chapter 3) to derive the total clinical chair time available each month. The amount of time spent on non-clinical service activities was compared to total available chair time to establish the percentage of clinical chair time used on clinical service and non-clinical service activities. This would establish the efficiency of utilisation of clinical chair time for delivering clinical services in high street optometric practice.

An audit was also conducted to assess the optimal time allocations for clinical services. In Chapter 3, the unit cost of a 60-minute appointment was derived. This unit could be subsequently divided to produce the unit cost for appointments of varying durations (Chapter 3). For instance a 30-minute appointment would be half the cost of a 60-minute appointment. This method was used to derive the relationship between appointment cost and time allocated to clinical services (appointment cost – time allocation relationship). The professional fees and appointment durations of clinical services offered during May 2012 and April 2013 were audited. The audit results were compared to the appointment cost – time allocation relationship. The comparison was used to determine the level of reduction in clinical service time allocations required to render clinical services profitable. An analysis was also carried out to establish clinician preferences for clinical services such to enhance revenue generation and efficiency of clinical chair time usage. The skill sets of each clinician was analysed to establish the range of clinical services each clinician was able to conduct. A further analysis was conducted to establish the revenue generation for each clinical service based on

the clinician conducting the service. This data was used to establish preferences for appointment bookings in high street optometric practice. All results were tabulated and presented graphically using Microsoft® Excel® (Microsoft Corporation, Redmond, Washington, USA). Ethical approval for this research was granted by Aston University Ethics Committee.

4.3 Results

BBR Optometry Ltd provided access to their electronic practice management system, i-Clarity, and data was collected on BBR Optometry Ltd premises.

4.3.1 Clinical chair time utilisation

Table 4.1 shows the total chair time used per month for non-clinical service activities. The average time spent each month on non-clinical service activities was 96.3 ± 17.3 hours across all clinics. The greatest number of hours used for non-clinical service activities was in January (114.67 hours) and mostly consisted of empty appointment slots (66 hours). The month with the least time spent on non-clinical service activity was July. Table 4.1 illustrates the variation in time used for non-clinical service activities over the 12-month study period. The non-clinical service activity consuming the most clinical chair time was empty appointment slots, followed by no-shows and reserved chair time (figure 4.1). Empty appointment slots may have occurred due to appointment cancellations at short notice. Consultancy, networking/bench marking and conference attendance were non-clinical service activities that used the least amount of clinical chair time (figure 4.1). The activity 'other' in table 4.1 and figure 4.1 related to slots in the clinic diary with no specific annotations or reason for not being used to deliver clinical services and was relatively minimal (figure 4.1).

	Chair Time (Hours)											
Activity	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13
Internal Meeting	5.83	13.00	9.00	4.17	15.00	5.67	10.67	7.33	5.00	11.33	13.83	2.33
External Meeting	3.67	0.00	0.00	0.00	2.33	14.33	0.00	14.67	0.00	0.00	4.00	0.00
Management	11.67	7.00	5.33	6.33	2.00	4.67	5.00	7.00	12.33	4.00	4.00	9.33
No-show	14.00	14.33	8.67	8.00	14.00	8.67	13.17	7.33	9.67	9.00	15.00	7.00
Reserved	16.50	9.50	9.50	5.50	7.17	10.67	8.50	9.50	10.17	8.67	10.33	9.00
Empty	30.17	28.33	20.00	19.33	24.67	66.67	45.83	60.50	66.00	46.50	52.17	56.83
Training	1.00	2.67	0.00	35.83	11.33	0.00	0.50	2.00	6.17	0.67	3.00	8.00
Consultancy	0.00	0.67	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Networking/Bench mark	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conference	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Supervision	0.00	0.00	0.00	7.67	4.50	0.00	0.00	0.00	0.00	11.00	7.83	1.33
Other	5.33	5.67	2.00	3.33	5.33	0.67	0.00	6.33	9.50	7.00	7.58	6.67
Total	88.17	81.17	61.50	90.17	89.33	111.33	83.67	114.67	118.83	98.17	117.75	100.50

Table 4.1 The total clinical chair time (hours) used for non-clinical service activities

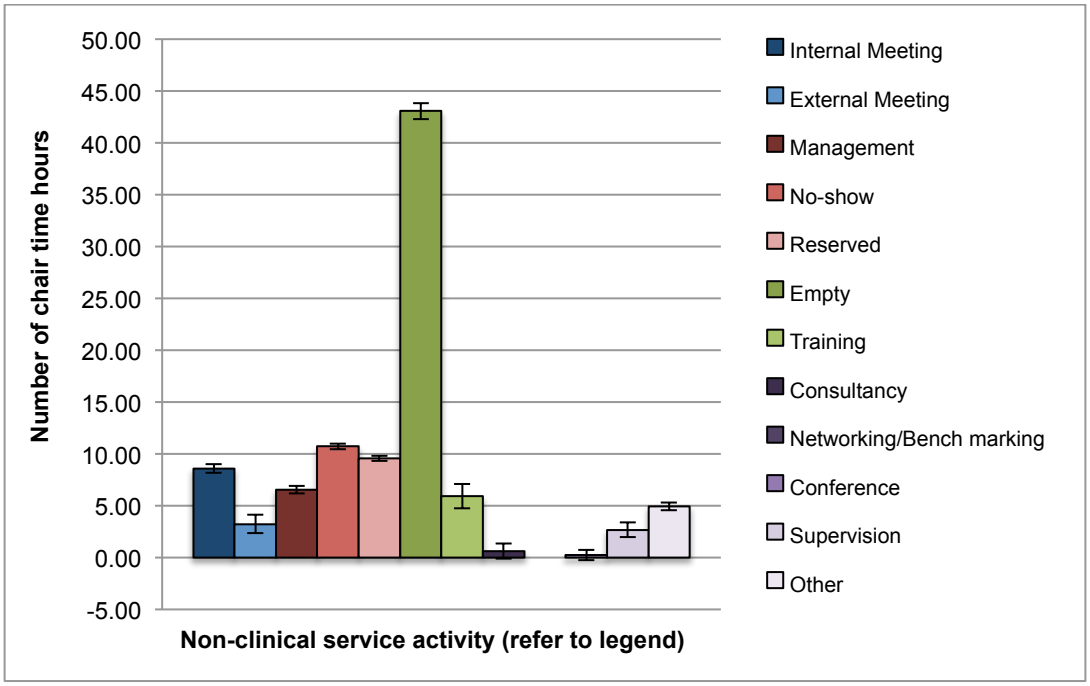


Figure 4.1 A bar chart to show the average number of clinical chair time hours used for non-clinical service based activities per month

The total clinical chair time (hours) available each month were derived as the number of clinics multiplied by the average operating hours per day (table 4.2). The mean number of clinics per month was 58.9 ± 5.7 and the average number of hours per day was 6.83. The mean clinical chair time available each month was 402.2 ± 38.6 hours. There was a significant variation of monthly clinical chair time of almost 40 hours during the study period (table 4.2).

	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13
Total number of clinics	45.3	55.7	57.1	60.5	57.9	67.8	65.9	58.7	57	57.7	60.6	62.5
Average hours per day	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83
Total clinical chair time	309.4	380.4	390.0	413.2	395.5	463.1	450.1	400.9	389.3	394.1	413.9	426.9

Table 4.2 The total chair time available each month for the provision of clinical services

The total clinical chair time (table 4.2) was used to derive the percentage of chair time used for delivering clinical services by subtracting the number of hours used for other non-clinical service activities (table 4.1). Figure 4.2 shows the percentage usage of chair time for the provision of clinical services. On average around 76.7% ± 4.4% of all chair time was spent on providing clinical services and just less than a quarter of clinical chair time was used on other activities. The usage of chair time

towards delivering clinical services varied throughout the study period and ranged from 69.5% to 84.7% (figure 4.2).

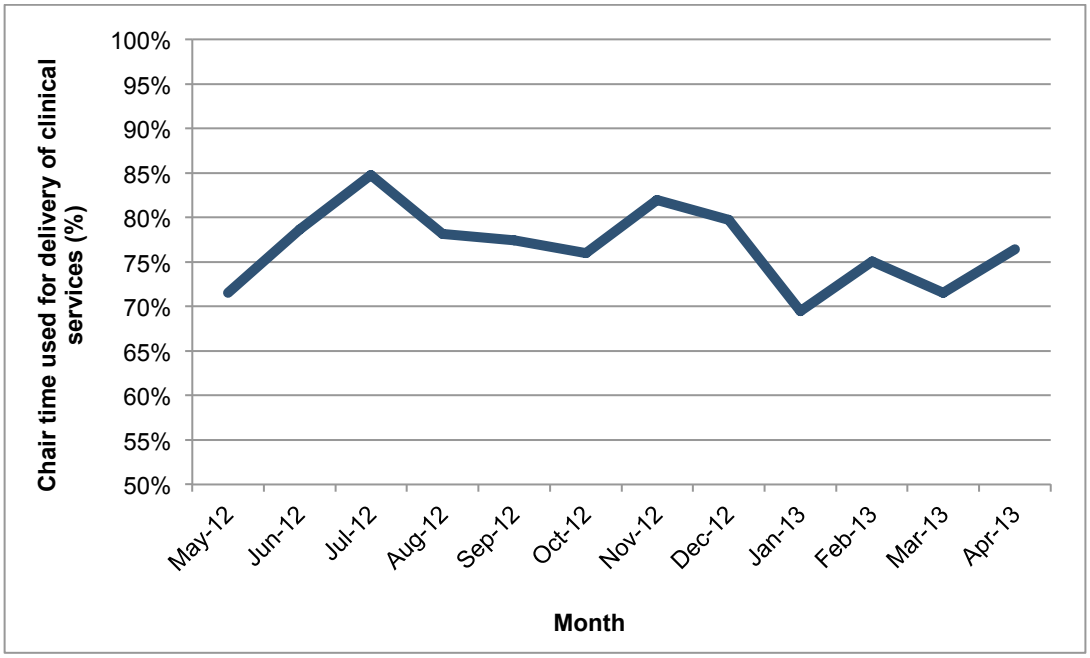


Figure 4.2 A line graph to show the percentage of clinical chair time used for delivering clinical services

4.3.2 Optimising appointment duration

BBR Optometry Ltd offers a range of clinical services and principle services are listed in table 4.3. The clinical services are broadly categorised as GOS, private eye examinations, contact lens services and community-enhanced services. Table 4.3 also illustrates the time allocations for each service type and the professional fees charged. Time allocations for services tend to be 20, 40 or 60 minutes (table 4.3). Each service incurs a standard fee, however private eye examinations and contact lens services can also incur a premium fee.

The cost of providing the clinical service varies according to the appointment duration as shown in table 4.4. The relationship between time allocated and cost is positively correlated as shown by the trend-line in figure 4.3, labelled as the 'time-cost relationship'. The time-cost relationship represents the costs incurred for appointments according to their duration. Therefore, for a clinical service of a given time allocation, the professional fee must lie above the time-cost trend line to render the service profitable. If the professional fee falls below the trend line the costs associated with the service outweigh the income generated. Hence, the service generates a net loss.

	Appointment name	Duration (minutes)	Professional Fee	
			Standard	Premium
General Ophthalmic Services (GOS)	Adult NHS sight test	20	£20.90	-
	Child NHS sight test	20	£20.90	-
Private eye exam	NHS extended exam	40	£58.90	£66.90
	Private eye exam	40	£59.00	£76.00
	Private U25 exam	20	£32.00	£39.00
Contact lens (CL) services	Soft CL exam	40	£75.00	£90.00
	RGP CL exam	40	£83.00	£99.00
	CL aftercare	40	£32.00	£38.00
Enhanced community services	Low vision assessment	40	£42.00	-
	General Practitioner Eye Referral Service (GPERS)	40	£40.00	-
	Glaucoma refinement (referred)	20	£50.00	-
	Glaucoma refinement (non-referred)	20	£40.00	-
	Post operative cataract assessment	20	£30.00	-
	Pre operative cataract assessment	20	£40.00	-
	Children's school screening	60	£41.40	-

Table 4.3 A list of the principle clinical services offered at BBR Optometry Ltd including the duration of each appointment and professional fees charged

	Appointment duration (minutes)								
	10	20	30	40	50	60	70	80	90
Cost per appointment	£18.83	£37.67	£56.50	£75.34	£94.17	£113.01	£131.84	£150.68	£169.51

Table 4.4 The cost of providing clinical services of different time durations

Figure 4.3 shows each of the principle clinical services plotted against the time-cost relationship trend line. The majority of clinical services are plotted below the trend line indicating a net loss. These mostly consist of GOS, private eye examination services and community-enhanced services. Furthermore this also includes the premium fee NHS extended exam service. Those falling below the trend line could be rendered profitable by reducing the time allocation for that service. For instance figure 4.3 illustrates that GOS (adult and child NHS sight test) could be rendered profitable by reducing the appointment duration to 10 minutes rather than the existing duration of 20 minutes. The service requiring the largest reduction in appointment time to ensure profitability is the children's school screening service, which would need to be reduced from 60 minutes to around 20 minutes. Figure 4.3

also shows that some services plot above the time-cost trend line, indicating that these services are profitable with the existing allocated time. Reducing the appointment duration would further improve profits, and may be necessary for those services that are producing only a minor profit. For instance the CL aftercare (premium fee) produces a profit of £0.33 and pre-cataract assessment generates a profit of £2.33. Reducing the time allocated to these services would ensure profitability and allow for minor fluctuations in costs.

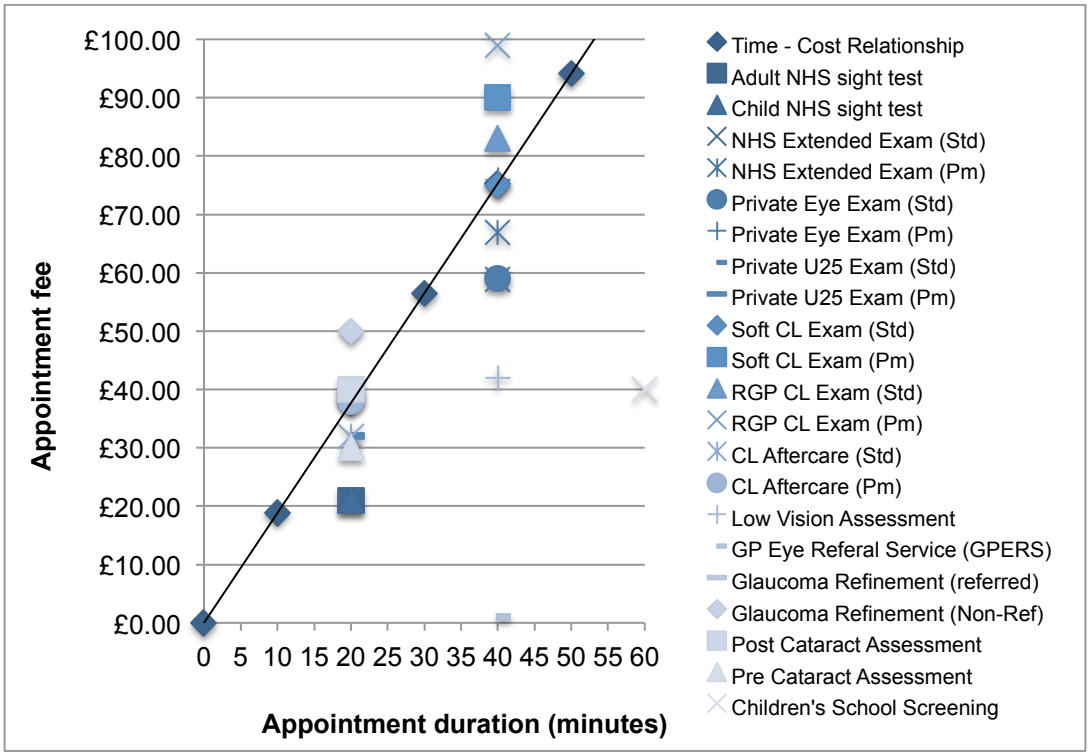


Figure 4.3 Graph to illustrate the ideal time allocation for clinical services of different durations. Some clinical services have differential professional fees categorised as standard (Std) and premium (Pm).

4.3.3 Assigning clinician preferences

BBR Optometry Ltd offers a range of clinical services delivered by a multidisciplinary team. Table 4.5 illustrates the clinical services that can and cannot be conducted by each clinician tier. The senior optometrist and other optometrists deliver the majority of clinical services. Other clinicians are able to deliver a smaller scope of services (table 4.5). It would be most efficient to fully apply the skills of other clinicians, such as the contact lens optician, clinical assistant and dispensing optician to ensure optometrist resources are freed for those services that can only be conducted by an optometrist. Therefore, preferences for clinical services should be assigned such that:

- The dispensing opticians would be assigned for all low vision assessment, low vision follow up, colorimetry and coloured overlay assessment services
- The clinical assistant would be assigned for all contact lens teach services
- The contact lens optician would be the first preference for CL aftercare, CL collection, and tolerance trial services

The green highlighted boxes in table 4.5 represent services that gain a higher professional fee when delivered by the senior optometrist as opposed to other optometrists and is the result of the differential pricing for private services. In these instances, greater revenues would be generated if the senior optometrist were assigned to all services generating a higher professional fee. Therefore table 4.5 illustrates that the majority private eye examination and contact lens services should be assigned to the senior optometrist.

	Appointment name	**Clinician**				
		Senior Optometrist	**Optometrist**	**Contact Lens Optician (CLO)**	**Clinical Assistant (CA)**	**Dispensing Optician**
General Ophthalmic Services (GOS)	Adult NHS sight test	£20.90	£20.90			
	New Adult NHS sight test	£20.90	£20.90			
	Child NHS Sight test	£20.90	£20.90			
	Low vision NHS sight test	£20.90	£20.90			
Private eye exam	NHS extended exam	£66.90	£58.90			
	Private eye exam	£76.00	£59.00			
	Private U25 exam	£39.00	£32.00			
	Child comprehensive	£59.90	£52.90			
Enhanced community services	Low vision assessment	£42.00				£42.00
	Low vision follow up	£0.00				£0.00
	General Practitioner Eye Referral Service (GPERS)	£40.00	£40.00			
	Glaucoma refinement (referred)	£50.00	£50.00			
	Glaucoma refinement (non-referred)	£40.00	£40.00			
	Post operative cataract assessment	£30.00	£30.00			
	Pre operative cataract assessment	£40.00	£40.00			

	Children's school screening	£41.40	£41.40			
Contact lens (CL) services	Soft CL exam	£90.00	£75.00			
	Soft CL (NHS) exam	£90.90	£75.90			
	RGP CL exam	£99.00	£83.00			
	RGP CL (NHS) exam	£99.90	£83.90			
	CL aftercare	£38.00	£32.00	£32.00		
	CL collection	£0.00	£0.00	£0.00		
	CL teach	£0.00	£0.00	£0.00	£0.00	
	Tolerance trial (standard & toric)	£70.00	£70.00	£70.00		
	Tolerance trial (complex & multifocal)	£90.00	£90.00	£90.00		
Other miscellaneous services	Cycloplegic refraction	£11.00	£11.00			
	Optical coherence tomography (OCT)	£38.00	£38.00			
	Emergency exam	£76.00	£59.00			
	Colorimetry		£60.00			£60.00
	Coloured overlay assessment		£30.00			£30.00
	Follow up (20 min)	£24.00	£18.00			
	Follow up (10 min)	£18.00	£16.00			
	Recheck	£0.00	£0.00			

Table 4.5 A table to show the clinical services that each clinician can conduct and the associated professional fee. The grey shaded boxes indicate services that cannot be conducted by the associated clinician.

4.4 Discussions

This study explored the options for improving the profits produced by optometric clinical services. This study focused on opportunities centred around improving the efficiency of clinical service provision rather than relying on reducing costs or increasing professional fees.

The efficiency of clinical chair time use was analysed. The clinical chair time should be fully used towards the delivery of clinical services to ensure the maximum use of professional skills and equipment. Maximising clinical chair time utilisation ensures the maximum volume of clinical service sales and enhances revenues and profits. However, clinical chair time may be used for other non-clinical service activities, for instance attending meetings, conferences and training sessions. Although these

activities do not contribute directly to sales, they are still valuable business activities. However, other non-clinical services activities such as no-shows and empty appointments are counterproductive. The majority of non-clinical service chair time at BBR Optometry Ltd is occupied by empty appointments (figure 4.1). This may be a result of late appointment cancellations or insufficient demand for clinical services. Demand for clinical services could be improved by reducing operating hours or reducing staff levels (Gikalov et al, 1997). Another option is having a portion of self-employed "locum" staff who can increase or decrease time according to demand. The downside is that their overall full-time equivalent rate is higher than contacted staff. Empty appointments were generally the greatest across the winter months and the lowest across the summer months (table 4.1). Therefore late cancellations and reduced demand for optometric clinical services may also be associated with seasons and weather conditions. Gikalov (1997) also found that poor weather conditions impacted the number of booked appointments kept in high street optometric practice.

A considerable number of clinical chair time hours were occupied by no-shows and reserved chair time. On average, the other non-clinical services activities occupied less chair time compared to empty, no-show and reserved appointments. Late cancellations and no-shows are common barriers encountered when maximising healthcare delivery and appointment schedules (Gupta and Denton, 2008; Ratcliffe et al, 2012; Tang et al, 2014). Late cancellations and no-shows impact productivity and reduce revenues (Ratcliffe et al, 2012; Tang et al, 2014). In addition, they may also result in increased waiting times and longer delays for other patients (Ratcliffe et al, 2012). However, some studies imply that no-shows and cancellations are actually initiated by appointment delays (Bean and Talago. 1995; Grunebaum et al, 1996; Festinger et al, 2002; Gallucci et al, 2005; Dreiter et al, 2008; Liu et al, 2010), although, other studies found no such relationship (Wang and Gupta, 2011). Nonetheless patients are likely to prefer sooner appointments rather than delayed appointments. Therefore there is a need to reduce appointment delays in high street optometric practice and subsequently reduce the volume of no-shows and cancellations. This may also improve the timeliness of clinical care. Implementing an appointment scheduling technique may improve the appointment delays. BBR Optometry Ltd currently operates using a traditional appointment scheduling system whereby bookings are accepted assuming the requested day and time is available. In some respects this represents a 'first-come first-serve' approach as popular slots may book sooner than others. An open access appointment

scheduling system aims to accommodate all bookings on the same day in order to reduce the waiting time for appointments (Ratcliffe et al, 2012; Feldman et al, 2015). However, same day appointments may not be the preference for all patients as some may wish to make advanced arrangements, such as transportation (Parente et al, 2005; Salisbury et al 2007; Gerard et al, 2008; Ratcliffe et al, 2012). Furthermore Sampson et al (2008) reported a reduction in patient satisfaction with same day appointments. Other options for reducing the impact of no-shows and cancellations are to issue no-show penalties, appointment reminders and consider overbooking clinics (Ratcliffe et al, 2012; Schultz and Kolish, 2013). However, it may be difficult to collect financial penalties for no-shows. Furthermore over booking clinics may result in further delays if poorly managed.

Reducing the appointment durations for clinical services may also increase profits generated. A reduction in appointment duration increases the capacity to perform a greater volume of services per clinic and hence increases the volume of clinical service sales. Additionally reducing the appointment duration improves the profit per service as shown in figure 4.3. BBR Optometry Ltd reduced the appointment duration for the adult GOS sight test (30 minutes to 20 minutes) and the Glaucoma Referral Refinement service (40 minutes to 20 minutes). This increased capacity by releasing clinical chair time and also produced cost savings of around £19.40 and £38.80 respectively for each adult GOS sight test and Glaucoma Referral Refinement appointment subsequently booked. In addition this change rendered the Glaucoma Referral Refinement service profitable rather than producing a new loss (figure 3.10). However, significant reductions in appointment durations are required to render all services profitable. This may compromise the level of clinical care provided (Europe Economics, 2013). In their study, Gikalov et al (1997) timed how long each clinician spent with the patient during the appointment in order to determine an appropriate reduction in appointment duration. Therefore this study could be extended to measure the chair time actually used for each clinical service, to ensure reductions in appointment duration does not impair the clinical care delivered. Although, this may result in a variety of wide ranging appointment durations. BBR Optometry Ltd only assigns appointment durations that are multiples of 20-minutes e.g. 20, 40 and 60 minute appointment durations. This allows different clinical services to be booked one after the other without creating any empty and unusable spaces. A wide range of different appointment durations may prevent appointments from neatly following on from each other. This may result in small gaps (e.g. 5 or 10 minutes) of idle chair time, which are too small to

be used towards delivering clinical services. Therefore considerations must be made to ensure appointment durations complement each other and prevents idle chair time. Table 4.1 illustrates the use of 'reserved' chair time for clinicians in order to complete administrative tasks and effectively 'catch up' if necessary. This may be due to insufficient appointment durations causing clinicians to run late. A survey by Dutton (2010) indicated that optometrists are prepared to overrun to deliver the appropriate clinical care. Further reducing appointment durations may cause an increase in reserved appointment slots, which would be counterproductive. Additionally, it is important to note that increasing the capacity for delivering clinical services by reducing appointment duration may not necessarily increase revenues and profit. This was demonstrated by Gikalov et al (1997) and was the result of insufficient demand for clinical services. However, it is uncertain whether practices should increase demand for services before increasing the capacity, or vice versa (Gikalov et al, 1997).

Clinician preferences can be set for particular appointments to ensure increased revenues and profitability as shown in table 4.5. This also ensures efficient use of staff clinical expertise. Setting preferences restricts the patients' choice of a preferred clinician. Some patients may prefer to see a familiar clinician and in some cases may even be willing to endure a longer appointment delay to see a preferred clinician (Gupta and Denton, 2008; Wang and Gupta, 2011). Although for popular clinicians this may cause a backlog of appointments (Savin, 2006). The ease of appointment booking with a preferred clinician is associated with increased patient satisfaction (Cheraghi-Sohi et al, 2008; Gerard et al, 2008; Wang and Gupta, 2008). Therefore, although dictating clinician preferences for clinical services will likely increase profits it may be associated with reduced patient satisfaction. Furthermore, allowing patients to choose a preferred clinician offers other benefits such as ensuring continuity of care (Doescher et al, 2004) and may also decrease the likelihood of no-shows (Carlson, 2002; Smith and Yawn, 1994).

4.5 Conclusions

This chapter aimed to explore various avenues to improving clinical service profits. Theoretically there are a number of methods to improving profits but operationally some methods create new challenges, particularly when reducing the duration for clinical services and incorporating clinician preferences for appointment bookings. This study highlights that improving clinical chair time utilisation would be the most beneficial method to improving profits. Improvements in the use of clinical chair

time can be enhanced to reducing empty appointments, no-shows and reserved chair time. However, this method will only prove effective if the practice has sufficient demand for clinical services to ensure chair time capacity is fully booked. Marketing and advertisement campaigns may increase demand for clinical services. Additionally reviewing the balance of demand and supply may also be beneficial as reducing chair time capacity could increase demand. This may also simultaneously reduce operating costs.

The study presented in this chapter is based on a single optometric practice and a relatively short study period. Further studies on a wider range of optometric practices are required to confirm the findings of this study. Additionally it would be interesting to review a practice following the implementation of changes to improve profitability to identify any challenges in the process and true long-term benefits.

Chapter 5: The role of professional service fees in high street optometric practice

5.1 Introduction

As discussed in Chapter 1, it is well recognised that optometric practices in the UK, and in many other countries, operate a loss leading pricing strategy. This is where a product or service is undercharged in the hope that it may 'lead' to other more profitable sales. This strategy has been applied in other industries such as razor blades and inkjet printers. In high street optometric practice, it is the sight tests and eye examination services that are undercharged, often below cost value, and the shortfall is recouped by high margin spectacle sales (see Chapter 2 and 3). Loss leading occurs with GOS sight tests due to a 'below-cost' remuneration (Optical Confederation, 2015) and so practitioners are left with no choice, but to cross subsidise with optical product sales. Chapter 3 illustrates the true cost of providing a GOS sight test to be £35.76 whereas the fee received is £21.10. However, practice managers determine their own fees for private eye examinations. Yet in Chapter 3 it was demonstrated that private eye examinations are also loss-leading services. Offering services at a reduced price will help draw customers into the practice for eye examinations and ensure competitive-pricing. Market research collated by the Optical Confederation (2013) illustrated that most eye examinations (63.5%) result in a need to update spectacles. Seventy-seven per cent of those patients will go on to purchase their prescription spectacles from the same optometric practice where they had their eye examination (YouGov, 2011). Therefore the loss leading strategy lends itself nicely to high street optometric services. However, set backs occur whenever a patient does not require a change in spectacles or chooses to shop elsewhere.

With around 7,250 optometric premises in the UK (Key Note Ltd, 2013), an abundance of choice exists for the consumer. Practices will aim to attract customers by differentiating from local competition. Multiples and large chains are able to offer generous discounts and promotions on products. Practices unable to discount their products may differentiate by offering a wider range of services, unique customer service, diagnostic technology or advanced expertise. Such huge investments often require an alternative pricing strategy to ensure a return on investment. Practice managers are understandably reluctant to increase prices for eye examination services due to fears of customers switching to local competition. Calver (2010) mapped changes in the GOS sight test and private eye examination

fees from 1989 to 2007 (figure 5.1 and 5.2). When compared to inflation, the GOS sight test remuneration had risen over the 18-year period, however increases in the average private sight test fee tended to lag below inflation (figure 5.2). This confirms the hesitance to differentiate and offer an alternative pricing structure. Figure 5.1 and 5.2 shows a sudden reduction in private eye examination fees in 2003. Calver (2010) suggests that this was associated with an increase in spectacle prices from 1999 to 2003 and reinforces the notion of loss leading within optometric practice.

Figure 5.1 General Ophthalmic Service sight test and private eye examination fees from 1989 to 2007 (Calver, 2010)

Figure 5.2 General Ophthalmic Service sight test and private eye examination fees from 1989 to 2007 with respect to inflation (Calver, 2010)

5.1.1 Perception of price

Zeithaml (1988) defined price as what is given up or sacrificed to obtain a product. This can be a monetary value (objective price) or represent a customer's perspective (perceived price). The later includes non-monetary costs such as time and effort, and is thought to be more meaningful to the consumer (Zeithaml 1988). Price is often used as an indicator of product or service quality (Zeithaml 1988; Lichtenstein & Burton 1989; Rao & Monroe 1989; Völckner & Hofmann 2007). Consumers will tend to rely on price as a cue for quality when other cues, such as brand name or product knowledge are absent (Gardner, 1971; Zeithaml 1988). The Global Attitudes and Perceptions About Vision Care survey, which was conducted across 13 countries, including the UK, revealed that around 50% of respondents did not know how to judge a good quality eye exam and 46% were not sure what a comprehensive eye examination involved (The Vision Care Institute, 2009). Interestingly, 62% of customers would be willing to pay more for a better eye examination (The Vision Care Institute, 2009). Findings specific to the UK indicated that 50% of customers would be willing to pay more for a better eye examination (Davies 2010). In this study customers may have interpreted 'better' as 'higher quality'. Fourteen per cent of UK customers were not sure where to obtain a comprehensive eye exam and 25% were not sure what a comprehensive eye examination service would involve (Davies 2010). Therefore, despite unknown product knowledge, consumers were using price to value their sight and to infer quality of eye examinations. Hence it could be argued that a demand exists for higher priced, 'better' quality eye care services in UK high street optometric practice.

The association of price with quality is referred to as the price-quality relationship and its validity has been well researched. Rao and Monroe (1989) and Hofmann and Volckner (2007) revealed a positive relationship between price and perceived quality. Therefore a higher price may be associated with a product or service of higher quality, and so elevating a consumer's expectations of performance. Whereas a low price may induce negative connotations about product or service quality (Völckner & Hofmann 2007). Other studies have found the price-quality relationship to be of low magnitude (Swan 1974; Lichtenstein & Burton 1989) and to vary across different product categories and services (Lichtenstein & Burton 1989; Chen et al. 1994), and so the relationship remains inconclusive. There are a number of explanations for these inconsistencies. Brucks et al (2000) suggested that price is associated to particular dimensions of quality, which in turn differ

among product categories. Additionally price as an indicator of quality seems to be more meaningful in product categories with large price variations and those with wide ranging quality variations (Zeithaml 1988). Furthermore a consumer's previous experience may be relevant; if a consumer has previously used price to successfully judge quality they may be inclined to do so again (Lichtenstein & Burton 1989), even if the true relationship is negatively correlated.

Price has an intriguing role on customer perceptions and remains an area of interest to many optometric practices striving to grow and develop in a highly competitive market. To the author's knowledge the price-quality relationship has not been investigated in context to consumers of high street optometric practices. Price increases are required during inflationary periods and could allow a practice to differentiate by facilitating investments in new technologies and expertise. Dabasia et al (2014) found that concerns over the cost-effectiveness were a major factor deterring practices from investing in new equipment and diagnostic technologies. Additionally price increases are essential for high street optometric practice to differentiate from the loss leading business model. The aims of this study were to investigate the effect of price on patient expectations and perceptions of service quality to establish the price-quality relationship for high street optometric services.

5.2 Methods

BBR Optometry Ltd typically sets a professional fee increase for all private services around every 18 to 24 months to compensate for inflationary changes and continual development. The next professional fee increase was due in October 2012. To determine the price-quality relationship, service quality would be measured before and immediately after the fee increase, to reduce any other influencing factors on service quality perceptions. The private optometric services themselves would remain unchanged.

The practice has previously offered a fixed fee for professional services regardless of the clinician conducting the service. On this occasion, BBR Optometry Ltd was introducing a premium fee for appointments with the senior optometrist. Table 5.1 shows the increase in professional fees for the most commonly booked private optometric services at BBR Optometry Ltd. General Ophthalmic Services and local community-enhanced service pathways were excluded from this study, as there was no change in fee. Additionally patients are often unaware of the remuneration

received by practices for conducting GOS and community-enhanced services as the optometric practice will claim and receive payment directly from local authorities.

Service quality is difficult to measure, as it is an elusive concept with limited objective qualities to assess. Parasuraman described perceptions of service quality as a comparison of what a consumer expects prior to receiving the service to what was experienced. Therefore service quality perceptions of an eye examination would be based upon what a consumer expects before the eye examination compared to the actual performance perceived. Expectations are shaped around previous experience, personal needs and word of mouth (Parasuraman et al, 1985). Desirable service quality is achieved when the service performance meets or exceeds previously held expectations. Poor service quality perceptions exist when performance does not meet expectations.

Appointment type	**Old fee**	**New Fee**	**Premium fee for Senior optometrist**
Private eye examination	£54	£59	£71
Private exam U25	£30	£32	£39
NHS Extended exam	£35	£38	£46
Contact lens aftercare	£29	£32	£32
Soft contact lens exam	£68	£75	£90
RGP lens exam	£76	£83	£99
Average Fee	£48.67	£53.17	£62.83
Average percentage increase		9%	29%

Table 5.1 Illustrates changes in professional fees for key private optometric services at BBR Optometry Ltd, which were implemented in October 2012

Various instruments have been developed to measure service quality. SERVQUAL is a validated questionnaire that has been widely used to assess service quality in healthcare, including hospitals (Babakus and Mangold, 1992) and dental care (Carman, 1990; Palihawadana and Barnes, 2004) and has recently been validated for optometric services (Smith, 2012). SERVQUAL was developed around the concept of comparing performance perceptions to expectations in order to determine a service quality 'gap'. The service quality gap (Q) scores are calculated by subtracting expectation scores (E) from perception scores (P) (Parasuraman et

al, 1988). A positive Q value illustrates that expectations were exceeded, while a negative Q value shows that expectations were not met.

The questionnaire consists of 22-items that are scored on a 1 - 7 likert scale before and after the service is received. A score of 1 illustrates strong disagreement with the statement or item, whereas a score of 7 shows that the consumers strongly agree with the statement. The 22-items relate to 5 categories (dimensions) of service quality (Parasuraman et al, 1988), as listed below:

- Tangibles: physical facilities, equipment and appearance of personnel (items 1-4)
- Reliability: ability to perform the promised service dependably and accurately (items 5-9)
- Responsiveness: willingness to help customers and provide prompt service (items 10-13)
- Assurance: knowledge and courtesy of employees and their ability to inspire trust and confidence (items 14-17)
- Empathy: caring, individualised attention the firm provides its customers (items 18-22)

Hence the SERVQUAL questionnaire can be analysed in a number of different forms, for instance item-by-item analysis, dimension by dimension or average measures of expectations (E), perceptions (P) and service quality gap (Q) scores (Buttle, 1996).

This study used the modified SERVQUAL questionnaire developed by Parasuraman et al (1991) to determine service quality before and after an increase in private professional fees. Smith (2012) suggested conducting the first part of the questionnaire to gather expectation scores just before the service was conducted and the second part (perceptions) immediately after the appointment. Questions were reworded to adapt the questionnaire to the high street optometric practice setting as suggested by Parasuraman et al (1991). Furthermore an additional question (“Overall, how would you rate the service from your optometrists”) was added to collect an overall rating of service quality. As described by Parasuraman et al (1988) the overall rating can be compared to overall Q scores to analyse the validity of the questionnaire using a one-way ANOVA test. Participant demographics were also collected including gender, age, frequency of visits, eye conditions, contact lens wear and supply, reason for visit and services received.

Additional questions were added at the end of the questionnaire to assess participant loyalty and satisfaction, as these are often the outcomes of high service quality (Cronin et al, 2000).

BBR Optometry Ltd sees an average of 650-700 patients a month, of whom around 50% have private eye examinations. Patients attending BBR Optometry Ltd for these services were invited to participate in the study 2 weeks prior to and following the fee change. Only private optometric services, as listed in table 5.1, were included in the study. Patients attending GOS sight tests or community-enhanced services were excluded, as the patient does not pay a fee for these services. Supplementary assessments, such as retinal imaging, were also excluded as these appointments often represent one-off assessments making it difficult to form expectations of service quality. Customers paying via the practices' monthly payment plan (Eyelife™) were also excluded, as fee changes did not impact these patients. The questionnaire was self-completed by each participant to remove any bias from staff or friends/relatives. Those unable to complete the questionnaire independently were excluded from the study, including those aged ≤16 and individuals with visual impairments. Participation in the study was optional. Completed questionnaires were placed in sealed boxes and patients were reassured that questionnaires were anonymous and confidential.

Ethical approval for this study was provided by Aston University Ethics Committee. All expectation (E) and perception (P) scores were collated using Microsoft® Excel® (Microsoft Corporation, Redmond, Washington, USA). Service quality gap (Q) scores were calculated for each item, dimension and averaged. Data analysis was conducted using IBM® SPSS® Statistics 22 (IBM Corporation, Armonk, New York, USA). Normality of data sets was assessed using the Shapiro Wilk test to ensure the appropriate statistical comparison tests were used.

5.3 Results

A total of 69 customers attending private optometric services participated in the study before the professional fee increase. Twenty-eight customers participated in the study following the fee change. Results obtained before the fee change will be referred to as group X and group Y for data collected after the fee increase. A number of SERVQUAL questionnaires were incomplete and were therefore excluded from the study. The total SERVQUAL questionnaires available for analysis were 33 and 16 in groups X and Y respectively. There were far fewer

participants in group Y and so the study period following the fee changes was extended for an additional week. During the extended period there were 15 additional participants in group Y, 3 of which were excluded due to incomplete results. There was no statistically significant difference between results in the original group Y and extended group Y (mean E score, P=0.954; mean P score, P=0.331; mean service gap Q score, P=0.214). Therefore the group Y data was combined resulting in a total of 28 group Y questionnaires.

Group X consisted of 15 males and 16 females (two customers gave no response to gender). The mix of participant gender for group Y was 8 males and 20 female participants. The mean age (±SD) was 61.0 (±19.1) and 67.4 (±19.7) years for Group X and Y respectively (P=0.359). Figure 5.3 illustrates the age profiles for both groups. The majority of subjects in both groups were older than 50 years of age (figure 5.3). Participants were generally attending BBR Optometry Ltd for routine eye examinations and contact lens aftercares (figure 5.4) and were existing customers of the practice (figure 5.5).

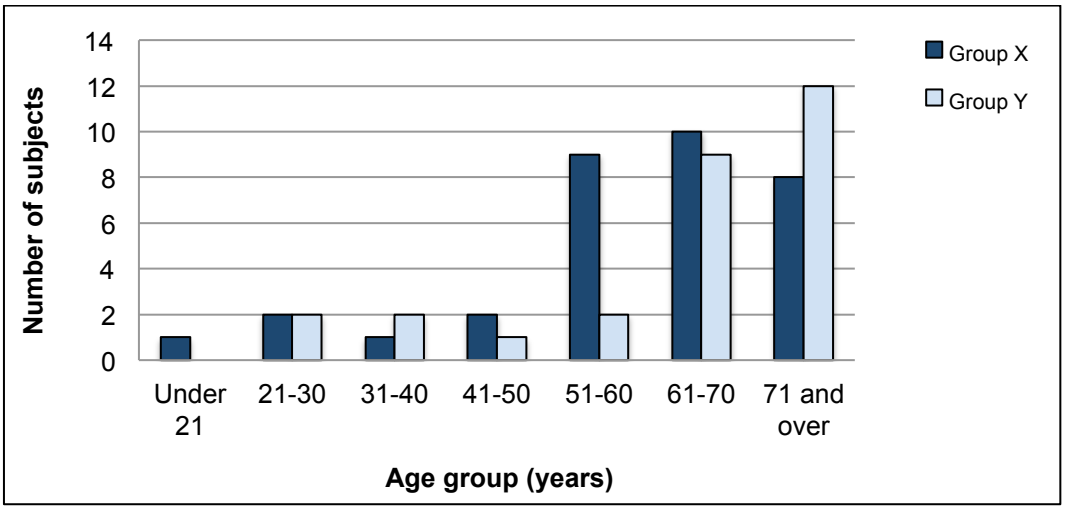


Figure 5.3 The age profiles for participants in Group X and Group Y

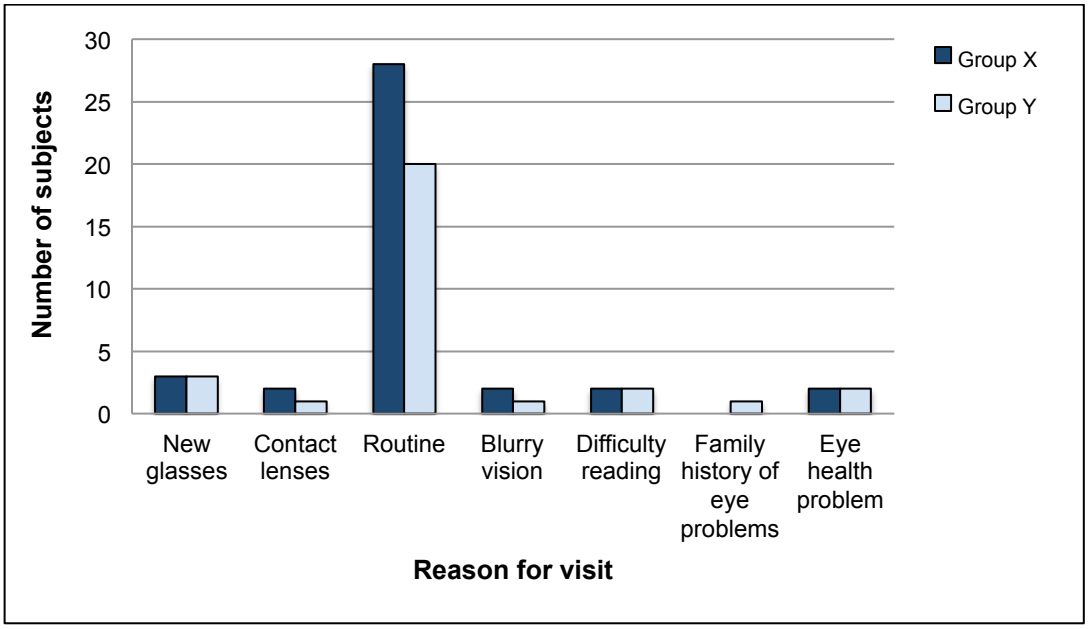


Figure 5.4 The main reason for visit for participants in Group X and Y. 'Routine' describes a patient attending for an annual or bi-annual examination with no particular concerns.

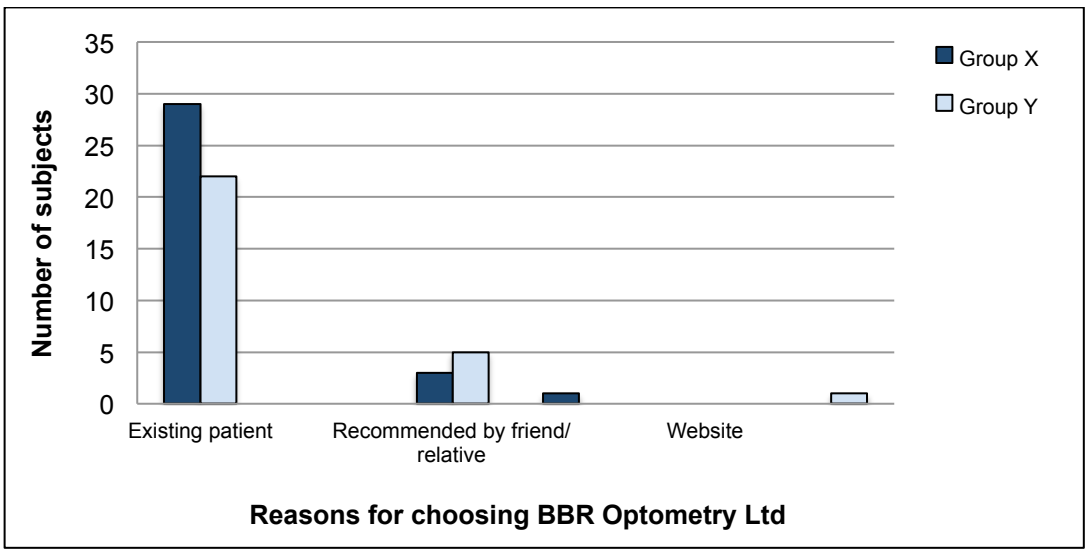


Figure 5.5 The reasons why study participants choose to attend BBR Optometry Ltd

All participants said they would recommend BBR Optometry Ltd to a friend or relative, although 2 subjects in group Y did not provide a response to the question. The following question asked if subjects had already recommended this practice to a friend or relative. The majority, 70% and 61% in Group X and Y, confirmed that they had been actively recommending BBR Optometry Ltd (P=0.472). Three subjects in each group gave no response. This illustrates that the majority of

subjects in both groups were satisfied with the service they received and thus were loyal customers promoting the practice by positive word of mouth.

In order to ensure results were valid, the subject's overall rating of customer service was compared to the average service gap Q score, as described by Parasuraman et al (1988). Subjects were able to rate the overall service quality as 'very poor', 'poor', 'fair', 'good' or 'excellent'. All subjects in this study rated the service quality as either 'good' or 'excellent'. In order for the SERVQUAL to render valid results, the average Q score for those rating the service as 'excellent' should be greater than those rating the service as 'good'. Figure 5.6 shows the average Q scores for each rating and clearly illustrates that those rating the service as 'excellent' have a greater average Q score than subjects rating the service as 'good'.

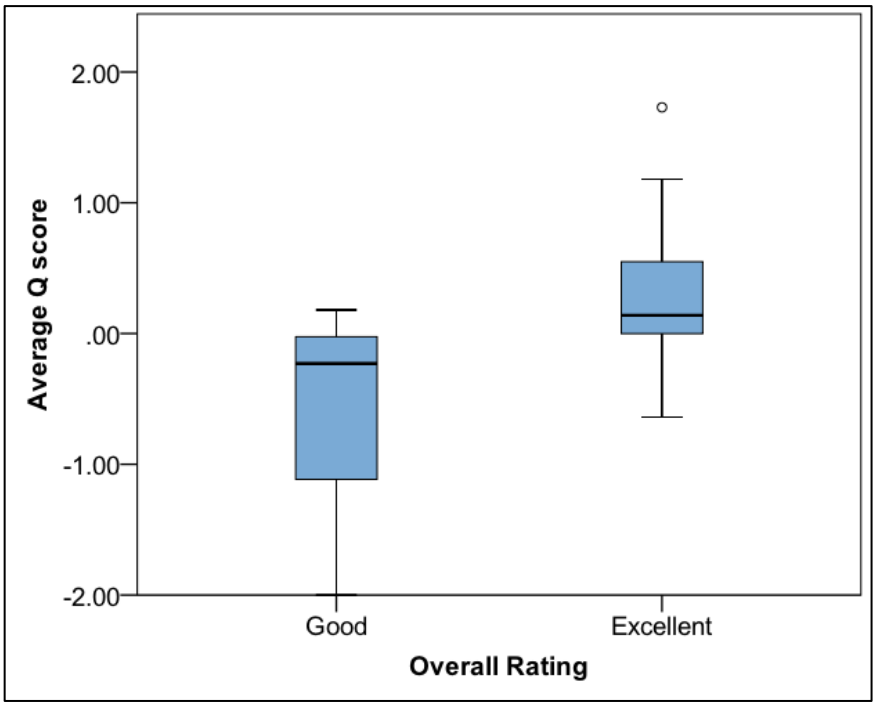


Figure 5.6 A box plot to show the relationship between overall ratings of service quality and the average quality gap 'Q score'. There were no responses of overall ratings as 'very poor', 'poor' or 'fair'.

A Shapiro-Wilk test showed average Q scores to have normal distribution for subjects rating the service as 'good' (P=0.340) and a non-normal distribution for subjects rating the service as 'excellent' (P=0.001). Therefore a statistical comparison was conducted using the Mann Whitney U test (1-tailed) for independent pairs. The average Q score for subjects rating the overall service

quality as ‘excellent’ was found to be statistically greater (p=0.046) than subjects rating the overall service quality as ‘good’, therefore confirming validation of the SERVQUAL questionnaire.

The reliability of the questionnaire was assessed using Cronbach’s Alpha. Cronbach’s alpha is a measure for internal consistency of questions relating to the same topic. The SERVQUAL can be categorised into 5 service quality dimensions (tangibles, reliability, responsiveness, assurance and empathy), each consisting of 4-5 questions. Cronbach’s alpha reliability coefficient was calculated to establish the reliability of each dimension for predicting the overall SERVQUAL E, P and Q scores (table 5.2). All values were found to be within the range 0.70 – 0.95, which is considered to be of good reliability (Nunnally and Bernstein, 1994; Bland and Altman, 1997).

Dimension	**E Score**	**P Score**	**Service gap Q Score**
Tangibles	0.788	0.756	0.767
Reliability	0.844	0.930	0.899
Responsiveness	0.755	0.892	0.722
Assurance	0.809	0.908	0.758
Empathy	0.799	0.897	0.771

Table 5.2 A summary of Cronbach’s alpha reliability coefficient calculated for each dimension and for each of the SERVQUAL measures; expectation score (E), perception score (P) and service quality gap score (Q)

A factor analysis was conducted to asses the factor structure for this data and to assess whether the five-dimension structure, as described by Parasurman et al (1988), were still valid. Factor analysis was performed on expectation scores, perception scores and service gap Q scores for the 22 SERVQUAL questions. The analysis identified five factors for expectation scores (component 1 explains 20.9%, component 2, 15.5%, component 3, 14.4%, component 4, 13.1% and component 5, 8.5% of total variance) and three factors for perception scores (component 1 explains 33.5%, component 2, 30.6% and component 3, 11.3% of total variance). There were five components identified for the service gap Q score data set, with the majority of variance accounted for by component 1 (23.7%), compared to variances of 10.5 – 12.8% for the other four components (table 5.3).

	Component				
	1	2	3	4	5
Q1					.787
Q2				.743	
Q3				.792	
Q4				.794	
Q5	.867				
Q6	.524				.421
Q7	.793				
Q8	.696				
Q9	.744				
Q10					.679
Q11			.768		
Q12		.758			
Q13			.651		
Q14	.639	.508			
Q15	.559	.589			
Q16		.775			
Q17	.574				
Q18	.805				
Q19	.498		.500		
Q20		.521	.406		.423
Q21		.546			
Q22			.654		

Table 5.3 Rotated component matrix illustrating a five factor construct. Factor loadings of less than 0.4 have not been displayed. Extraction method: Principle Component Analysis. Rotation method: Varimax with Kaiser Normalisation, Rotation converged in eight iterations. Kaiser-Meyer-Olkin measure of sampling adequacy = 0.781. Bartlett's test of sphericity approx. Chi-Square = 912.912, df = 231, P<0.001

The factor analysis for service gap Q scores (table 5.3) identified items pertaining to the SERVQUAL dimensions 'tangibles' and 'reliability' as components four and one respectively. There was overlap between the items associated with 'responsiveness', 'assurance' and 'empathy' in components two and three (table 5.3). Table 5.3 illustrates that component five mostly loaded on items one and ten of the 22-item SERVQUAL questionnaire.

SERVQUAL item	Group X			Group Y		
	E	P	Q	E	P	Q
1. Up-to-date equipment	6.91	6.88	-0.03	6.75	6.89	0.14
2. Visually appealing facilities	5.88	6.52	0.64	5.82	6.71	0.89
3. Employee's appearance	6.21	6.85	0.64	6.11	6.89	0.79
4. Visually appealing materials (e.g. posters, leaflets)	5.67	6.36	0.70	5.43	6.36	0.93
5. Keeps to promises	6.79	6.58	-0.21	6.68	6.75	0.07
6. Sincere interest in solving problems	6.88	6.79	-0.09	6.75	6.89	0.14
7. Dependable (performs service right the first time)	6.73	6.61	-0.21	6.68	6.93	0.25
8. Provides service at the time promised	6.79	6.73	-0.06	6.75	6.86	0.11
9. Insists on error-free records	6.67	6.73	0.06	6.71	6.89	0.18
10. Tell you exactly when services will be performed	6.64	6.76	0.12	6.50	6.86	0.36
11. Provides a prompt service	6.55	6.67	0.12	6.50	6.86	0.36
12. Staff always willing to help customers	6.76	6.82	0.06	6.79	6.82	0.04
13. Staff are able to respond to requests promptly	6.48	6.70	0.21	6.46	6.82	0.36
14. Trustworthy staff	6.85	6.70	-0.15	6.82	6.79	-0.04
15. Feel safe in transactions	6.82	6.82	0.00	6.86	6.89	0.04
16. Polite staff	6.76	6.88	0.12	6.64	6.89	0.25
17. Knowledgeable staff able to answer questions	6.52	6.73	0.21	6.61	6.75	0.14
18. Provides timely and convenient appointments	6.55	6.76	0.21	6.57	6.75	0.18
19. Opening hours to suit its customers	6.12	6.55	0.42	6.32	6.68	0.36
20. Staff give customers individual attention	6.58	6.76	0.18	6.50	6.79	0.29
21. Have customers best interests at heart	6.82	6.88	0.06	6.71	6.86	0.14
22. Staff understand customers specific needs	6.45	6.79	0.33	6.64	6.71	0.07
AVERAGE	6.56	6.72	0.16	6.53	6.80	0.27

Table 5.4 The mean expectations (E), perceptions (P), and service gap (Q) scores for Group X and Y for each of the SERVQUAL items

A summary of expectations, perceptions and Q scores for Group X and Y is shown in table 5.4. Both groups show item 4 'Materials associated with excellent optometrists (e.g. pamphlets, posters, leaflets) should be visually appealing' to have the lowest expectation score. The highest expectation score in Group X is for item 1 which is related to up-to-date equipment. However, interestingly for Group Y

the highest expectation score is for item 15 'You should feel safe in your transactions with excellent optometrists' suggesting that the increased fees changed the focus of expectations for Group Y. The distribution of expectation scores for both groups was non-normal (Shapiro Wilk test; P<0.001 and P=0.008). The mean expectation scores for Group X and Y were similar, 6.56 (±0.43) and 6.53 (±0.46) respectively (P=0.917). This finding implies that increases in professional fees did not generally influence expectations of service quality for subjects in this study.

A Shapiro Wilk test showed mean perception scores for both groups to be non-normally distributed (P<0.001 for both groups). The mean perception scores in Group X were similar to Group Y, 6.72 (±0.53) compared to 6.80 (±0.29) respectively (P=0.591). Therefore professional fees do not influence customers' perceptions of service quality in the high street optometric setting.

The service gap Q score was calculated as the difference between perception and expectation scores and are shown in table 5.4. A negative Q score shows that expectations were not met, whereas a positive Q score shows expectations of service quality were exceeded. The deviation from zero shows the significance of the difference between expectations and perceptions. Table 5.4 shows that for Group X, expectations were not met for items 1, 5, 6, 7, 8 and 14. Whereas only one item (14) was found to have a negative Q score for Group Y. The mean perception scores were greater than the mean expectation scores in each group (Group X, P=0.004; Group Y, P=0.009), rendering positive overall Q scores and demonstrating that customers' expectations were generally exceeded. The mean Q scores for Group X and Group Y were non-normally distributed (Shapiro Wilk test, P<0.001 and P=0.002) and were found to be similar, 0.16 (±0.53) and 0.27 (±0.46) respectively (P=0.948). This suggests that increases in professional fees did not tend to influence a customer's perception of overall service quality for subjects in this study.

A comparison of mean results for each individual SERVQUAL item between Group X and Y was conducted. No items show significant differences between the 2 groups for expectations (P=0.169 to P=0.980), perceptions (P=0.068 to P=0.968) or service gap Q score (P=0.109 to P=0.961). A comparison of mean results for the SERVQUAL dimensions (tangibles, reliability, responsiveness, assurance and empathy) was also carried out. No significant differences were found between results of Group X and Group Y (P=0.329 to P=0.992).

Group Y consists of patients paying an increased fee and also patients paying a premium fee to see the senior optometrist (table 5.1). Hence the latter group experienced a much greater price for eye care services. Group Y can be subdivided into a standard fee group and premium fee group, each consisting of 15 and 13 subjects respectively. Table 5.5 shows the mean expectation, perception and service gap Q scores for the three groups. Group Y (premium fee) has the greatest E, P and Q score compared to the other two groups. A Kruskal Wallis test was conducted to identify any significant differences between the three groups. There were no statistically significant differences between the three groups for expectations (P=0.809), perceptions (P=0.264) or service quality Q scores (P=0.843).

Group	Expectations (E)	Perceptions (P)	Service gap (Q)
Group X	6.56 (±0.43)	6.72 (±0.53)	0.16 (±0.53)
Group Y (Standard fee)	6.47 (±0.51)	6.72 (±0.33)	0.26 (±0.53)
Group Y (Premium fee)	6.60 (±0.42)	6.89 (±0.22)	0.29 (±0.38)

Table 5.5 The mean E, P and Q scores for Group X and Group Y, subdivided into differential fee categories

5.4 Discussion

This study aimed to establish the relationship between price and perceived service quality of private services in high street optometric practice. Because of the highly competitive market many practices are reluctant to increase prices for services. Hence, creating a dilemma when investing in new equipment, training and higher qualifications, and when contemplating differentiating from the traditional loss leading business model. This study aims to provide an initial step towards understanding patients' reactions towards price changes, in particular their expectations and perceptions of service quality.

The validated SERVQUAL questionnaire developed by Parasuraman et al (1991) was used to collect service quality measures. The questionnaire was recently shown to be appropriate for use in the high street optometric setting (Smith, 2012). Figure 5.6 shows good correlation between the mean SERVQUAL service gap (Q) scores and overall service quality scores. Furthermore the SERVQUAL results were found to have good internal consistency as measured by Cronbach's alpha coefficient (table 5.2). Factor analysis identified five factors as described by

Parasuraman et al (1988). The tangibles and reliability dimensions preserved the expected items (table 5.3), although remaining items associated with assurance, empathy and responsiveness were spread across two components. Smith (2012) also identified overlap between these three dimensions. Parasuraman et al (1994) considered that these dimensions (assurance, empathy and responsiveness) could form a single factor and Robledo (2001) described this as 'customer care'. Component five (table 5.3) mostly loaded on item one and ten of the 22-item SERVQUAL questionnaire and related to questions regarding 'up-to-date equipment' and informing the customer 'exactly when services will be performed'. This may have occurred due to subjects associating 'up-to-date equipment' with practice management software and recall/reminder systems rather than clinical equipment.

This study consisted of a relatively small sample of 61 total participants, rendering low statistical power of 21%. Therefore this study should be considered as a pilot study. Although a post-hoc analysis shows that this study had an effect size of 0.22 and so would consider a difference of 0.22 as significant.

There were no differences in expectations, perceptions or overall service gap Q scores between Group X and Y. This implies that the price of private optometric services do not influence a consumer's expectations or perceptions of service quality. Therefore a price-quality relationship does not exist for high street optometric services. A generalised price-quality relationship in other service and products categories also remains inconclusive and can vary between providers, consumers and categories (Zeithaml, 1988; Lichtenstein & Burton 1989; Chen et al. 1994). It is thought that consumers only tend to use price as an indicator of performance expectations when they are unsure of what level of performance to expect (Grewel, Rao and Monroe, 1988, 1989; Dodds, Monroe and Grewal, 1991).

The majority of participants in Group X and Y were existing patients at BBR Optometry Ltd (figure 5.5). It could be argued that these participants were able to form performance expectations based on their previous experience rather than relying on price. Therefore expectations of service quality were unchanged before and after the price increase. Existing patients may also be aware that BBR Optometry Ltd tends to set higher fees compared to the average high street optometric practice. The average private eye examination fee in the UK is £26.00

(Optical Confederation, 2015), whereas the private eye examination fee at BBR Optometry is £54, increasing to £59 during the study period. It is thought that consumers display repeat purchase patterns when the price of a service or product is perceived as reasonable (Bei and Chiao, 2001). Therefore existing patients, who return for eye examinations at BBR Optometry, may perceive the price as reasonable despite it being higher than the UK average.

The service quality perception scores were significantly greater than expectation scores for both groups. Therefore participants' expectations of service quality were exceeded in Group X and Y. Voss et al (1998) suggested that this tends to occur when the price of the service and performance of the service are consistent. Hence, although BBR Optometry Ltd's prices for private optometric services are greater than the UK average (Optical Confederation, 2015), the price is perceived as being consistent with the performance of service offered. BBR Optometry Ltd differentiates from local competition by offering high levels of customer service and advanced technology to assess and manage eye conditions. These investments have been funded by higher prices for private optometric services. Therefore it could be hypothesised that patients recognise the additional value of the service and therefore associate it with a higher price. Furthermore high prices can act as an incentive for the company to maintain high levels of performance (Whitney et al, 1997). Voss et al (1998) described that when price and performance are inconsistent, for instance high price-low service quality or low price-high service quality, there is no difference between expectation or perception scores of service quality.

High levels of perceived service quality and service value often leads to customer satisfaction and loyalty (Cronin et al, 2000). Study participants actively recommended BBR Optometry Ltd to friends and family and therefore displayed high customer satisfaction. Homburg et al (2005) suggested that highly satisfied customers are usually willing to pay more for services and products. Furthermore the negative impact of price increases is weaker for highly satisfied customers (Homburg et al, 2005). Hence customer satisfaction may be a factor as to why this study found no relationship between price and service quality of high street optometric services. Homburg et al (2005) inferred that customer satisfaction could influence a business' pricing strategy. For instance if the majority of a company's customers are highly satisfied, this may allow the company to charge higher prices in general.

This study also evaluated the impact of a premium fee for appointments with the senior optometrist. There was no difference in expectations, perceptions and overall service gap Q score for patients paying a premium fee compared to those paying the standard fee. Therefore this study implies that patients are prepared to pay a higher fee to see a more experienced practitioner. Whitney et al (1997) found that price of dental services was associated with quality of care delivered and vice versa. Perhaps patients in the current study associated experience with higher quality of care and thus agreed to pay greater professional fees to see a more experienced optometrist. The senior optometrist also had higher qualifications, which may be an additional factor. In other product categories the overall quality may be judged by brand name rather than price (Gardner, 1971). In this study the senior optometrist was the most established practitioner, and therefore perhaps developed a type of brand name or reputation. Hence the optometrist's name becomes a cue for service quality rather than price.

5.5 Conclusions

This pilot study found no relationship between price and service quality of high street optometric services. However, this particular practice charges above average prices, and patients appear to agree with the higher prices. This study implies that patients value a practitioner's experience and qualifications and are therefore prepared to pay higher prices for senior and higher qualified optometrists. There are also other factors to consider such as a patient's previous experience, customer satisfaction and practice performance levels. This study describes an insight into patients' reactions towards the price of high street optometric services and indicates that the profession tends to overestimate any negative impact of price increases. However there is much more to explore within this topic. For instance are patients aware of prices and do patients comprehend the variability in service quality for high street optometric services. Furthermore it would be beneficial to explore what patients value as part of a private eye examination e.g. practitioner experience, expertise, advanced technology, discounts and offers, appointment duration, time keeping, diary flexibility, or service quality. This study comprised of a small sample of participants whom on the whole were accustomed to paying above average prices for eye examinations. Therefore the relatively small increase in price may not have been sufficient enough to trigger a reaction. A further study could investigate larger increments in price increases, and amongst different cohorts of customers.

Chapter 6: The impact of monthly payment plans on the high street optometric business model

6.1 Introduction

Chapters 2 and 3 suggest that an alternative business model is required to evolve high street optometric practice from a loss leading business model into a model that provides self-sustainable clinical services. In Chapter 4 it was shown that operational efficiency and cost reduction can improve profits. The notion of raising professional fees to improve profitability was investigated in Chapter 5. However, the insufficient remuneration received for GOS sight tests remains a barrier to this goal. Shickle et al (2015) illustrated that a practice providing only GOS sight tests, and no private services or retail of optical products, would struggle to break-even, let alone produce profits. The study suggests that a "subsidy towards cost of accommodation or staffing, or a higher eye examination fee would be needed to deliver a realistically financially viable eye examination service" (Shickle et al, 2015). Professional fees set for private eye examinations are more flexible as practitioners themselves define them. Despite this the average private eye examination fee is £26.00 (Optical Confederation, 2015) and is not substantially greater than the remuneration for GOS sight tests. The cost of providing a GOS sight test or eye examination, considering the average time spent conducting one is around 25.8 minutes (Dutton, 2010), equates to around £45.00 – this figure has been derived based on data from BBR Optometry Ltd as presented in Chapter 3. Therefore a significant rise in the average private eye examination fee is required to enable private clinical services to be self-sustainable. Although, a more significant rise may be required for comprehensive eye examinations and specialist services that may have longer appointment durations.

The study in Chapter 5 illustrated that patients attending high street optometric practice are prepared to pay higher professional fees for consultations with more experienced or higher qualified clinicians. However, it is uncertain whether patients would be prepared to pay higher fees in general. Shickle and Griffin (2014) noted that many patients presently view high street optometric practices as "expensive places". Although it was also noted that "the offer of a free eye examination was worthless if the individual had to then pay for an expensive pair of spectacles" (Shickle and Griffin, 2014). Therefore perhaps patients would welcome an alternative business model in high street optometric practice. Furthermore, recent market research by GfK indicates that patients are now tending to opt for higher

priced optical products (Hale, 2014). These include designer spectacle frames, daily disposable and silicone hydrogel contact lenses, which mostly carry a price premium. Hence patient spending trends within optics and optometry are changing. Therefore perhaps patients would accept greater professional fees for a comprehensive premium eye examination service.

As illustrated in Chapter 3, a stark increase in professional fees is required to render some clinical services self-sustainable. Many practitioners and practice managers in the UK are hesitant to increase professional fees for private services (Calver, 2010). This is most likely due to the highly competitive environment and fear of losing customers to local competition. However, a large professional fee could be broken down into several monthly instalments to ensure services are affordable to patients.

6.1.1 Monthly payment plans

Eye care monthly payment plans offer optical products and clinical services to patients whereby fees are paid via a fixed monthly direct debit. The monthly payment plan is often a contractual agreement. Almost all optometric practices in the UK offer regular payment plans (via direct debit or standing order payments) as a mode of payment for optical products such as contact lenses or spectacles (Optician, 2012). However, only around 52% of practices offer monthly payment plans for private eye examination and contact lens services (Optician, 2012). The level of service can vary from providing a bi-annual or annual eye examination, to even unlimited consultations. The level of service may also vary according to the scope of additional assessments included e.g. digital retinal photography. Hence, these schemes can be tailored to the needs of the practice and particular patient cohorts. For instance many practices will offer a different monthly payment plan scheme to spectacle-only patients compared to contact lens wearers.

Monthly payment plans allow practices to charge realistic professional fees for private clinical services. The greater fee is intended to account for all service delivery costs and results in reduced reliance on cross subsidy with optical products, such as spectacles (Russ, 2008). This subsequently enables the practice to offer generous discounts on optical products to monthly payment plan ‘members’, often around 20% - 30% (Russ, 2008). The greater the discount the more attractive the scheme will appear to patients, particularly to those more likely to invest in higher priced products such as high index spectacle lenses and

progressive addition lenses. Furthermore the discount is thought to entice patients into purchasing spectacles more frequently than usual (Russ, 2008) and therefore further enhancing product sales.

Monthly payment plans offer a number of additional benefits to the business. For instance monthly payment plans ensure a better cash flow and timely collection of payments (Optician, 2011). In addition monthly payment plans may help reduce patient drop-outs and encourage greater loyalty (Optician, 2012). The study conducted by CooperVision shows that on average, around 72% of patients kept their direct debit/standing order running for longer than three years (Optician, 2012). Monthly payment plans also offer an opportunity to retain patients. For instance a patient wishing to receive optometric services or optical products elsewhere must first contact the practice to cease their monthly payment plan contract. This provides an opportunity for the practice to actively discuss the situation with the patient and encourage them to remain a customer. The study by CooperVision found that 63% of practices not offering a monthly payment plan took no action when a patient dropped out of contact lens wear (Optician, 2012). However this was much lower, only 29%, for practices offering monthly payment plans.

An additional advantage of monthly payment plans is that the scheme can be inclusive of supplementary diagnostic tests and assessments such as retinal photography. This may relieve ‘sales pressure’ from support staff and optometrists, as monthly payment plan patients may automatically receive additional assessments and upgrades. It may also make purchasing advanced optical equipment more viable for practices, as an additional pricing structure would not be required. The cost of new optical equipment could be absorbed within the monthly payment plan fee, particularly if the scheme grows a significant number of loyal members. Furthermore, the notion that monthly payment plans enable clinical services to be self-sustainable may relieve commercial pressure for high street optometric practices to attain high spectacle conversion rates. Eye examinations and sights tests are exempt from Value Added Tax (VAT) whilst spectacles and contact lenses are partially exempt as they have a retail and professional fee element. If there is a higher proportion of the total income derived from monthly payment plans the proportion of VAT in the final product is less.

6.1.2 Aims

There is a need to develop the traditional loss leading business model and charge more realistic professional fees for high street optometric services. This requires a significant rise in current professional fees. However, suddenly charging large sums for services may deter patients and may negatively impact the business. An alternative is to break down the fee into monthly direct debit instalments. This is common for a number of household services including Internet and phone supply and other expensive services including vehicle servicing. It is also common in some predominantly private healthcare professions such as dentistry, where commercial systems such as Denplan predominate.

Monthly payment plans are presently offered at high street optometric practices across the UK (Optician, 2012), although popularity of monthly payment plans for clinical services is fewer. This could be due to uncertainty of the true impact of monthly payment plans on high street optometric practice business models. To the author's knowledge the financial viability of monthly payment plans in high street optometric practice has not been presented in peer-reviewed literature. However, monthly payment plans could provide a solution to ensuring clinical services are self-sustainable and remain affordable to patients. This study aims to assess the impact of monthly payment plans on high street optometric practice business models, particularly in contrast to the traditional loss-leading model. This study will focus on whether monthly payment plans offer an alternative strategy to loss leading and whether discount incentives truly impact product sales.

6.2 Methods

BBR Optometry Ltd offers a monthly payment plan, called Eyelife^{TM}. Eyelife^{TM} allows patients to arrange monthly direct debit payments for professional care. The professional care package includes annual eye examinations, emergency appointments and additional assessments such as follow-up and dry eye assessments. The care plan also includes supplementary tests such as fundus photography, optical coherence tomography and corneal topography. For contact lens wearers the scheme incorporates contact lens aftercare and contact lens refitting appointments. The monthly fee is greater for contact lens wearers due to the likelihood of more frequent consultations.

Eyelife^{TM} entitles the patient to an unlimited number of appointments, and so if desired patients might be reviewed sooner than their usual recall. Furthermore

contact lens patients can combine Eyelife^{TM} with any contact lens product. BBR Optometry Ltd encourages patients to join Eyelife^{TM} by offering discounts on spectacles, sunglasses and contact lenses. Eyelife^{TM} has a minimum term of 18-months and discounts apply to products bought throughout the time of being an Eyeife^{TM} member. The scheme exists as three tiers (Elite, Select and Optimum), all of which have varying monthly fees and entitles different levels of discounts on products (table 6.1). Eyelife^{TM} Elite is the most popular likely due to the greater discounts available. In addition patients receive 50% discount on repairs and replacement optical products. Patients that are not on the Eyelife^{TM} monthly payment plan are also able to receive the same level of care and products but pay fees at point of sale.

Monthly Payment Plan	Monthly Direct Debit	Spectacle Discount	Sunglasses Discount
Eyelife^{TM} Optimum	**£7.95**	**20%**	**20%**
Eyelife^{TM} Select	**£9.95**	**25%**	**25%**
Eyelife^{TM} Elite	**£12.50**	**35%**	**35%**

Table 6.1 A summary of monthly payment plans offered to spectacle only wearers at BBR Optometry Ltd

This study was a retrospective audit of spectacle only wearers attending private eye examination services at BBR Optometry Ltd. A comparison of Eyelife^{TM} Elite members to non-members was conducted to assess the financial viability of monthly payment plans. Only subjects aged 19 to 70 and who had attended an 'initial' eye examination appointment from June 2010 to December 2010 were eligible for this study. For the Eyelife^{TM} group, the 'initial' eye examination was considered as the eye examination immediately prior to joining Eyelife^{TM} Elite. For the non-member group the 'initial' appointment consisted of an extended eye examination or private eye examination during the study period. Additionally for inclusion in this study the non-member subjects had to have a pair of spectacles dispensed following their 'initial' appointment. The Eyelife^{TM} membership scheme is often offered to patients following a spectacle dispense, such that the patient can instantly benefit from the product discounts proposed. Therefore it is vital to compare Eyelife^{TM} members to non-members whom also purchased spectacles at BBR Optometry Ltd following an eye examination. Exclusion criteria was the same for both cohorts: diagnosis of glaucoma or diabetes mellitus, family history of

glaucoma or current contact lens wearer, as these factors often influence the frequency of optometric consultations.

Data was collected over an 18-month period (from the initial appointment date) for each subject. An eighteen-month duration was chosen, as this is simply the minimum term for the Eyelife™ contract. Data was extracted from electronic records available at the practice site. The number of appointments, fees received for clinical services, number of spectacle dispenses, total spectacle sales and average dispense values (before and after any discounts) were recorded for each subject. This information provided clinical service and spectacle dispense revenue for each subject. The clinical service and spectacle dispense costs and profits were calculated using data presented in Chapter 3. Therefore in this study the cost for a 40 and 20-minute appointment was estimated as £77.63 and £38.81 (financial year 2011/12), respectively. The cost endured per spectacle dispense was estimated as the retail costs associated with spectacle dispenses (£455K, as defined in Chapter 3 for financial year 2011/12) divided by the estimated annual number of spectacle dispenses (2265, as shown in Chapter 2). Therefore the cost per spectacle dispense was around £201.05. It was assumed that costs remained constant during the 18-month study period.

Data was tabulated using Microsoft® Excel® (Microsoft Corporation, Redmond, Washington, USA) and statistically analysed using IBM® SPSS® Statistics 22 (IBM Corporation, Armonk, New York, USA). Distribution normality was established for each data set using a Shapiro-Wilk test. Statistical comparisons between Eyelife™ members and non-members were conducted using Mann-Whitney U test and Independent T-test accordingly. This study considered a P-value less than 0.05 as statistically significant. Ethical approval for this retrospective audit was sought and granted by Aston University Ethics Committee.

6.3 Results

There were 54 Eyelife™ Elite members and 101 non-members eligible for this study. The Eyelife™ group consisted of 22 males and 32 females, whereas the non-member group comprised of 31 males and 70 females. The mean age was 60.0 ± 9.6 and 57.2 ± 10.5 years of age (P=0.093), for the Eyelife™ and non-member group respectively. The age range was 21 to 70 for both groups. Eyelife™ and non-member subjects were long-term patients at BBR Optometry Ltd, having on average first joined the practice in 2004 and 2001, respectively.

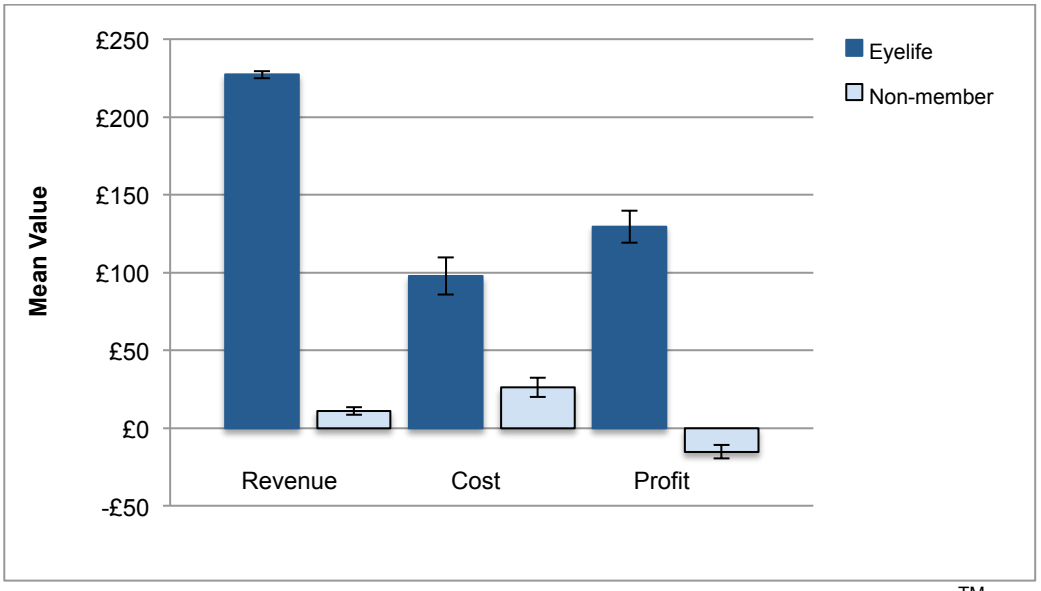


Figure 6.1 Mean clinical revenue, cost and profit generated by the Eyelife™ and non-member group

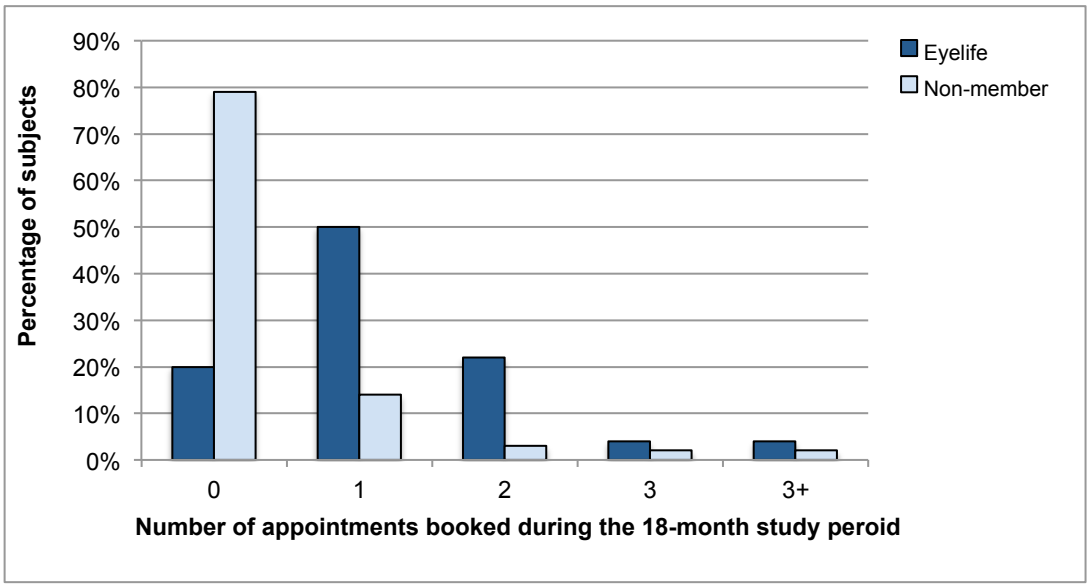


Figure 6.2 A bar chart to show the number of appointments booked by subjects of both groups during the study period

Eyelife™ members generated an average of £227.26 ± £17.50 of clinical revenue during the 18-month period (figure 6.1). This was significantly greater (P<0.001) than the non-member group, which generated mean clinical revenue of £10.99 ± £23.72 (figure 6.1). Figure 6.1 also shows that the Eyelife™ group incurred significantly higher clinical costs (P<0.001). This was likely due to the greater number of consultations attended by the Eyelife™ group, as shown in figure 6.2. The majority of the Eyelife™ group (80%) attended at least 1 consultation during

the 18-month study (figure 6.2). While very few subjects, around 21%, from the non-member group attended any appointments (figure 6.2). The mean number of consultations attended by the Eyelife^{TM} group was 1.26 ± 1.14, and was significantly greater (P<0.001) compared to 0.34 ± 0.80 for the non-member group. Despite sustaining a significantly greater mean clinical cost, the Eyelife^{TM} group generated significantly greater (P<0.001) clinical profit of £129.50 ± £76.59 (figure 6.1). Whereas, the non-member group generated an average net loss for clinical services of -£15.14 ± £43.76 (figure 6.1). This illustrates the loss leading nature of the traditional optometric business model.

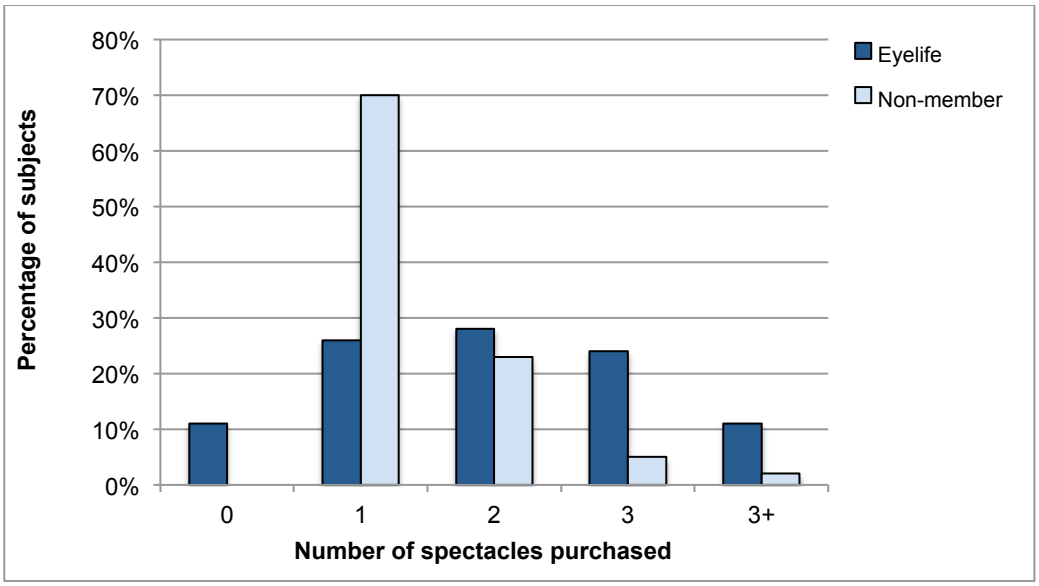


Figure 6.3 A bar chart to illustrate the number of spectacles dispensed to subjects of both groups during the 18-month study period

Figure 6.3 shows that the majority, 70%, of non-member subjects purchased a single pair of spectacles during the study period. Whereas subjects of the Eyelife^{TM} group tended to purchase a greater quantity of spectacles, with the majority (28%) purchasing two pairs during the study (figure 6.3). The mean number of spectacles purchased was 2.02 ± 1.27 and 1.39 ± 0.68 for the Eyelife^{TM} and non-member group respectively. A Mann Whitney U-test revealed that the mean number of spectacles purchased by the Eyelife^{TM} group was significantly larger (P<0.001).

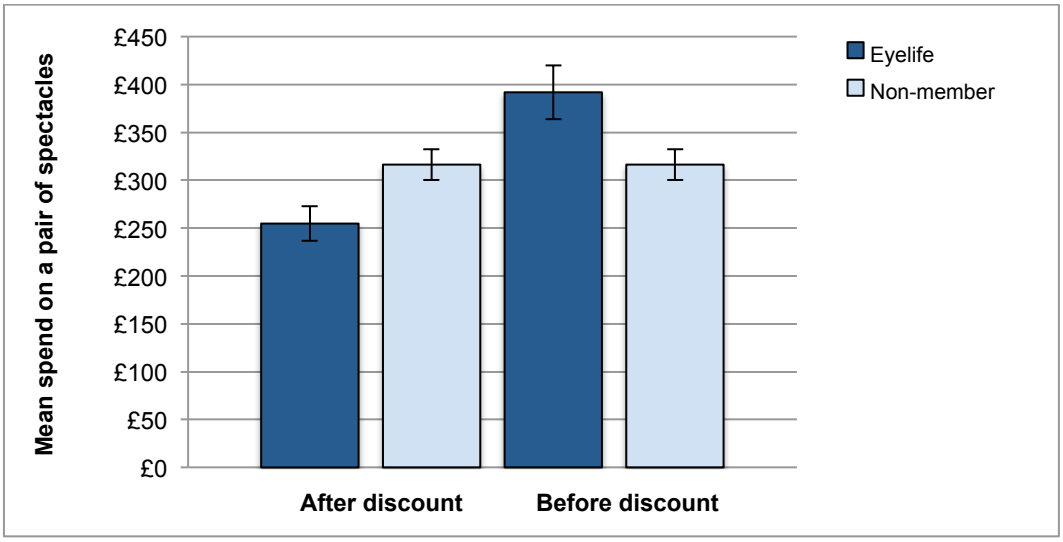


Figure 6.4 The mean spectacle dispense value after and before any discounts. The Eyelife™ group received a 35% discount on spectacles as part of their monthly payment plan. The non-member group did not receive any discounts on optical products.

Figure 6.4 illustrates the average spend per spectacle dispense by both groups. The mean spend (after any discounts) was £254.71 ± £134.29 and £316.10 ± £162.42 for the Eyelife™ and non-member group respectively, and were not found to be statistically different (P=0.062). However, the study also assessed the mean spend per spectacle dispense prior to any discounts. This was undertaken to analyse whether discounts offered via monthly payment plans encouraged patients to upgrade their optical products. Figure 6.4 shows the mean spend on spectacles (before discount) for the Eyelife™ group was £391.86 ± £206.58 compared to £316.10 ± £162.42 for non-members. A Mann Whitney U-test showed that the mean spend prior to discount was statistically significantly greater for the Eyelife™ group (P=0.008).

Eyelife™ members, on average, generated significantly greater (P=0.028) spectacle dispense revenue (figure 6.5) of £519.31 ± £300.54 compared to £424.29 ± £263.74 for non-members. Eyelife™ members also incurred greater costs (P<0.001) associated with spectacle dispenses (figure 6.5). Mean spectacle dispense profit was found to be £113.49 ± £164.97 and £145.60 ± £217.28 for the Eyelife™ and non-member group, respectively. An independent samples t-test was used to assess if there was a significant difference in spectacle dispense profit between the two groups. The mean spectacle dispense profit between the

Eyelife™ and non-member group was not found to be statistically significantly different (P=0.305).

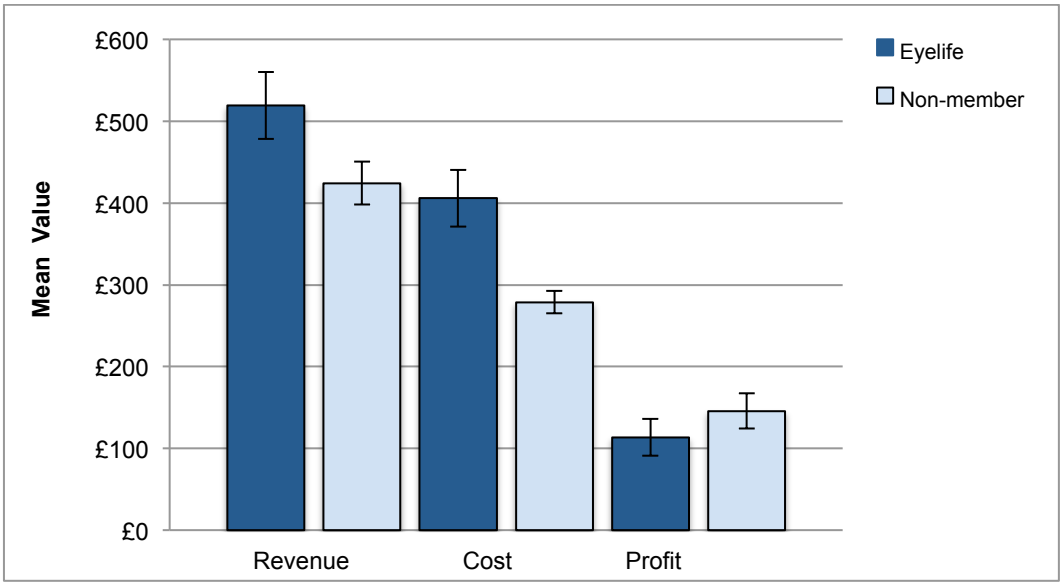


Figure 6.5 Mean spectacle dispense revenue, cost and profit generated during the 18-month study period

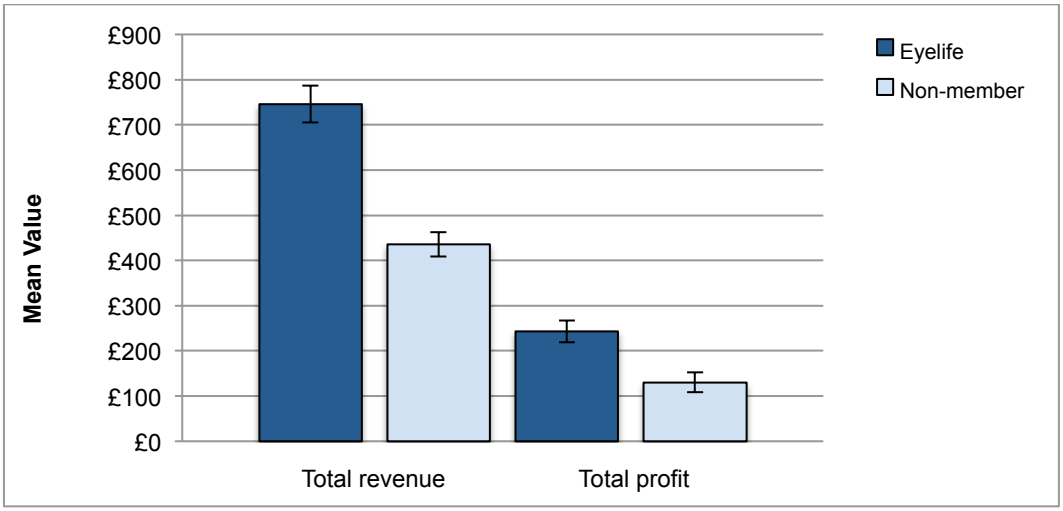


Figure 6.6 Total revenue and total profit created by the Eyelife™ and non-member group

Figure 6.6 shows the overall revenue and profit generated by both study groups. The total revenue generated by the Eyelife™ group was £746.57 ± £301.87, and was significantly greater (P<0.001) than total revenue generated by the non-member group (£435.27 ± £268.89). Furthermore an independent samples t-test shows that the Eyelife™ group generated significantly higher overall profit

(P=0.002). Total profit generated was £242.99 ± £178.01 and £130.46 ± £226.37 for the Eyelife™ and non-member group, respectively.

6.4 Discussions

This study aimed to establish if monthly payment plans offered a worthy alternative to the traditional loss leading business model. Furthermore this study assessed whether discounts offered via monthly payment plans truly boost spectacle sales by both volume and value.

6.4.1 Clinical service sales

This study shows that monthly payment plan patients generate vastly greater clinical service revenue and profits compared to the traditional model. Figure 6.1 shows that the monthly payment plan differs from the 'non-member' traditional loss-leading model. Clinical revenue generated via the Eyelife™ plan was able to cover all costs associated with service delivery and render a net mean profit. This study therefore supports the perception that monthly payment plans offer an alternative business model for high street optometric practice. This study illustrates that the monthly payment plan model enables optometric professional services to be self-sustainable without cross subsidy with optical product sales. Hence this alternative model is likely to be less susceptible to commercial pressures encountered in high street optometric practice. For instance when patients attending an eye examination require no change in optical correction or choose to dispense elsewhere.

The mean net clinical service revenue for the non-member group was £10.99 ± £23.72. This is much lower than the UK average professional fee for private eye examinations, which is £26.00 (Optical Confederation, 2015). This was surprising considering that BBR Optometry Ltd's professional fees are generally greater than the UK average (see Chapter 3). This finding was likely attributed to the lower uptake of professional services by the non-member group (figure 6.2), with 70% of non-member subjects having attended no eye examination appointments during the study period. This was recorded as £0.00 clinical service revenue and hence deflated the mean revenue for the group. This reflects that clinical service revenue generated via the traditional business model is highly dependent on actual appointment bookings. Whereas the monthly payment plan offers a steady clinical revenue stream regardless of the number of appointments booked. This is

advantageous for cash flow purposes and in scenarios of reduced service uptake, for instance in poor weather conditions.

The Eyelife^{TM} group displayed a significantly greater number of consultation bookings, with 80% of subjects booking at least one appointment during the 18-month period. These findings support the suggestion that monthly payment plans 'bring patients back into the practice more regularly' (Optician, 2011a). The Eyelife^{TM} scheme encourages annual eye examinations compared to the traditional bi-annual recall. This may account for the perceived reduced appointment bookings by the non-member group, whom likely had bi-annual recalls. Therefore perhaps the results simply reflect the subject's responses to routine recalls and reminders. Those non-member subjects that had attended an eye examination during the 18-month study period may have encountered concerns regarding their ocular health or vision triggering an earlier consultation. Unfortunately the reason for attending an appointment was not recorded in this study. A recent report implied that around 25% of patients only booked an eye examination when they were concerned about their vision or ocular health (Optometry Today, 2015). Monthly payment plans may encourage such patients to have regular eye examinations regardless of encountering problems. Furthermore it was noted that the majority of the public would visit their General Practitioner regarding eye health problems rather than an optometrist (Optometry Today, 2015). More regular eye examinations via monthly payment plans may enhance the role of optometrists in managing common ocular complaints.

Other factors influencing the frequency of eye examination bookings must also be considered. For instance a patient is more likely to encounter ocular health and vision concerns with age. However, the subjects mean age was found to be statistically similar between the Eyelife^{TM} and non-member groups. The study excluded patients with a family history of glaucoma and those diagnosed with glaucoma or diabetes mellitus. However, there is an array of ocular conditions that may trigger patients to attend eye examinations more frequently, such as being diagnosed with age-related macular degeneration or a corneal dystrophy. Therefore perhaps patients with such concerns self selected to join the Eyelife^{TM} monthly payment plan knowing that the scheme offered an unlimited number of consultations.

6.4.2 Spectacle dispenses

The majority (70%) of non-member subjects purchased a single pair of spectacles during the audit. Around 30% of non-members purchased more than one pair. However, spectacle purchase trends were different amongst Eyelife™ members, with the majority (63%) purchasing more than one pair. Twenty-six per cent of Eyelife™ members only purchased one pair of spectacles. This illustrates that monthly payment plans encourage patients to purchase spectacles more frequently as described by Russ (2008). This finding may be due to monthly payment plan members attending more consultations. Hence increasing the opportunity to discuss visual needs and offer additional pairs of spectacles. However, Russ (2008) suggested that monthly payment plans offering annual eye examinations will tend to render a lower than average spectacle conversion rate. Whereas plans offering bi-annual eye examinations will produce a greater spectacle dispense conversion rate (Russ, 2008). This study disagrees as Eyelife™ members, typically attending annual eye examinations, had a significantly greater mean spectacle dispense rate compared to the non-member group.

The study reported in Chapter 2 found that spectacle conversion rate was associated with patient gender. More specifically that females tended to have a higher conversion rate. However, in this study the non-member group had a greater ratio of females to males and had a significantly lower mean spectacle dispense rate. A fraction of Eyelife™ members (11%) did not produce any spectacles during the 18-month audit. This highlights that incentives, other than optical product discounts, attract patients to joining monthly payment plans. This study did not assess the reason(s) for becoming an Eyelife™ member or choosing not to join the scheme. However, perhaps those Eyelife™ members had concerns and preferred the notion of unlimited comprehensive eye examinations as discussed in paragraph 6.4.1.

6.4.3 Average spend on spectacles

The average spend on spectacles was similar between the two groups. Eyelife™ members received a 35% discount on spectacles as part of the monthly payment plan. The initial spend on spectacles by Eyelife™ members, before discount, was found to be statistically greater than the average spend on spectacles by non-members. This implies that the discount incentive encourages Eyelife™ members to upgrade to higher priced products. Contradictorily, Russ (2008) implied that the discount only encourages patients to purchase a greater volume of spectacles

rather than a greater spend per dispense. However, dispensing opticians and optometrists may overestimate the importance of price to patients and may not actively offer upgrades or the full range of products (Fylan et al, 2005). It is feasible that knowing the patient will receive a discount encourages practitioners to offer a full range of products and options. Likewise this analogy can be applied to study subjects. Hence it is possible that Eyelife™ members, knowing they would receive a discount, requested higher priced products.

This study suggests that Eyelife™ members tend to purchase higher value spectacles. This may be due to the discounts offered to Eyelife™ members. However it may also be associated with the subjects spending habits. Perhaps those subjects typically spend more on spectacles and now enjoy a 35% discount by joining Eyelife™. Therefore it is possible that subjects self-selected to join the scheme and take advantage of the generous discounts, rather than the scheme encouraging greater spend. The average spend per spectacle dispense was reviewed to establish whether monthly payment plans alter the spending habits of members. The mean spend per spectacle dispense was found to be £253.94 ± £165.82 for Eyelife™ subjects (before joining Eyelife™). A paired-samples t test shows that the average spend on spectacles after joining Eyelife™, £391.86 ± £206.58, was significantly greater ($P<0.001$) than the average spend prior to joining the scheme. Therefore this study shows that monthly payment plans do encourage patients to upgrade to higher value products.

The average spend per spectacle dispense (after discount) was greater than £250 for both groups. The mean spend on spectacles has been reported to be around £155 over two years (Optician, 2011a). The present study illustrated a greater mean spend, which was more in tune with that expressed by Atkins et al (2009). The study by Atkins et al (2009) consisted of patients attending private eye examination services (determined by the mean age of study groups) as did this study. Furthermore, the study presented in Chapter 2 showed that patients attending private eye examinations at BBR Optometry Ltd typically spend over £300 per spectacle dispense. This is comparable to the average spend (before discount) presented in this study and therefore implies that subjects of this study displayed typical spending trends.

The greater volume of spectacle dispenses and higher mean spend illustrated by Eyelife™ members may also have been attributed to other factors. For instance Atkins et al (2009) and the study presented in Chapter 2 suggest older age is

associated with a higher average spend per dispense. This is likely due the greater visual demands of presbyopic patients. However, there was no statistically significant difference in mean age of subjects in the two groups. Furthermore, the study presented in Chapter 2 suggests that females generally purchase higher value spectacles compared to males. This study shows the Eyelife^{TM} group to have a greater average spend yet has a lower percentage of female subjects, 59% compared to 69% for the non-member group. Therefore it is unlikely that gender was an influencing factor for mean spend per spectacle dispense. Other factors influencing the mean spend per dispense include wealth and social status. Unfortunately those aspects of patient demographics were not recorded.

Refractive error is also a possible factor. It could be argued that subjects with higher or complex refractive errors are more reliant on spectacles. Hence, such subjects may be inclined to purchase spare pairs of spectacles or even prescription sunglasses and sports eyewear. Additionally those with high or complex refractive errors may be inclined to invest in upgrades on optical products such as anti-reflection coatings and higher-index lenses. The refractive errors of study subjects was available and were therefore assessed. The best sphere (based on spectacle prescription issued at the 'initial' appointment) was calculated for the right and left eye and then averaged to provide a single result for each subject. The results excluded direction of refractive error (i.e. myopic or hypermetropic) and were treated as magnitude of best sphere refractive error. The mean best sphere for Eyelife^{TM} members was found to be significantly greater (P=0.019) than for non-members, 2.58 ± 2.38 and 1.81 ± 2.00 respectively. Therefore refractive error of study subjects may have influenced results of this study, particularly volume of spectacle sales and average spend. It is also possible that refractive error of patients encouraged self-selection onto the Eyelife^{TM} scheme. Patients with higher or more complex refractive errors are likely familiar with the associated costs of maintaining up-to-date optical correction and may greatly appreciate the discounts offered via Eyelife^{TM}.

Figure 6.5 illustrates that the Eyelife^{TM} group generated significantly greater revenue and costs associated with spectacle dispenses. It is probable that this result was due to the Eyelife^{TM} group tending to purchase a greater volume of spectacles rather than purchasing higher value spectacles. Hence this study agrees that monthly payment plans boost spectacle sales. However, the mean spectacle dispense profit generated by study subjects were similar between the

two groups. Therefore despite greater mean revenue, the inflated costs associated with a higher volume of spectacle dispenses impacted the net profit margin. This study indicates that monthly payment plans do not increase mean profit generated via spectacle dispensing compared to the traditional business model. In this study each individual spectacle dispense incurred a fixed cost as described in section 6.2 of this chapter. However, if patients were purchasing multiple pairs of spectacles at the same visit this would increase efficiency and reduce costs. Furthermore a less complex dispense may take less time and hence reduce costs e.g. single vision compared to varifocal dispense. Unfortunately this study was unable to record the dispense type and when spectacle dispenses took place, i.e. whether they were separate or grouped transactions.

6.4.4 Overall revenue and profits

The Eyelife^{TM} group produced significantly greater clinical and spectacle dispense revenue. Net clinical profit was greater for the Eyelife^{TM} group also. However, spectacle dispense profit was statistically similar between the Eyelife^{TM} and non-member group. The two income streams collated revealed that the Eyelife^{TM} group generated significantly greater overall revenue and profits per subject as shown in figure 6.6. Therefore this study concludes that monthly payment plans generate greater revenue and profits per patient compared to the traditional loss-leading business model.

6.4.5 Limitations

This study consisted of two groups with uneven subject numbers. The non-member group had almost double subject numbers compared to the Eyelife^{TM} group, which may have influenced the results. In addition a prior sample size calculation was not conducted due to lack of published data in this subject area. A post hoc statistical power calculation was conducted based on overall net profit results, as this variable determines both the viability of the business model and sales activity for both groups. The post hoc statistical power calculation of the presented sample size was 90%. Therefore despite an uneven sample size the study had high statistical power for rejecting the null hypothesis.

6.5 Conclusions

This study confirms that monthly payment plans encourage patients to purchase a greater number of spectacles and higher value spectacles. Also this study confirms

that monthly payments plans offer an alternative business model to loss leading. This is useful knowledge for practitioners and practice managers motivated to evolve their practices away from the traditional model. Perhaps in order to survive increased local competition and increased competition from Internet and supermarket suppliers. Furthermore the increased revenue and profits generated via monthly payment plans may inspire practitioners to invest in advanced optometric technologies such as ultra-wide field retinal imaging or optical coherence tomography. Also it may provide resources to fund further professional development such as therapeutic prescribing.

The business model illustrated by monthly payment plans appears to be self-sustainable without reliance on product sales. This leaves the business less susceptible when patients dispense elsewhere. Additionally monthly payment plans may increase patient retention (Russ, 2008) by introducing a 'switching barrier'. Patients must firstly contact the practice or their bank if they choose to cancel the monthly payment plan. This creates an initial barrier and so patients are more likely to continue at the current practice. This may be vital to retaining contact lens patients. A recent report suggested contact lens wearers are more likely than spectacle wearers to purchase products online (Optometry Today, 2015). The report stated that 21% of respondents claimed to purchase contact lenses online (Optometry Today, 2015). This poses a threat to high street optometric practices, to which monthly payment plans may offer a solution. The concept of contact lens wearers and loyalty via monthly payment plans is discussed further in Chapter 7.

Chapter 7: Customer loyalty among daily disposable contact lens wearers

7.1 Introduction

The UK contact lens market is a mature market, with only relatively small yearly increases in wearers (Keynote Limited, 2010). In total, there are around 3.7 million contact lens wearers in the UK (ACLM, 2013), which represents 7.7% of the adult population and approximately 12% of adults requiring a refractive correction. Contact lens sales form a significant portion of income, around 19% of the optical industry market share (Mintel Group Limited, 2015). Hence contact lens patients are valuable assets and it would be in the best interest for optometric practices to retain customers. There are concerns that contact lens wearers, more so than spectacle wearers, are more likely to purchase products online (Optometry Today, 2015). In Chapter 6 it was illustrated that monthly payment plans offer an alternative business model for eye examination services. Monthly payment plans also encourage patients to purchase products more frequently and upgrade products (Chapter 6). Therefore monthly payment plans may form a strategy to improving customer loyalty among contact lens wearers.

7.1.1 Internet supply of contact lenses

Changes to the Opticians Act made in 2005 allowed contact lenses to be supplied by other businesses, including supermarkets and Internet based companies. The Mintel Group Limited (2015) suggested that online retailers capture 3% of the optical goods market. A recent survey commissioned by the Association of Contact Lens Manufacturers (ACLM) suggested that 10% of contact lens wearers purchase contact lenses online, and a further 10% from supermarkets (Optician, 2013). Other non-UK based literature indicated that around 7% and up to 22.5% of contact lens wearers obtain their lenses from online sources (Fogel and Zidile, 2008; Wu et al, 2010; Dumbleton et al, 2013; Dumbleton et al, 2013a;). Online suppliers have the advantage of low operational costs and are subsequently able to offer competitive prices. Also contact lens wearers may prefer this mode of purchase, as it is more convenient. Despite this, the majority of contact lens wearers remain loyal to their eye care practitioners (ECP), with 66% to 70% of wearers purchasing lenses from their practitioner (Wu et al, 2010; Dumbleton et al, 2013).

There are growing concerns over contact lens wearers obtaining lenses from Internet suppliers. Dumbleton et al (2013) reported that wearers purchasing lenses

from their ECP display greater compliance in terms of replacement frequency and intervals between eye examinations than wearers purchasing lenses elsewhere. Furthermore, Wu et al (2010) revealed that wearers purchasing lenses from Internet suppliers are more likely to overlook aftercare visits. This cohort of patients has also been associated with a higher risk of developing serious complications, such as microbial keratitis (Stapleton et al, 2008). Internet supply of contact lenses also poses a threat to optometric practices. It directly impacts contact lens sales but also indirectly affects the awareness of the practice and brand by reducing footfall in the high street (Mintel Group Limited, 2013).

7.1.2 Customer loyalty

The number of customers that switch from one company/supplier to another in a given time period is referred to as the customer churn rate. Deregulation of the sale and supply of contact lenses has increased the number of suppliers and subsequently has made it easier for customers to 'shop around'. The contact lens market is therefore considered as mature in that there are many contact lens suppliers including Internet suppliers. As the contact lens market saturates further it is likely that the customer churn rate will increase, as observed in the mobile telecommunications sector (Kim et al, 2004). Hence, practitioners and practice managers must work harder to retain existing customers to secure their loyalty and compliance.

Improving customer loyalty and retaining existing customers has been well studied. Published literature reveals a common theme of two important factors to improving customer loyalty. Customer satisfaction is the strongest component to creating loyal customers (Jones et al, 2000). The study presented in Chapter 5 shows that patients attending BBR Optometry Ltd were overall extremely satisfied with the optometric services provided. Additionally patients attending BBR Optometry Ltd were loyal to the practice and actively recommended to friends and family (Chapter 5). The second component to improving customer loyalty is known as 'switching barriers' or 'switching costs'. Switching barriers are factors that make it difficult for customers to switch service provider (Jones et al, 2000) and includes financial, social and psychological costs or implications (Fornell, 1992). Therefore, a customer that is not completely satisfied with a product or service may still remain with the existing provider due to perceived switching barriers (Kim et al, 2004). These switching barriers can allow for minor fluctuations in service quality, which would otherwise result in customer defection (Jones et al, 2000). Jones et al (2000)

describes that customers only consider switching barriers when satisfaction falls below a critical level. Colgate et al (2007) also found that the majority of customers would choose to stay loyal to a service provider, despite thinking of changing, due the absence of a negative critical event occurring.

It is vital for optometric practices to deliver high levels of service quality in order to retain existing contact lens wearers, particularly since contact lens wearers generate greater profits than other patients (Ritson, 2006). A survey conducted by the London Business School revealed that contact lens patients generate greater profits in the long term compared to spectacle wearers, due to a constant need for contact lens supply rather than one isolated sale (Ritson, 2006). Optometric practices often offer incentives to customers, such as discounts, to improve customer loyalty. For instance some practices offer a discount when an annual supply of contact lenses is purchased at the time of the examination. Patients purchasing an annual supply of lenses have also been shown to display greater compliance with contact lens wear (Dumbleton et al, 2013). In the UK, it is more common practice to offer a similar incentive but with monthly payment plans. Monthly payment plans allow patients to pay for professional care and contact lens products on a monthly direct debit. Patients are contracted to purchase and receive a given amount of contact lenses, and again this is likely to improve compliance, particularly with replacement frequency, as the patient has no incentive to overuse lenses or solutions.

Monthly payment plans additionally permit a more realistic professional fee to be charged for professional care and so products can be offered at more competitive prices (Llewellyn, 2012). This was also illustrated in Chapter 6. Monthly payment plans have proven popular among patients in the UK, with 72% remaining on a direct debit plan after three years (Optician, 2012), although this may be related to perceived switching barriers since monthly payment plans are a contractual agreement. Also monthly payment plans can offer a ‘bundle’ of services and products. This can lead to price comparisons becoming less transparent and therefore reduce the likelihood of customers switching (Domagalski, 2000). However, Dumbleton et al (2013) described that only 43% of study subjects purchased the recommended annual supply of lenses and only 52% of UK optometric practices offer monthly payment plans to contact lens wearers (Optician, 2012). This suggests that practitioners and practice managers are reserved towards increasing patient loyalty through these methods and casts doubt

on the tangible benefits of monthly payment plans, such as increased sales and profit.

7.1.3 Aims

The contact lens market is becoming increasingly competitive and although only a relatively small number of contact lens wearers choose to purchase lenses online, a future threat to optometric practices remains. Twenty-six per cent of contact lens wearers have considered purchasing contact lenses online (Optician, 2013) and 41% of wearers have claimed they are likely to do so in the future, mostly due to cheaper prices (Optometry Today, 2013). Other factors contributing to contact lens wearers 'shopping around' include, location, practice opening hours, customer service and ease of ordering (Olivares, 2012). Daily disposable wearers are more likely (55%) than frequent replacement wearers (33%) to purchase contact lenses elsewhere, as are males compared to females, 57% and 32% respectively (Optician, 2013).

A gap exists in peer-reviewed literature on the topic of contact lenses and customer loyalty, with most information presenting in non-peer reviewed articles such as market research reports and industry magazine articles. Monthly payment plans are thought to anecdotally improve customer loyalty, although there is limited tangible evidence. This study aims to gain an insight into the tangible effects of monthly payment plans on customer loyalty among contact lens wearers. The key focus of this study will be loyalty, more specifically the uptake of professional services, sales of contact lenses and spectacles by volume and value

7.2 Methods

BBR Optometry Ltd offers a monthly payment plan, called Eyelife™ as described in Chapter 6 (section 6.2). Table 7.1 outlines the various tiers of Eyelife™ available to contact lens wearers and the associated discounts/incentives. For contact lens wearers there is an additional tier 'Eyelife™ Classic'.

A retrospective audit was conducted on daily disposable contact lens wearers at BBR Optometry Ltd. This study focused on daily disposable wearers as they have been shown to be more susceptible to Internet supply compared to other frequent replacement lenses (Ewbank, 2013). A comparison of Eyelife™ members with non-members was carried out to assess influences on patient loyalty. The number of appointments (contact lens aftercare, eye examination and combined aftercare and

eye examination), number of spectacle dispenses, average spectacle dispense value and contact lens sales (by volume and value) were recorded for both groups for a fixed 18 month period from June 2011 to November 2012. Revenue, costs and net profit were categorised as clinical service, spectacle or contact lens.

Monthly Payment Plan	Monthly Direct Debit	Spectacle Discount	Sunglasses Discount	Contact Lens Discount
Eyelife™ Classic	£8.00	20%	15%	16%
Eyelife™ Optimum	£9.95	20%	20%	16%
Eyelife™ Select	£11.85	25%	25%	16%
Eyelife™ Elite	£14.50	35%	35%	16%

Table 7.1 A summary of monthly payment plans offered to contact lens wearers at BBR Optometry Ltd

Subjects aged 19 to 69 and in full time daily disposable contact lens wear during a fixed period from June 2011 to November 2012 were included in the study. Eyelife™ patients were only included if membership was continuous during the 18-month audit period. Exclusion criteria were as follows: diagnosis of diabetes mellitus or glaucoma or a positive family history of glaucoma, as these factors can influence the interval between examinations.

Electronic records of daily disposable contact lens wearers were analysed at the practice site. All data collected was tabulated in Microsoft® Excel® (Microsoft Corporation, Redmond, Washington, USA). Statistical analysis was conducted using IBM® SPSS® Statistics 22 (IBM Corporation, Armonk, New York, USA) and Microsoft® Excel®. A Shapiro-Wilk test was conducted on all data sets to determine distribution normality. Statistical comparisons between Eyelife™ members and non-members were conducted using Mann-Whitney U test and Independent T-Test for non-parametric and parametric data sets respectively. A P-value less than 0.05 was considered significant. Aston University Ethics Committee provided ethical approval for this study.

7.3 Results

Two hundred and sixty-eight patients at BBR Optometry Ltd were identified as current daily disposable contact lens wearers, however only 86 were full time wearers and therefore met inclusion criteria for this study. A further 18 subjects were excluded as they were diagnosed with glaucoma or diabetes mellitus, or had

a positive family history of glaucoma. The audit comprised of 38 Eyelife™ members (11 male and 27 female) and 30 non-members (12 male and 18 female). The age ranged from 20 to 67 years for the Eyelife™ group and was 20 to 69 years for the non-members group; mean age (± SD) was 42.7 ± 15.0 years and 40.8 ± 16.7 years (P=0.771) for the Eyelife™ and non-member group respectively. Both groups consisted of long-term contact lens wearers, on average wearing lenses for 12.0 ± 5.5 years and 10.3 ± 4.3 years (P=1.231) for the Eyelife™ and non-member group respectively. The most recent lenses were fitted 8 years ago for the Eyelife™ group and 6 years ago for the non-members.

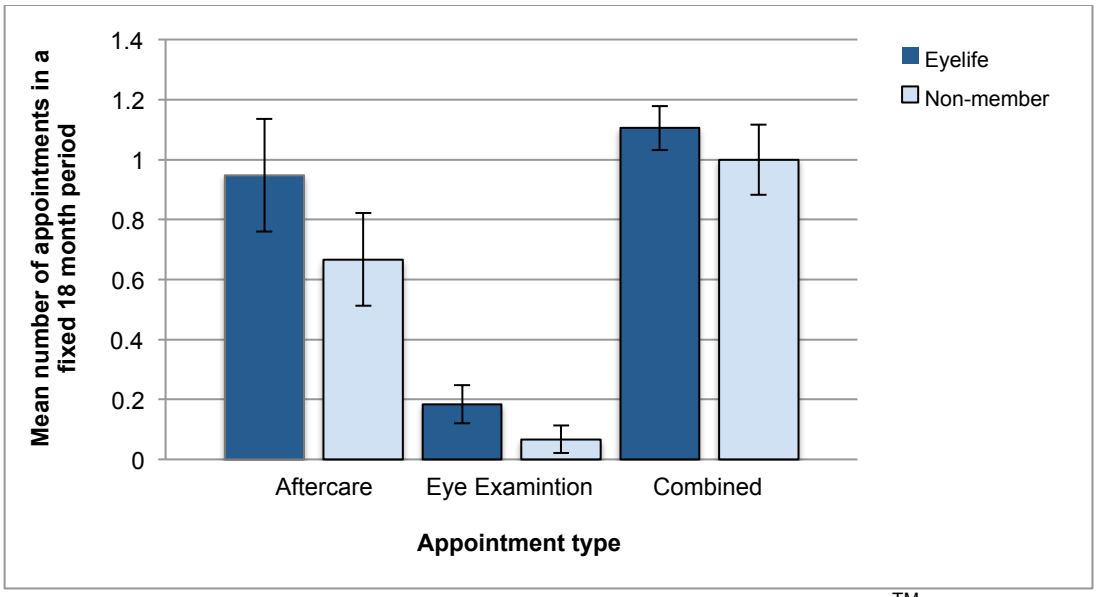


Figure 7.1 Mean number of appointments attended by the Eyelife™ group and non-member group during 18-months

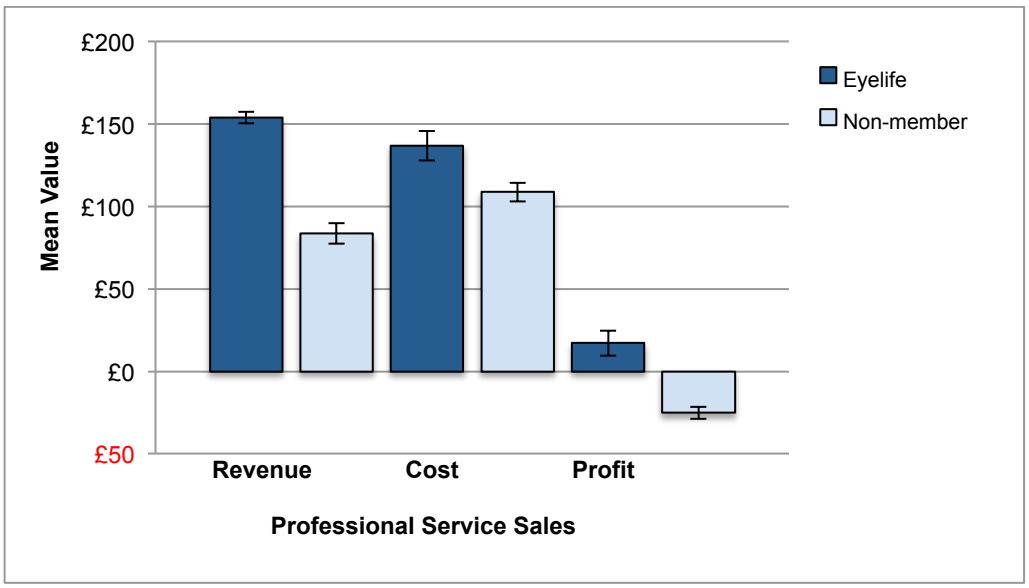


Figure 7.2 Mean revenue, cost and profit generated from clinical service sales

Figure 7.1 shows that Eyelife™ members have a greater uptake of eye examination services compared to non-members (P<0.001). However, there were no significant differences found in the number of aftercare (P=0.169) and combined appointments (P=0.459) between the two groups. Eyelife™ members appear to generate much higher clinical service revenue (P<0.001) and profit (P<0.001) compared to non-members (figure 7.2). Figure 7.2 shows that the non-member group generates a mean loss from clinical services sales (-£25.18 ± £19.79) compared to the Eyelife™ group, which generates a mean profit of £17.09 ± £47.22. The mean cost of providing clinical services was significantly greater for the Eyelife™ group (figure 7.2) at £136.87 ± £55.43 in contrast to £108.68 ± £31.25 for the non-member group (P=0.016).

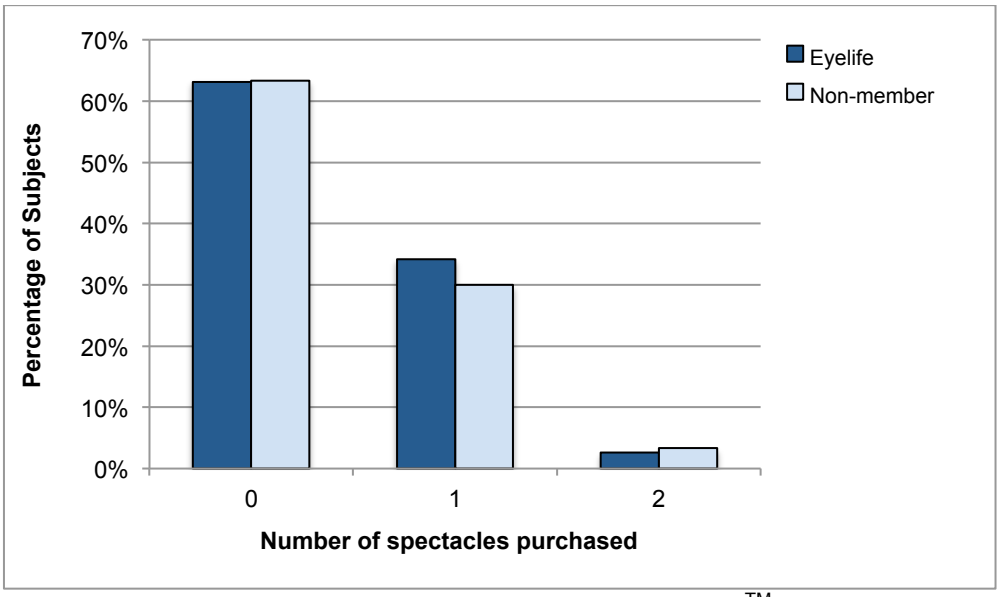


Figure 7.3 The number of spectacles purchased by Eyelife™ members and non-members during June 2011 to November 2012

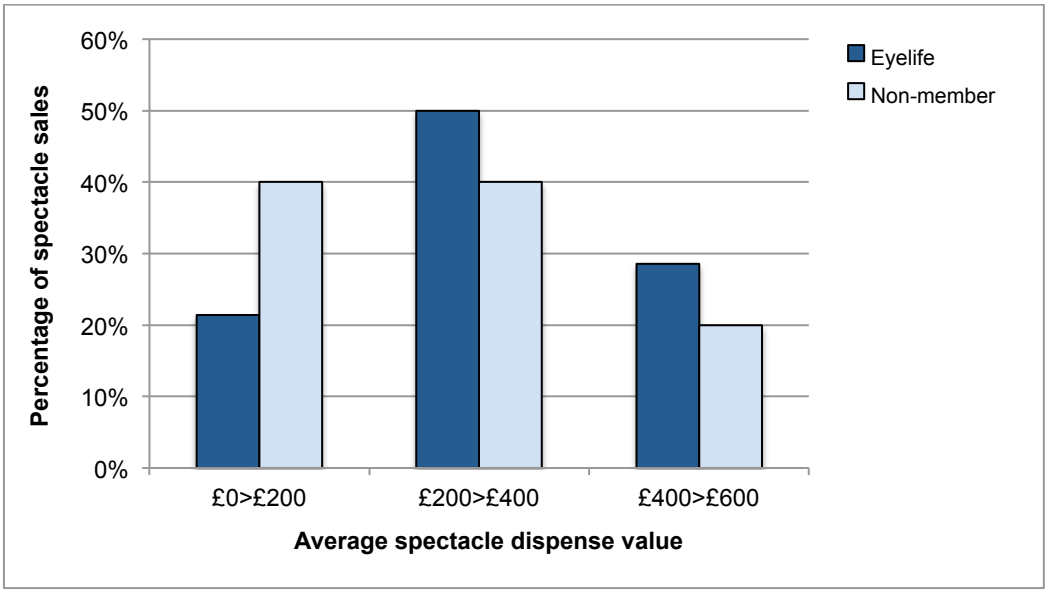


Figure 7.4 Mean value of spectacles purchased by both groups

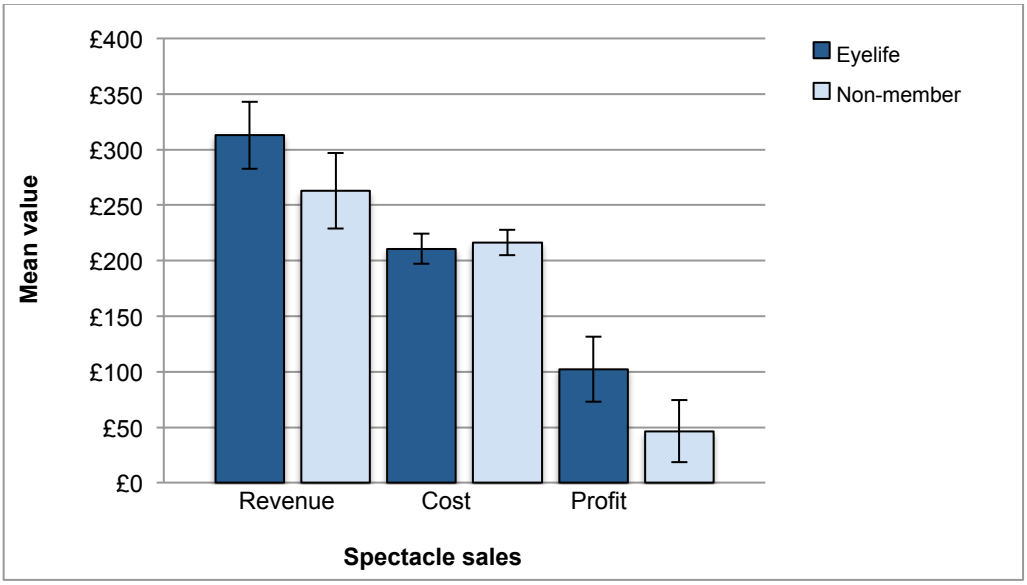


Figure 7.5 The mean revenue, cost and net profit generated from spectacle sales for Eyelife™ members and non-members

Figure 7.3 shows that only 36.8% of Eyelife™ members invested in spectacles during the 18-month audit period and only 33.3% for the non-member group. There was no significant difference (P=0.790) in the mean number of spectacles purchased between the two groups (figure 7.3). Figure 7.4 demonstrates trends in average spectacle dispense values between the two groups. The mean average dispense values for the Eyelife™ group and non-member group were £295.82 ± £180.91 and £232.49 ± £143,76 respectively, and displayed no statically significant difference (P=0.369). Eyelife members' generated, on average, £313.01 ± £186.59

revenue and £102.30 ± £180.35 profit in spectacles sales compared to £262.79 ± £186.00 revenue and £46.45 ± £153.18 profit from the non-member group. However, revenue (P=0.522), costs (P=0.807) and profits (P=0.435) generated through spectacle sales were not found to be statistically different between the two groups.

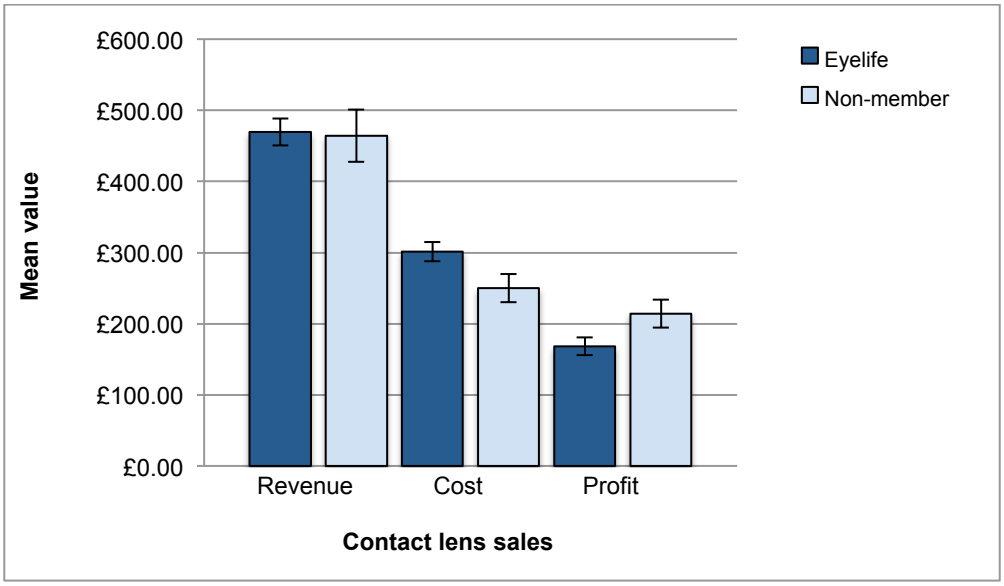


Figure 7.6 Mean revenue, cost and profit generated by contact lens purchases by Eyelife™ members and non-members

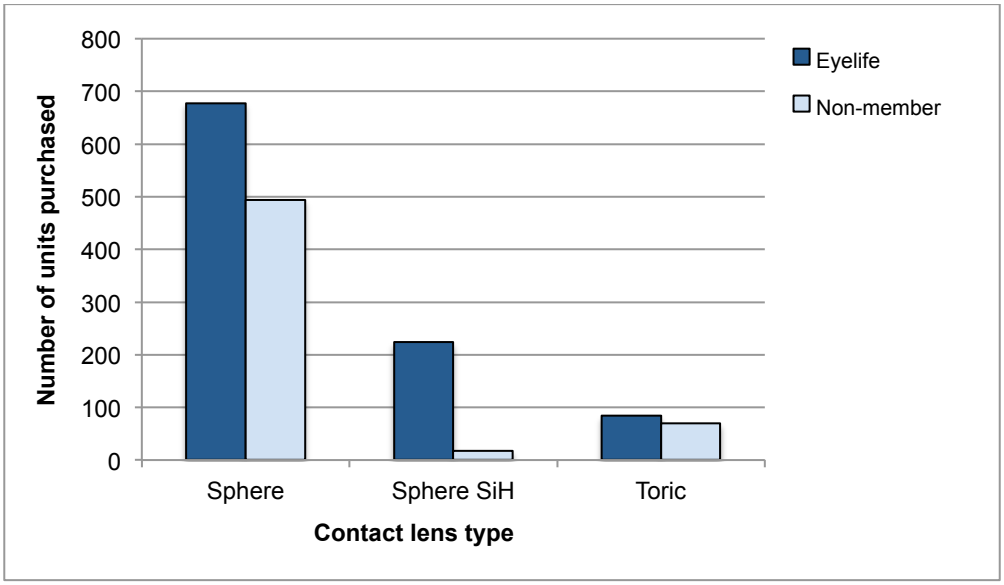


Figure 7.7 A bar chart to display the units of contact lenses purchased by both groups

Figure 7.6 shows income generated from contact lens sales. Mean revenue generated through contact lens sales was similar between the two groups (P=0.337). The mean profit generated through contact lens sales for the Eyelife™ group was £168.21 ± £76.22 and £214.22 ± £107.80 for the non-member group (P=0560). Figure 7.6 reveals Eyelife™ members to have significantly greater (P=0.037) costs related to contact lens sales, £301.27 ± £84.42 compared to £250.13 ± £108.77 for non-members. Eyelife™ members purchased many more units of contact lenses as displayed in figure 7.7, particularly conventional and silicone hydrogel spherical lenses. The numbers of toric lens sales were similar (figure 7.7). The Eyelife™ group bought almost twice as many units of contact lenses than the non-member group, 986 compared to 582 units respectively. Figure 7.8 illustrates that both groups tended to purchase higher volumes of mid-value contact lenses, the non-member group more so (72%) than the Eyelife™ group (43%). Eyelife™ members had a more even distribution of lens purchases across the 3 price ranges, compared to the non-member group (figure 7.8). Figure 7.9 reveals the percentage of subjects that were fitted with low, mid and high-value contact lenses. The majority of subjects from both groups were wearing mid-value contact lenses. A higher percentage of Eyelife™ members, 24% compared to 10%, are wearing low-value and high-value contact lenses compared to non-members (figure 7.9).

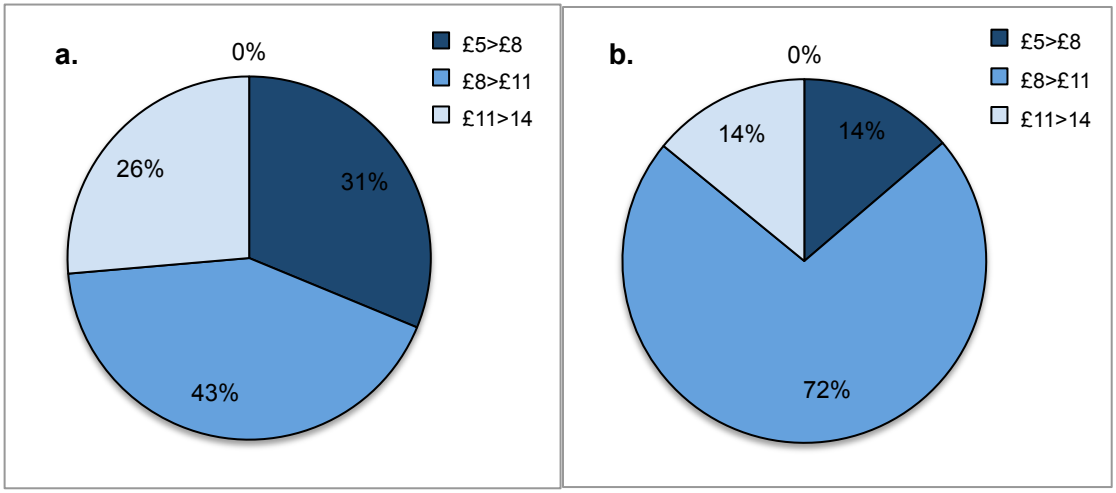


Figure 7.8 Cost price distribution of lens units purchased by both groups (a) represents Eyelife™ members and (b) represents the non-member group

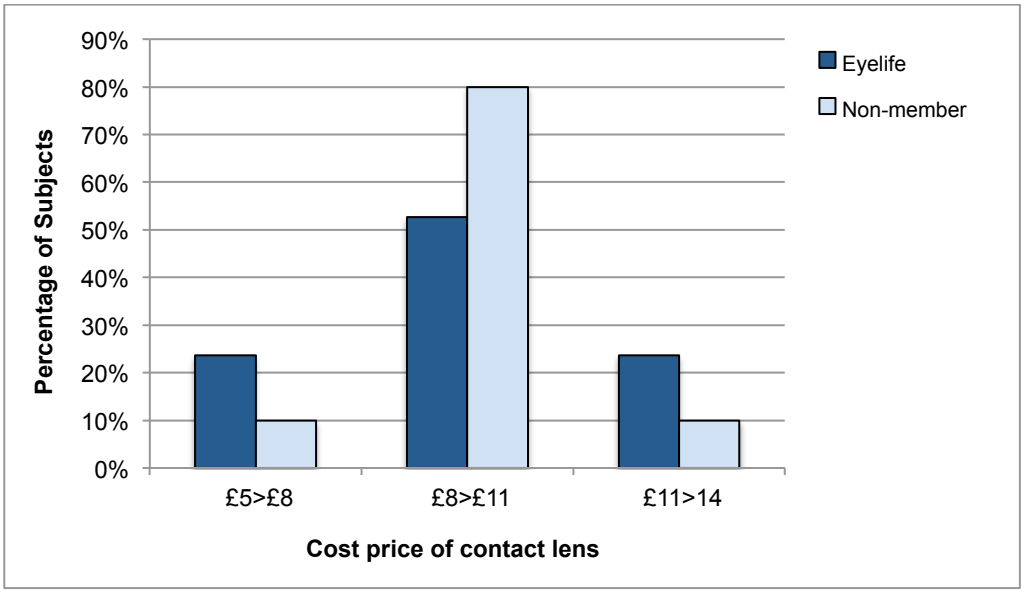


Figure 7.9 A bar chart to show the percentage of subjects fitted with each type of lens categorised by cost price

The overall mean revenue generated in the 18-month period was £738.76 ± £247.47 for Eyelife™ members and £589.01 ± £312.04 for non-members (P=0.026). The overall mean profit produced by Eyelife™ members was £222.99 ± £163.79 compared to £183.10 ± £160.22 for non-members (P=0.243).

7.4 Discussion

Contact lens wearers form high net worth clients to many optometric practices (Ritson, 2006). The aim of this study was to investigate the relationship between monthly payment plans and customer loyalty among daily disposable contact lens wearers.

7.4.1 Professional service uptake

Eyelife™ members have a more frequent uptake of all services compared to non-members (figure 7.1). Eyelife™ members are encouraged to have more regularly eye examinations, every year, as opposed to every two years. This supports the notion that monthly payment plans "brings patients back into the practice more regularly" (Optometry Today, 2012). The Eyelife™ monthly payment plan has no limit to the number of services a patient wishes to book. This may explain the higher amount of services attended by Eyelife™ members, particularly those prepared 'to get their monies worth'. Also the concept of unlimited appointments may lead Eyelife™ members to become less hesitant to arrange additional

unscheduled appointments for minor complications or concerns, lowering the risk of developing serious complications. Dumbleton et al (2013) revealed that patients purchasing contact lenses from their ECP tend to return more frequently for examinations compared to patients obtaining lenses elsewhere. Interestingly all Eyelife^{TM} subjects had purchased contact lenses from BBR Optometry Ltd, whereas only 90% of the non-member group had acquired lenses directly from the practice. The number of contact lens aftercare and combined appointment visits between the two groups were similar, and so the Eyelife^{TM} plan fails to encourage more frequent contact lens checks.

The most popular appointment type amongst both groups was the combined (aftercare and eye examination) type, with both groups on average attending for at least one combined appointment during the 18-month audit period (figure 7.1). Many subjects also attended an aftercare only appointment; Eyelife^{TM} members more frequently than non-members (figure 7.1). Therefore on average all subjects attended some form of contact lens aftercare as least once during the 18-month period, suggesting all subjects were compliant towards the recommended minimum 12-month interval between contact lens checks.

The Eyelife^{TM} group generated far superior clinical service revenue and profits (figure 7.2), which were not only statistically significant, but will also have a positive impact on the business. Figure 7.2 illustrates that monthly payment plans allow clinical services to generate ‘stand-alone’ profits rather than loss leading. Efron et al (2012) calculated the annual revenue from contact lens professional fees to be £150. This was based on the first 12 months of contact lens wearer. The current study suggests that professional fees generated from contact lens wearers are less than this, particularly from wearers not on monthly payment plans. However the current study is based on established wearers rather than the first 12 months of contact lens wear, which would include initial fitting appointment fees.

Figure 7.2 also demonstrates a statistically significant difference in the costs associated with providing professional care between the two groups. This is likely related to the difference in service uptake as the Eyelife^{TM} group scheduled many more appointments in total.

7.4.2 Spectacle sales

Eyelife™ members attend more frequently for eye examinations creating an ideal opportunity to supply spectacles and sunglasses since 80% of contact lens wearers also wear spectacles (Optometry Today, 2012). However, this study found relatively low spectacle purchases amongst both groups of daily contact lens wearers. Over 60% of patients in both groups did not purchase any spectacles during the 18-month audit (figure 7.3), despite 94.7% and 86.7% of Eyelife™ members and non-members attending at least one eye examination or combined appointment during the audit period. This study implies that contact lens wearers have a low spectacle dispense conversion rate compared to spectacle wearers; 44% of spectacle wearers purchased new spectacles in the last 12 months and 35% purchased a pair 1-2 years ago (Mintel Group Limited, 2013). Additionally a lower spectacle conversion rate among contact lens wearers was illustrated in the study presented in Chapter 2. However, another study suggested that the majority of contact lens wearers in the UK purchase spectacles just as frequently as spectacle only wearers (Aslam, 2013). Therefore the notion that contact lens patients tend to have a lower conversion rate could be unique to patients at BBR Optometry Ltd. It is also possible that these patients may have purchased spectacles elsewhere.

The mean number of spectacle sales and average spend on spectacles were similar between the two groups (figures 7.3 and 7.4). Therefore the monthly payment plan and accompanying discounts failed to entice Eyelife™ members to purchase more spectacles and upgrade to higher value products. Hence this monthly payment plan designed for contact lens wearers did not generate significantly greater spectacle sale revenue or profits compared to the non-member group. This indicates that the spectacle discount offered to Eyelife™ members was an insufficient incentive to grow spectacles sales. This finding questions whether the payment plan should include discounts on spectacles and emphasises that members may have joined Eyelife™ for other reasons.

7.4.3 Contact lens sales

Key Note Limited (2010) reported that the annual spend on daily disposable contact lenses was around £200 to £400, and Efron et al (2012) calculated annual spend to be £378.98. The current study shows a higher spend on contact lenses (figure 7.6), by both groups, as this audit encompassed an 18-month period rather than 12 months. However, if values reported in published literature (Key Note

Limited, 2010; Efron et al, 2012) are projected to represent an 18-month period, they become comparable. Therefore it would be reasonable to assume that subjects of this study represent normal daily disposable contact lens purchase behaviour.

Both groups produced similar levels of revenue and profit from contact lens sales (figure 7.6). However, the practice costs for supplying lenses was significantly different, with the Eyelife^{TM} group creating more costs, £301.27 ± £84.42 compared to £250.13 ± £108.77 for the non-member group (figure 7.6). This finding could be the result of greater volume of contact lens sales displayed by the Eyelife^{TM} group or greater value of contact lens sales. The value of contact lens purchases by both groups was similar (figure 7.8). Both groups of daily disposable wearers favoured mid-value lenses (figure 7.8). The calculated cost per unit (total contact lens cost divided by total units sold) was found to be £11.61 for the Eyelife^{TM} group and £11.60 for the non-members. Hence, monthly payment plans do not influence the value of contact lens purchases. Therefore the greater costs incurred is the likely result of a substantially higher volume of contact lens purchases by the Eyelife^{TM} group; 986 units compared to 582 units (figure 7.7). Eyelife^{TM} members receive a discount towards contact lens purchases (table 7.1) and so, despite a greater volume of sales the mean revenue appears deflated, and consequently renders a lower profit margin (figure 7.6). Therefore monthly payment plans do not influence the value of contact lens purchases. However, this study confirms that monthly payment plans are successful in encouraging customers to purchase a greater volume of contact lenses.

It could be argued that the distribution of refractive error amongst the two groups may have influenced the volume of contact lens sales. Both groups consisted of full time wearers, although a patient with a higher refractive error might be more proactive in keeping up-to-date with their lens supply. Additionally those with higher refractive errors may wear lenses for longer hours and so may have been fitted with newer materials such as silicone hydrogel. Figure 7.7 shows that Eyelife^{TM} members purchased more silicone hydrogel lenses than non-members. The refractive errors for study subjects were reviewed. The best sphere (BS) contact lens prescription was recorded for each eye and then averaged (excluding direction, minus or plus). The average BS for Eyelife^{TM} members was 4.33 ± 1.77, and was found to be significantly greater (P=0.039) than 3.64 ± 2.20 for non-members. This factor may have influenced patients into self-selecting onto the

Eyelife™ plan and purchasing a greater volume of contact lenses. Alternatively this may be a direct result of the discount received by Eyelife™ members or due to switching barriers associated with monthly direct debits.

7.4.4 Revenue and profit

Monthly payment plans allow realistic fees to be charged for optometric services, creating less reliance on product sales to produce profit (Brogan, 2011). This allows for a more sustainable business model, particularly in such a competitive market. This study found that of all the revenue streams, clinical service revenue demonstrated a statistically significant difference. The Eyelife™ members generated almost double clinical service revenue (figure 7.2) and thus produced significantly greater overall revenue. However, there was no significant difference in the overall profit generated by the two groups. Therefore despite producing more revenue, monthly payment plans for contact lens wearers do not generate more profits. This is due to the greater costs incurred through a higher volume of discounted contact lens sales (figure 7.6).

This study indicates that monthly payment plans offer an alternative and perhaps more sustainable business model. Charging appropriately for clinical services provides the opportunity to supply products at competitive prices and will encourage contact lens patients to remain loyal to the practice. Additionally a pricing structure with a higher professional service fee and lower commodity cost is advantageous as incomes generated from services are VAT exempt. Eyelife™ members purchased significantly more contact lenses (figure 7.7). It is uncertain whether this was the result of competitive prices or other factors such as refractive error, switching costs and customer satisfaction. Offering competitive prices may also improve compliance and encourage contact lens wearers to refrain from overusing lenses (Dumbleton et al, 2013, Dumbleton et al, 2013a).

7.4.5 Limitations

Study subjects consisted of a relatively small sample. Post hoc statistical power calculation of the presented sample size was 67%. The ideal statistical power would be higher at 80%; for which this study would require a sample size of 95 subjects, to detect a difference of £150 in overall mean revenue at a significance level of 5%. Therefore a larger study is required to verify findings from this initial study.

The subjects in this study mostly comprised of females subjects. A recent survey suggested that females are less likely to purchase contact lenses from Internet based companies (Optician, 2013). The majority of subjects were long-term customers of the practice, which may also influence customer loyalty. Additionally long-term customers tend to perceive higher switching barriers than short-term customers (Morgan and Hunt, 1994; Lui et al, 2011). Furthermore this study was isolated to daily disposable contact lens wearers and also to a single optometric practice, and so the results of this study may not portray other contact lens populations.

7.5 Conclusions

This study assessed the influence of monthly payment plans on customer loyalty among daily disposable contact lens wearers. Monthly payment plan members purchased a higher volume of contact lenses and attended more professional services. Overall monthly payment plan members were found to demonstrate greater practice loyalty, although there was little influence on the number and value of spectacles sales. In addition this study suggests that monthly payment plans offer a more sustainable business model by generating greater clinical service revenue and thus relying less on product sales to generate profits. This is advantageous, as contact lens wearers tend to purchase spectacles less frequently than spectacle only patients (Chapter 2). Such a model that steers away from loss leading allows products to be priced competitively. Monthly payment plans also align well with other developments in optometry, such as specialist optometric services including complex contact lens fitting and therapeutic prescribing. Specialist optometric services may not lead to product sales, and so monthly payment plans would allow such services to become self-sustainable without relying on cross-subsidy with products. However, uptake of the service and increase in the number appointments would need to be considered within the monthly payment plan fee. Further investigation is required to establish whether similar trends occur among different lens modalities, new contact lens wearers, new patients and different types of optometric practices.

Chapter 8: General discussions and conclusions

8.1 Introduction

Traditional high street optometric practices in the UK and in many other countries use a loss-leading business strategy; in fact the sight test or eye examination is often just a means to obtain the prescription needed for spectacles. As discussed in Chapter 2 the eye examination services are offered at a very low price to attract customers and costs are recouped through spectacles sales. These traditional services will often result in the patient needing to update their spectacles, and so the loss-leading model is apt for traditional optometric services where the business model is more reliant upon spectacle sales. The market is highly competitive with dominant national chains (such Specsavers, Boots Opticians and Vision Express) and more recently with Internet and supermarket suppliers. High street optometric practices are able to differentiate from local competition and offer more than traditional sight test and eye examination services. For instance practices may provide specialist and enhanced eye care services, which may involve participating in local community-enhanced services, or investing in advanced diagnostic equipment and higher qualifications. These opportunities widen the role of optometrists, develop the level of primary eye care and enhance professional development (Konstantakopoulou et al, 2014). However, there is evidence to suggest that these opportunities to differentiate may not align well with the traditional loss-leading business model, and so their financial viability from a practice perspective is questionable.

The financial viability of enhanced clinical care via community-enhanced services or investing in additional equipment and higher qualifications has not been well studied. For instance it is presumed that offering community-enhanced services may result in lost opportunity for spectacle sales. However, the scale of lost opportunity for spectacle sales has not been investigated and has not been quantified in terms of volume or value. Furthermore, optometrists may feel that patients are not willing to pay privately for specialist services such as retinal imaging (Dabasia et al, 2015). However, this evidence is based on the view of practitioners that have become accustomed to loss-leading rather than the view of the service seeking public. Shickle and Griffin (2014) noted that there is a public perception that primary eye care is expensive, but this often relates to optical products rather than optometric services.

The studies presented in this thesis aimed to understand the particular aspects of the loss-leading business model that form barriers to developing specialist or enhanced eye care pathways. The studies also demonstrated methods of overcoming these barriers, including adopting a new pricing strategy, making operational changes and by increasing professional fees. In addition this research was part of a wider collaborative project between BBR Optometry Ltd and Aston University's Business Partnership Unit (see Appendix 4). This collaborative Knowledge Transfer Partnership (KTP) project was intended to grow BBR Optometry Ltd as an optometric practice by applying knowledge derived from the research presented in this thesis. The KTP project was part funded by BBR Optometry Ltd and by the UK Technology Strategy Board.

8.2 Summary of research findings

The contribution of each optometric service category and type towards the loss-leading business model was assessed in the study in Chapter 2. The audit confirmed that traditional services have high demands and generate high volumes of spectacle sales. BBR Optometry Ltd invested in advanced retinal imaging equipment (OCT and ultra-wide field retinal imaging), and is included as part of all private examinations. A GOS eligible patient can opt to also have retinal imaging and pays a supplementary private fee as part of the NHS extended examination appointment. The NHS extended examination demonstrated the greatest uptake (around 32% of all appointment bookings) of all appointment types. Hence this study illustrates that a high demand exists for private supplementary retinal imaging procedures for GOS eligible patients. However, this could be associated with marketing efforts at BBR Optometry Ltd and so further research and understanding of patient demands is required. Hence it would be ideal to repeat this study on a wider scale and incorporate a number of different practices to establish whether trends illustrated in this study are universal or specific to BBR Optometry Ltd.

Community-enhanced services are NHS funded services that enable particular eye conditions to be managed within high street optometric practices. Community-enhanced services also allow re-assessment of patients suspected of particular eye conditions in order to refine referrals to secondary care. Community-enhanced services were found to have the least demand in terms of service uptake (8% of all booked appointments) and generated relatively few spectacle dispenses. Therefore community-enhanced services do not tend to lead to other forms of sales and for

this reason do not align well with the loss-leading strategy. The study outlined in Chapter 2 therefore confirms the lack of fit of community-enhanced services within the traditional business model in terms of service uptake and generation of high volume and value spectacle sales. This is mostly due to the nature of these services. Community-enhanced services are geared towards monitoring and managing specific eye conditions and so from the outset the target audience for this service is narrowed. Also, community-enhanced services do not replace the need for an eye examination and so patients are still likely to book traditional services for refraction and prescription needs. This study primarily focused on the major key performance indicators (number of appointments booked, spectacle conversion rate and value of spectacle sales). Further research is required to evaluate the contribution of different services towards other softer performance indicators and intangibles of the business. For instance the ability of different services to attract new patients, maintain loyalty and enhance the patient experience, as these benefits may outweigh those associated with optical product sales.

The research presented in Chapter 2 highlighted optometric services that would tend to result in opportunistic spectacle sales and those that would not. This knowledge was used to redefine common key performance indicators used at BBR Optometry Ltd. For instance, spectacle conversion rate was historically measured as the number of spectacle sales generated from all appointment bookings. However, it is now apparent that community-enhanced services and contact lens aftercare services should be excluded from this performance indicator, as these services do not necessarily include review of spectacles. In fact, these services would cause the true conversion rate to become deflated. This resulted in more achievable targets for principal key performance indicators at BBR Optometry Ltd and this research encourages practice managers to refine their common key performance indicators.

Since community-enhanced services do not lead to spectacle sales it is argued that an alternative strategy is required as outlined in Chapter 3. This could also be argued for contact lens services as they also performed inadequately in generating spectacle sales. A ‘cost-plus’ approached seemed appropriated to ensure professional fees or remuneration is sufficient to cover the cost of service provision and generate a stand-alone profit. The cost of providing a particular service is difficult to establish as high street optometric practices have a wide range of

business activities. The study in Chapter 3 critically appraised existing methods for calculating the cost of service provision and deemed them inadequate. However a more appropriate technique exists, known as activity-based costing (ABC), and was applied to BBR Optometry Ltd cost data. This more complex method of costing identified the cost of service provision at BBR Optometry Ltd as £107.27 per hour per clinic (during the 2013/14 tax year). This was significantly less than figures derived from readily available calculators including The Association of Optometrists' (AOP) Optometric Practice Costs Model for Shared Care Schemes and the CIBA Vision Professional Fee Template.

Knowledge of service delivery costs was used to derive the stand-alone profits generated by individual optometric services at BBR Optometry Ltd. The study in Chapter 3 illustrated that GOS sight tests generate a loss, as expected as part of the loss-leading business model. Interestingly the private eye examination services also tended to produce a loss. These services include the provision of retinal imaging and so research presented in Chapter 2 and 3 indicated that investment in retinal imaging is presently subsidised with income generated via spectacle sales. Although, increases in professional fees reduced the level of cross-subsidy required (figure 3.10). Contact lens services were identified as the most profitable stand-alone services, which is ideal since these services are poor generators of spectacle sales (figure 2.5). Community-enhanced services illustrated a large variation in profitability and averaged at a loss of around £7.76 per appointment. This confirms the lack of cost-based fee structures when commissioning community-enhanced services and offering private specialist services. Hence research presented in this thesis confirms a need to improve the profitability of these services using a more appropriate professional fee structure. The data presented in Chapter 3 is based on a single practice and so does not represent an average for UK optometric practices. The study focuses on identifying a robust method for determining the true cost of optometric service delivery rather than presenting common costs and pricings.

The remuneration for community-enhanced services is usually non-negotiable for individual practices, as they are defined by clinical commissioning groups in consultation with local optometric committees (LOC). Therefore there is limited scope to improve profitability of community-enhanced services via fee increases. However, reducing consumption of resources and therefore increasing operational efficiency may improve the profitability of community-enhanced services as

discussed in Chapter 4. This study identified three key areas for improving operational efficiency and was oriented around reducing appointment durations, ensuring full use of clinical chair time and assigning clinician preferences for particular services. Reductions in appointment durations and assigning clinician preferences were applied to services at BBR Optometry Ltd to improve profitability. These changes were applied to the adult GOS sight test and Glaucoma Referral Refinement services in tax year 2012/13, which rendered cost savings of around £19.40 and £38.80 respectively for each subsequent appointment booked. The changes made to the Glaucoma Referral Refinement service actually rendered the service profitable compared to generating a loss prior to operational changes (figure 3.10). Furthermore these changes increased opportunity by releasing clinical chair time. Unfortunately, as discussed in Chapter 4, these changes could not be applied to all unprofitable optometric services as it would compromise the level of service quality and introduce additional operational challenges. The study concluded that the most efficient method of improving optometric service profitability overall was to maximise clinical chair time. Maximising clinical chair time allows clinical service costs to be spread over a larger number of clinical service sales. Clinical chair time usage can be improved by minimising the number of empty appointments, cancelled appointments and 'no-shows'. Furthermore clinical chair time may be maximised by ensuring demands are met during busy periods and reducing the number of clinics in quiet months. On average around 77% of clinical chair time was used towards delivering clinical services. It is difficult to ascertain whether this percentage is more or less efficient than other practices due to limited research and published material in this area. It would be beneficial to establish the norm amongst UK optometric practices to establish realistic and achievable targets. Hence future research would include establishing the average clinical chair time usage amongst UK optometric practices and developing an essential key performance indicator.

Practitioners and practice managers in the UK set professional fees based on market pressures rather than applying a cost-based pricing structure. This is associated to the loss leading business model, and may not be appropriate for private specialist services. This is because private specialist services may require investment in advanced diagnostic technology or higher qualifications, for instance optical coherence tomography or therapeutic management of ocular disease. For example the NHS extended examination at BBR Optometry Ltd includes retinal imaging as a private supplementary procedure. Advanced retinal cameras are

costly and so patients accessing these services are required to pay appropriate professional fees to fund the investment. However, there is evidence to suggest that practitioners and practice managers are reluctant to introduce higher professional fees (Calver 2010, Dabasia et al, 2014), most likely due to market pressures and fears of customers switching to local competition. Patients' responses to changes in professional fees for private optometric services are not well researched in peer-reviewed literature. It is reasonable to presume customers may expect more from a higher priced service, which is known as the price-quality relationship. The study in Chapter 5 assessed the impact of increased professional fees on patients' expectations and perceptions of service quality.

The study presented in Chapter 3 identified the cost of delivering optometric services and was used to set a cost-based pricing structure at BBR Optometry Ltd. An incremental increase in professional fees was implemented in October 2012. The fee increase was a percentage increase and so for most services this was relatively small at less than £10. The study presented in Chapter 5 showed no relationship between prices and perceived service quality. This was particularly fascinating as the study also included the introduction of a premium fee for the most senior (and higher qualified) optometrist. Therefore this study suggests that patients value experience and higher qualified clinicians and are prepared to pay higher fees for appointments with them. Hence this study encourages practice managers in the UK to apply differential fee structures to fund investment in higher-level qualifications. This study was extremely fascinating and introduces an initial insight into what patients may value the most from primary eye care. It is essential to further understand this topic as practice managers can then confidently meet demands and needs of the public and well as enhance their businesses. Future research could be to expand this study, and consider greater fee increases and also repeat in different types of practices to again ensure that findings are not specific to BBR Optometry Ltd.

As discussed previously practice managers are reluctant to increase professional fees to facilitate investment in expensive equipment. However, increases in professional fees can be made affordable to patients by spreading them across several months via a monthly direct debit payment plan. There are a number of practices in the UK already offering such plans to patients (including BBR Optometry Ltd). However, there is a lack of peer-reviewed evidence to support the benefits of such fee structures. The retrospective audits presented in Chapter 6

and 7 assessed the benefits of monthly payments plans against the traditional business model for key patient groups (spectacle wearers and daily disposable contact lens wearers). Both studies found that monthly payment plans offer an alternative business model, whereby clinical service provision is self-sustainable without reliance on cross-subsidy with product sales. In addition monthly payment plans encourage spectacle wearers to purchase a greater number of spectacles and upgrade to more expensive products, and contact lens wearers to purchase a higher volume of contact lens products. Monthly payment plans should also increase loyalty to the practice by forming switching barriers. However, the key incentive for spectacle wearers to join monthly payment plans is associated with discounts received on spectacle products, likewise contact lens wearers receive discounts on contact lenses. This may narrow the target audience for monthly payment plans as only patients likely to significantly benefit from product discounts will be interested. For instance, patients with large or complex refractive errors, whom depend highly on spectacles and/or contact lenses. Hence monthly payment plans may not appeal to patients that do not require refractive correction.

8.3 Conclusions

The research presented in this thesis provides an in-depth understanding of key revenue streams of high street optometric practices and provides a thorough understanding of the cost and profit base of individual business activities. This research focused on clinical service based activities only and did not analyse and explore developments to retail based activities within high street optometric practices. This research proposes methods of improving the profitability of high street optometric services to ensure stand-alone profitability, particularly for specialist non-refraction based services, and to support investment in new equipment and higher qualifications. Technologies have advanced to aid refraction, such as autorefractors and even smartphone applications (Bastawrous, 2015). These advancements threaten the role of optometrists as refractionists. In addition, the market competition for prescription spectacles is likely to further rise with fashion stores now entering the market. For instance, Topshop Oxford Circus now stocks fashionable spectacles and has glazing facilities (Lidbury, 2015). Hence the core functions of high street optometric practices are threatened by increasing competition and advancements in technology. Therefore, to continue as successful businesses, high street optometric practices may have to differentiate. The research presented in this thesis encourages practice managers to offer a wider

scope of specialist non-refraction based services and advanced expertise and diagnostic equipment that cannot be supplied by other industries.

The findings of this thesis have been applied to grow BBR Optometry Ltd as a business, namely by providing a thorough understanding of the existing business model, establishing a cost-based fee structure, facilitating improvements in operational efficiency and highlighting successful alternative business models. This research has also facilitated the development of additional private specialist non-refraction based services at BBR Optometry Ltd, including ultra-wide field retinal imaging, orthokeratology and dry eye services. These services are not intended to generate spectacle sales and so have a fee structure based on activity-based costing, which does not rely on cross subsidy with optical products. In addition research from this thesis has been applied to develop a model for assessing future investments to determine the financial viabilities.

This research is highly relevant to practice owners, managers and key opinion leaders and has been well received at national and international conferences (see published abstracts in appendices). Furthermore due to the impact of this research, this Knowledge Transfer Partnership (KTP) project was awarded the best new KTP at Aston University's KTP poster competition in 2012 and the best-established KTP in 2014. In addition the success of this KTP project resulted in the author being shortlisted for the national KTP 'Business Leader of Tomorrow' award in 2013 and received a rating of 'Very Good' on completion (see Appendix 5).

8.4 Future research opportunities

This research has touched on key issues presenting barriers within high street optometric practice. However the major weaknesses of these studies are that they are based on a single independent practice and so findings do not necessarily represent the UK market and industry. It would be interesting to expand these studies across a sample of UK practices and establish trends within the industry. Further research is also required to establish the long-term viability of concepts and techniques presented in this study. For instance, the long-term viability of implementing a cost-based fee structure using the activity-based costing concepts. The activity-based costing method is time consuming and complex and so it would be useful to practice owners and managers to establish the long-term gains and whether the exercise could be adequately maintained. Also further understanding of acceptable profit margins for optometric services would be beneficial as the

studies presented in this thesis mostly focus on calculating costs rather than implementing new pricing. A second collaborative project between BBR Optometry Ltd and Aston University's Business Partnership Unit aims to develop specialist services for vulnerable groups. This project will assess the robustness of using activity-based costing methods to cost new optometric services that are based on providing enhanced care for vulnerable patient groups.

It would also be valuable to expand on research related to the public's perceptions of optometric services. More specifically the value patients put on primary eye care and how patients assess this e.g. appointment duration, clinical expertise, appointment availability, equipment, higher qualifications, practice environment etc. This may help to identify areas in which high street optometric practices are able to develop with fewer challenges and concerns of patients switching to local competition. This may also encourage practitioners to undertake higher training and gain additional qualifications if tangible benefits to the business are identified. This thesis illustrated that monthly payment plans offer an alternative business model. Further work looking at larger samples and other patient cohorts are required to establish the findings illustrated. Also further research is required to understand the incentives for joining monthly payment plans and assess the scope to widen the target audience.

List of References

Action on Cataracts (2000). Action on Cataracts: Good Practice Guidance. London: Department of Health.

Adams, M. (1996). Activity-based costing (ABC) and the Life Insurance Industry. The Service Industries Journal; 16(4), p. 511-526.

Ang, W. S., Ng, W. G. and Azuara-Blanco, A. (2009). The influence of the new general ophthalmic services (GOS) contract in optometrist referrals for glaucoma in Scotland. Eye; 23, p. 351-355.

Aslam, A. (2013). Contact Lenses and spectacles: a winning combination. Optician (issue 25/10/2013, p. 26). Available from: http://www.opticianonline.net/contact-lenses-and-spectacles-a-winning-combination/ [Accessed 5th Sept 2015]

Association of Optometrists. (2008). Primary Eye Care in the Community – A proposal for enhanced services 2008. Leaflet available from: http://www.aop.org.uk/practitioner-advice/enhanced-services-england/ [Accessed 22nd Jan 2015].

Association of Optometrists, (2008a). What Community Based Optical Practices Can Offer Healthcare Commissioners and Patients. Available from: http://www.aop.org.uk/uploads/uploaded_files/napc_joint_proposal_april_2008.pdf [Accessed 2nd Aug 2015].

Atkins, N.P., Morgan, S.L. and Morgan, P.B. (2009). Enhancing the approach to selecting eyewear (EASE): A multi-centre, practice based study into the effect of applying contact lenses prior to spectacle dispensing. Contact Lens and Anterior Eye; 32, p. 103-107.

Avlonitis, G.J. and Indounas, A.K. (2005). Pricing objectives and pricing methods in the services sector. Journal of Services Marketing; 19(1), p. 47-57.

Avlonitis, G.J. and Indounas, K.A. (2007). An empirical examination of the pricing policies and their antecedents in the services sector. European Journal of Marketing; 41(7/8), p. 740-764.

Awobem, J. F., Cassels-Brown, A., Buchan, J. C. and Hughes, K. A. (2009). Exploring glaucoma awareness and the utilization of primary eye care services: community perceived barriers among elderly African Caribbeans in Chapletown, Leeds. Eye; 23(1), p. 243.

Azuara-Blanco, A., Burr, J., Thomas, R., Maclennan, G. and McPherson, S. (2007). The accuracy of accredited glaucoma optometrists in the diagnosis and treatment recommendation for glaucoma. British Journal of Ophthalmology; 91, p. 1639-1643.

Babakus, E. and Mangold, W.G. (1992). Adapting the SERVQUAL scale to hospital services: An empirical investigation. Health Services Research; 26(6), p.165–186.

Baird, K.M., Harrison, G.L. and Reeve, R.C. (2004). Adoption of activity management practices: a note on the extent of adoption and the influence on organizational and cultural factors. Management Accounting Research; 15, p. 323-399.

Bastawrous, A., Rono, H. K., Livingstone, I. A. T., Weiss, H. A., Jordon, S., Kuper, H, and Burton, M. J. (2015). Development and Validation of a Smartphone-Based Visual Acuity Test (Peek Acuity) for Clinical Practice and Community-Based Fieldwork. JAMA Ophthalmology; 133(8), p. 930-937.

Bean, A.G. and Talaga, J. (1995). Predicting appointment breaking. Journal of Health Care Marketing; 15(1), p. 29-34.

Bei, L-T. and Chiao, Y-C. (2011). An integrated model for the effects of perceived product, perceived service quality, and perceived price fairness on consumer satisfaction and loyalty. Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behaviour; 14, p.125-140.

Bell, P.C. (2012) The concepts of revenue management: a tutorial. International Transactions in Operational Research; 19, p. 23-37.

Bhargava, J. S., Bhargava-Bhan, A., Foss, A. J. and King, A. J. (2008). Views of glaucoma patients on provision of follow-up care; an assessment of patient preferences by conjoint analysis. British Journal of Ophthalmology; 92: p. 1601-1605.

Bland, J.M. and Altman, D.G. (1997). Statistics notes: Cronbach's alpha. The British Medical Journal; 314, p.572.

Bringnall, S. (1997). A contingent rationale for cost system design in service. Management Accounting Research; 8, p. 325-346.

Brogan, R. (2011). New Focus: CIBA's web seminar takes stock. Optician (issue 26/02/2011). Available from: http://www.opticianonline.net/Articles/2011/01/26/27019/News+Focus+CIBA's+web+seminar+takes+stock+.htm Last accessed (23/05/2013) [Accessed on 15th March 2015].

Buttle, F. (1996). SERVQUAL: review, critique, research agenda. European Journal of Marketing; 30(1), p. 8-32.

Brucks, M., Zeithaml, V. A., and Naylor, G. (2000). Price and brand name as indicators of quality dimensions for consumer durables. Journal of the Academy of Marketing Science; 28(3), p. 359-374.

Cagwin, D. and Bouwman, M. J. (2002). The association between activity-based costing and improvement in financial performance. Management Accounting Research; 3, p. 1-39.

Calver, R. (2010). The Health and Social Security Act 1984 and the price of spectacles among corporate practices in the United Kingdom (1980-2007): a review. Ophthalmic and Physiological Optics; 30(2), p. 113-123.

Carman, J. M. (1990). Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. Journal of Retailing; 66(1), p. 33-55.

Celino, G. and Jewitt, P. (2012). Repeat pressures in Oxfordshire. Optometry Today (issue 30/11/2012). Available from: http://www.optometry.co.uk/uploads/clinical-audit-series/november-30-2012.pdf [Accessed on 5th Sept 2015].

Chea, A. C. (2011). Activity-Based Costing System in the Services Sector: A Strategic Approach for Enhancing Managerial Decision Making and Competitiveness. International Journal of Business and Management; 6(11), p 3-10.

Chen, I.J., Gupta, A. & Rom, W. (1994). A study of price and quality in service operations. International Journal of Service Industry Management; 5(2), p. 23-33.

Cheraghi-Sohi, S., Hole, A., Mead, N., McDonald, R., Whalley, D., Bower, P. and Roland, M. (2008). What patients want from primary care consultations: A discrete choice experiment to identify patients' priorities. Annals of Family Medicine; 6(2), p. 107-115.

Clarke, P. and Mullins, T. (2001). Activity based costing in the non-manufacturing sector in Ireland: A preliminary investigation. Irish Journal of Management; 22(2), pp. 1-18.

Clemence, C .(2012). It's not all that bad, is it? Optometry Today (issue 15/06/2012, p. 36). Available from: http://www.optometry.co.uk/uploads/exams/articles/cet_27_01_2012_morgan.pdf [Accessed on 5th Sept 2015].

Coast, J., Spencer, I. C., Smith, L. and Spry, P. G. (1997). Comparing costs of monitoring glaucoma patients: hospital ophthalmologists verses community optometrists. Journal of Health Services Research and Policy; 2, p. 19-26.

Colgate, M., Tong, V. T-U, Lee, C. K-C. and Farley, J. U. (2007). Back From the Brink: Why Customers Stay. Journal of Service Research; 9(3), p. 211-228.

College of Optometrists. (2015) Guidance for professional practice. Sale and supply: Taking the prescription elsewhere (A273). Available from: http://guidance.college-optometrists.org/guidance-contents/knowledge-skills-and-performance-domain/sale-and-supply-of-spectacles/#open:179 [Accessed on 13th Dec 2015].

College of Optometrists and Medix UK. (2008). The College of Optometrists Clinical Practice Survey: Market Research Report. London: Medix UK (unpublished).

Hawley, C., Albrow, H. A., Sturt, J. and Mason, L. (2010). UK eye care services project: Phase One – systemic review of the organisation of UK eye care services. London: College of Optometrists.

Hawley, C., Albrow, H., Sturt, J. and Mason, L. (2010a). UK Eye Care Services Project, Phase Two: Organisation of Eye Care Services in the West Midlands. London: College of Optometrists.

Cooper, R. and Kaplan, R. S. (1991). Profit priorities from activity-based costing. Harvard Business Review; May-June 1991 issue, p. 130-137.

Cronin, J. J., Brady, M. K. and Hult, G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction in consumer behavioural intentions in service environments. Journal of Retailing; 76(2), p.193-218.

Cross, V., Shah, P., Bativala, R. and Spurgeon, P. (2007). ReGAE 2: glaucoma awareness and the primary eye care service: some perceptions among African Caribbeans in Birmingham UK. Eye; 21, p. 912-920.

Dabasia, P. L., Edgar, D. F., Garway-Heath, D. F. and Lawrenson, J. G. (2014). A survey of current and anticipated use of standard and specialist equipment by UK Optometrists. Ophthalmic and Physiological Optics; 34, p. 592-613.

Davey, C. J., Green, C., and Elliot, D. B. (2011) Assessment of referrals to the hospital eye service by optometrists and GPs in Bradford and Airedale. Ophthalmic and Physiological Optics; 31, p. 23-28.

Davies, I. (2010). Global attitudes and perceptions about vision care. Optician (issue 8/10/10 ,p.21–24). Available from: https://s3-eu-west-1.amazonaws.com/rbi-communities/wp-content/uploads/importedimages/global-attitudes.pdf [Accessed on 5th Sept 2015].

Dickey, H., Ikenwilo, D., Norwood, P., Watson, V. and Zangelidis, A. (2012). Utilisation of eye-care services: The effect of Scotland's free eye examination policy. Health Policy; 108, p. 286-293.

Dodds, W., Monroe, K. B. and Grewel, D. (1991). Effect of price, brand, and store information on buyers' product evaluations. Journal of Marketing Research; 28, p.307-319.

Doescher, M. P., Saver, B. G., Fiscella, K. and Franks, P. (2004). Preventive care: Does continuity count? Journal of General Internal Medicine; 19(6), p. 632-637.

Domagalski, J. (2000). Early experiences in mass market utility retailing. Public Utilities Fortnightly; 138(2), p. 29-31.

Dreiher, J., Froimovici, M., Bibi, Y., Vardy, D. A., Cicurel, A., and Cohen, A. D. (2008). Non-attendance in obstetrics and gynecology patients. Gynecologic and Obstetric Investigation; 66(1), p. 40-43.

Dumbleton, K., Richter, D., Bergenske, P. and Jones, L. W. (2013). Compliance with Lens Replacement and the Interval between Eye Examinations. Optometry and Vision Sciences; 90, p. 351-358.

Dumbleton, K., Woods, C. A., Jones, L. W., and Fonn, D. (2013a). The impact of contemporary contact lenses on contact lens discontinuation. Eye and Contact Lens; 39, p. 92-98.

Dutton, C. (2010). Testing Times Survey 2010. Available from: http://testingtimes.christiandutton.com/downloads/TestingTimes2010Results.pdf [Accessed on 10th Feb 2015].

Efron, S. E., Efron, N., Morgan, P. B. and Morgan, S. L. (2012). A theoretical model for comparing UK costs of contact lens replacement modalities. Contact Lens and Anterior Eye; 35, p, 28-35.

Europe Economics. (2013). Optical Business Regulation, Final report for the General Optical Council. London: Europe Economics.

Ewbank, A. (2013). Understanding the CL consumer: Part 1 – Buying habits and customer loyalty. Optician; 6400(245), p. 38-40.

Feldman, J., Liu, N., Topaloglu, H. and Ziya, S. (2014). Appointment Scheduling Under Patient Preference and No-Show Behavior. Operations Research; 62(4), p. 794-811. Available from: http://dx.doi.org/10.1287/opre.2014.1286 [Accessed on 4th Sept 2015].

Fogel, J. and Zidile, C. (2008). Contact lenses purchased over the Internet place individuals potentially at risk for harmful eye care practices. Optometry; 79, p. 23-35.

Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. Journal of Marketing; 56(1), p. 6-21.

Frampton, P. (2011). The Henry Ford School of Optometry: making acute eye management pay. Optometry Tomorrow conference, 7th. Liverpool, 20-21 March 2011 (unpublished).

Festinger, D. S., Lamb, R. J., Marlowe, D. B. and Kirby, K. C. (2002). From telephone to office: intake attendance as a function of appointment delay. Addictive Behaviors; 27(1), p. 131-137.

Fylan, F., Grunfield, E. A., Turvey, A. and Desallais, J. (2005). Four different types of client attitudes towards purchasing spectacles in optometric practice. Health Expectations; 8, p. 18-25.

Gallucci, G., Swartz, W. and Hackerman, F. (2005). Brief reports: Impact of the wait for an initial appointment on the rate of kept appointments at a mental health center. Psychiatric Services; 56(3), p. 344-346.

General Ophthalmic Services Contract, (2010). General Ophthalmic Mandatory Services Model Contract. London: Department of Health.

General Optical Council. (2015). General Optical Council Annual Report, Annual Fitness to Practice and Financial Statements for the year ended 31 March 2015. London: General Optical Council.

General Optical Council. (2015a). What is an optometrist/dispensing optician? Available from: https://www.optical.org/en/Education/Careers/Pre-registration_home.cfm. [Accessed on 2nd Aug 2015]

Gerard, K., Salisbury, C., Street, D., Pope, C. and Baxter, H. (2008). Is fast access to general practice all that should matter? A discrete choice experiment of patients' preferences. Journal of Health Services Research and Policy; 13(2), p. 3-10.

Gikalov, A. A., Baer, D. M. and Hannah, G. T. (1997). The Effects of Work Task Manipulation and Scheduling on Patient Load, Revenue, Eyewear Turnover, and Utilization of Staff and Doctor Time. Journal of Organizational Behavior Management; 17(1), p. 3-35.

Gray, S. F., Spry, P. G., Brookes, S. T., Peters, T. J., Spencer, I. C., Baker, I. A., Sparrow, J. M. and Easty, D. L. (2000). The Bristol shared care glaucoma study: outcome at follow up at 2 years. British Journal of Ophthalmology; 84, p. 456-463.

Gray, S. F., Spencer, I. C., Spry, P. G., Brookes, S. T., Baker, I. A., Peters, T. J., Sparrow, J. M., and Easty, D. L. (1997). The Bristol shared care glaucoma study – validity of measurements and patient satisfaction. Journal of Public Health Medicine; 19(4), p. 431-436.

Grunebaum, M., Luber, P., Callahan, M., Leon, A.C., Olfson, M. and Portera, L. (1996). Predictors of missed appointments for psychiatric consultations in a primary care clinic. Psychiatric Services; 47(8), p. 848-852.

Gupta, D. and Denton, B. (2008). Appointment scheduling in health care: Challenges and opportunities. IIE Transactions; 40, p. 800-819.

Hale, M. (2014). GfK identifies the quality sweet spot in optics. Optician (issue 1/06/2014). Available from: http://www.opticianonline.net/gfk-identifies-quality-sweet-spot-optics/. [Accessed on 5th Sept 2015].

Henson, D. B., Spencer, A. F., Harper, R. and Cadman, E. J. (2003). Community refinement of glaucoma referrals. Eye; 17, p. 21-26.

Herefordshire Council Research Team. (2013). 2011 Census Key Statistics, Hereford City. Available from: https://factsandfigures.herefordshire.gov.uk/media/21655/hereford_2011_census_profile.pdf [Accessed on 2nd Aug 2015].

Holtzer-Goor, K., Sprundel, E. V., Lemij. H. G., Plochg, T., Klazinga, N. S. and Koopmanshap, M. A. (2010). Cost-effectiveness of monitoring glaucoma patients in shared care: an economic evaluation alongside a randomised controlled trial. BMC Health Services Research; 10, p. 312. doi:10.1186/1472-6963-10-312.

Homburg, C., Koschate, N. and Hoyer, W. D. (2005). Do satisfied customers really pay more? A study of the relationship between customer satisfaction and willingness to pay. The Journal of Marketing; 69(2), p. 84-96.

Huefner, R. (2011). Revenue Management: A Path to Increased Profits. New York: Business Expert Press, LLC.

Indounas, K. and Avlonitis, G. J. (2009). Pricing objectives and their antecedents in the services sector. Journal of Service Management; 20(3), p. 342-374.

Innes, J., and Mitchell, F. (1997). The application of Activity-based costing in the United Kingdom's Largest Financial Institutions. The Service Industries Journal; 17(1), p. 190-203.

Jones, M. A., Mothersbaugh, D. L. and Beatty, S. E. (2000). Switching Barriers and Repurchase Intentions in Services. Journal of Retailing; 76(2): p. 259-274.

Key Note Ltd. (2010). Opticians & Optical Goods Market Assessment, Feb 2010; 5th Edition. Teddington: Key Note Ltd.

Key Note Ltd. (2013). Market Report 2013: Ophthalmic Goods & Services, 19th ed. Teddington: Key Note Ltd.

Key Note Ltd. (2014). Market Update 2014: Ophthalmic Goods & Services, 20th ed. Teddington: Key Note Ltd.

Kim, M-K., Park, M-C. and Jeong, D-H. (2004). The effects of customer satisfaction and switching barrier on customer loyalty in Korean mobile telecommunications services. Telecommunications Policy; 28, p. 145-159.

Konstantakopoulou, E., Harper, R. A., Edgar, D. F. and Lawrenson, J. G. (2014). A qualitative study of stakeholder views regarding participation in locally commissioned enhanced optometric services. BMJ Open; 4, e004781. Doi:10.1136/bmjopen-2013-004781.

Kurtz, D. L. and Clow, K. E. (1998). Services Marketing. New York: John Wiley & Sons Ltd.

Lacy, N. L., Paulman, A., Reuter, M. D. and Lovejoy, B. (2004). Why we do not come: Patient perceptions on no-shows. Annals of Family Medicine; 2(6), p. 541-545.

Leamon, S., Hayden, C., Lee, H., Trudinger, D., Appelbee, E., Hurrell, D-L. and Richardson, I. (2014). Improving access to optometry services for people at risk of preventable sight loss: a qualitative study in five UK locations. Journal of Public Health; 36(4), p. 667-673.

Lichtenstein, D. R. and Burton, S. (1989). The relationship between perceived and objective price-quality. Journal of Marketing Research; 26(4), p.429-443.

Lidbury, O. (2015). Best alternative shops for prescription glasses. Telegraph (09/04/2015). Available From: http://fashion.telegraph.co.uk/article/TMG11523126/Best-alternative-shops-for-prescription-glasses-and-sunglasses.html [Accessed on 8th Sept 2015].

Liu, C-T., Guo, Y. M. and Lee. C-H. (2011). The effects of relationship quality and switching barriers on customer loyalty. International Journal of Information Management; 31, p. 71-9.

Liu, N., Ziya, S. and Kulkarni, V. G. (2010). Dynamic scheduling of outpatient appointments under patient no-shows and cancellations. Manufacturing and Service Operations Management; 12(2), p. 347-364.

Llewellyn, R. (2012). An alternative approach. Optician (issue 27/04/2012). Available From: http://www.opticianonline.net/Articles/2012/04/27/29354/An+alternative+approach.htm. [Accessed on 23rd May 2013].

Local Optical Committee Support Unit (LOCSU) (2015). Atlas Map of Optical Variation. Available from: http://www.locsu.co.uk/community-services-pathways/community-services-table [Accessed on 2nd Aug 2015].

Loffler, G., Henderson, R., Bolland, S. and Gordon, G. E. (2011). Therapeutic prescribing for optometrists: an initial perspective. Optometry in Practice; 12(3), p. 87-98.

Lovelock, C. and Wirtz, J. (2008). Services Marketing; People, Technology, Strategy, 7th ed. Chapter 6: Setting Prices and Implementing Revenue Management. Essex: Pearson Education Limited.

Marks, J. R., Harding, A. K., Harper, R. A., Williams, E., Haque, S., Spencer, A. F. and Fenerty, C. (2012). Agreement between specially trained and accredited optometrist and glaucoma specialist consultant ophthalmologists in their management of glaucoma patients. Eye; 26, p. 853-861.

Mason, A. and Mason, J. (2002). Optometrist prescribing of therapeutic agents: findings of the AESOP survey. Health Policy; 60(2), p. 185-97.

McLaughlan, B. and Edwards, A. (2010). Understanding of the purpose of an eye test among people aged 60 and over in the UK. Optometry in Practice; 11(4), p.179-188.

Meidan, A. and Chin, A. C. (1995). Mortgage-pricing determinants: a comparative investigation of national, regional and local building societies. International Journal of Bank Marketing; 13(3), p. 3-11.

Mintel Group Limited. (2010). Optical Goods Retailing – UK, February 2010. London: Mintel Group Ltd.

Mintel Group Limited. (2013). Optical Goods Retailing - UK, February 2013. London: Mintel Group Ltd.

Mintel Group Limited. (2015). Optical Goods Retailing – UK, February 2015. London: Mintel Group Ltd.

Moore, C.G., Wilson-Witherspoon, P. and Probst, J. C. (2001). Time and money: effects of no-shows at a family practice residency clinic. Family Medicine Journal; 33(7), p. 522-527.

Morgan, R. M and Hunt, S. D. (1994). The Commitment-Trust Theory of Relationship Marketing. Journal of Marketing; 58, p. 20-38.

Morris, M. H and Fuller, D. A. (1989). Pricing an industrial service. Industrial Marketing Management; 18(2), p. 139-146.

Moss, I. (2005). Running a successful optical practice. Optician (issue 16/08/2005). Available from: http://www.opticianonline.net/running-a-successful-optical-practice/. [Accessed on 5th Sept 2015].

Myint, J., Edgar, D. F., Kotecha, A., Murdoch, I. E. and Lawrenson, J. G. (2011). A national survey of diagnostic tests reported by UK community optometrists for the detection of chronic open angle glaucoma. Ophthalmic and Physiological Optics; 31, p. 353-359.

Needle, J. J., Petchey, R. and Lawrenson, J. G. (2008). A survey of the scope of therapeutic practice by UK Optometrists and their attitudes to an extended prescribing role. Ophthalmic and Physiological Optics; 28, p. 193-203.

NHS choices. (2015). Am I entitled to a free NHS eye test? Available from: http://www.nhs.uk/chq/pages/895.aspx?CategoryID=68&SubCategoryID=157. [Accessed on 2nd Aug 2015].

NHS Wales. (2014). EHEW Manual and protocols. Available from: http://www.eyecare.wales.nhs.uk/sitesplus/documents/1082/EHEW%20Manual%20v9%20July%202014%20FINAL%20pdf%2026.09.2014%20%2D%20English.pdf [Accessed on 2nd Aug 2015].

Nunnally, J. C. and Berstein, I. H. (1994). Psychometric Theory (3rd ed). New York: McGraw-Hill.

Office for National Statistics. (2012). Key Figures for People and Society: Population and Migration. Available from: http://neighbourhood.statistics.gov.uk/dissemination/LeadKeyFigures.do?a=7&b=6275128&c=Herefordshire&d=13&e=13&g=6385768&i=1001x1003x1004&m=0&p=-1&q=1&r=1&s=1426355950163&enc=1 [Accessed on 15th Mar 2015].

Office for National Statistics. (2013). Key Figures for People and Society: Population and Migration. Available from: http://neighbourhood.statistics.gov.uk/dissemination/LeadTableView.do?a=7&b=6275128&c=Herefordshire&d=13&e=13&g=6385768&i=1001x1003x1004&m=0&p=-1&q=1&r=1&s=1426355950179&enc=1&dsFamilyId=2474. [Accessed on 15th Mar 2015].

Olivares, G. E. (2012). Contact lens purchasing behaviour. Contact Lens Spectrum (issue 12/01/2012). Available from: http://www.clspectrum.com/articleviewer.aspx?articleID=107731. [Accessed on 23rd May 2013].

Olson, J. C. (1977). Price as an Informational Cue: Effects in Product Evaluation. In: Woodside, A. G., Sheth, J. N. and Bennet, P. D. (eds.) Consumer and Industrial Buying Behaviour. New York: North Holland Publishing Company.

Optical Confederation. (2013). Optics at a Glance 2012. Available from: http://www.opticalconfederation.org.uk/downloads/key-statistics/optics-at-a-glance2012web.pdf [Accessed on 13th Dec 2015].

Optical Confederation. (2015). Optics at a Glance 2014. Available from:

http://www.opticalconfederation.org.uk/downloads/optics-at-a-glance2014web.pdf [Accessed on 13th Dec 2015].

Optician. (2011). Practices fare badly in new direct debit statistics. Optician (issue 9/11/2011). Available from: http://www.optometry.co.uk/business/boosting-profits/?article=2866. [Accessed on 5th Sept 2015].

Optician. (2011a). Contact lenses 'could be key', features. Optician (issue 31/05/2012). Available from: http://www.optometry.co.uk/news-and-features/features/?article=3527. [Accessed on 5th Sept 2015].

Optician. (2012). Double or drop. Optician (issue 30/11/2012). Available from: http://www.opticianonline.net/double-or-drop/. [Accessed on 5th Sept 2015].

Optician. (2013). Understanding the CL consumer. Part 1 – Buying habits and customer loyalty. Optician (issue 3/05/2013). Available from: http://www.opticianonline.net/Articles/2013/05/03/31124/understanding-the-cl-consumer.html. [Accessed on 23rd May 2013].

Optician. (2014). GfK identifies the quality sweet spot in optics. Optician (issue 1/06/2014). Available from: http://www.opticianonline.net/gfk-identifies-quality-sweet-spot-optics/. [Accessed on 5th Sept 2015].

Opticians Act. (1989). London: The Stationery Office Limited.

Optometry Today. (2012). Contact lenses 'could be key'. Optometry today (issue 31/05/2012). Available from: http://www.optometry.co.uk/news-and-features/features/?article=3527. [Accessed on 23rd May 2013].

Optometry Today. (2013). One in two CL wearers look online. Optometry Today (issue 8/05/2013). Available from: http://www.optometry.co.uk/news-and-features/news/?article=4619. [Accessed on 23rd May 2013].

Optometry Today. (2015). Public's view of optometry remains positive. Optometry Today (issue 15/05/2015). Available from: http://www.optometry.co.uk/news-and-features/news/?article=7321. [Accessed on 5th Sept 2015].

Paleologo, G. A. (2004). Price-at-Risk: A methodology for pricing utility computing services. IBM Systems Journal; 43(1), p. 20-30.

Palihawadana, D. and Barnes, B. R. (2004). The measurement and management of service quality in dental healthcare. Health Services Management Research; 17, p.229-236.

Parasuraman, A., Zeithaml, V. A. and Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. Journal of Marketing; 49, p. 41-50.

Parasuraman, A., Zeithaml, V. A. and Berry, L. L. (1988). SERVQUAL: A multiple-scale for measuring consumer perceptions of service quality. Journal of Retailing; 64(1), p.12-40.

Parasuraman, A., Zeithaml, V. A., Berry, L. L. (1991). Refinement and Reassessment of the SERVQUAL scale. Journal of Retailing; 67(4), p. 420-450.

Parasuraman, A., Zeithaml, V. A., Berry, L. L. (1994). Alternative scales for measuring service quality: a comparative assessment based on psychometric and diagnostic criteria. Journal of Retailing; 70(3), p. 201-230.

Parente, D. H., Pinto, M. B. and Barber, J. C. (2005). A pre-post comparison of service operational efficiency and patient satisfaction under open access scheduling. Health Care Management Review; 30(3), p. 220-228.

Park, J. C., Ross, A. H., Sparrow, J. M., Penny, J. and Mundasad, M. V. (2009). Evaluation of a new cataract surgery referral pathway. Eye; 23, p. 309-313.

Parkins, D. J. and Edgar, D. F. (2011). Comparison of the effectiveness of two enhanced glaucoma referral schemes. Ophthalmic and Physiological Optics; 31, p. 343-52.

Ratcliffe, A., Gilland, W. and Marucheck, A. (2012). Revenue management for outpatient appointments: joint capacity control and overbooking with class-dependent no-shows. Flexible Service and Manufacturing Journal; 24, p. 516-548.

Rao, A. R. and Monroe, K. B. (1988). The moderating effect of prior knowledge on cue utilization in product evaluations. Journal of Consumer Research; 15, p. 253-264.

Rao, A. R. and Monroe, K. B. (1989). The effect of price, brand name, and store name on buyers' perceptions of product quality: an integrative review. Journal of Marketing Research; 26(3), p. 351-357.

Ratnarajan, G., Newsom, W., Vernon, S. A., Fenerty, C., Henson, D., Spencer, F., Wang, Y., Harper, R., McNaught, A., Collins, L., Parker, M., Lawrenson, J., Hudson, R., Khaw, P. T., Wormald, R., Garway-Heath, D. and Bourne, R. (2013). The effectiveness of schemes that refine referrals between primary and secondary care – the UK experience with glaucoma referrals: the Health Innovation & Education Cluster (HIEC) Glaucoma Pathways Project. BMJ Open; 3(7), doi: 10.1136/bmjopen-2013-002715.

Ritson, M. (2006). Which Patients are More Profitable? CL Spectrum; 21(3), p. 38-42.

Robledo, M. A. (2001). Measuring and managing service quality: Integrating customer expectations. Managing Service Quality; 11(1), p. 22-31.

Russ, M. (2008). Professional Fees: Part 2 – Fee and product pricing calculations. Optician (issue 28/03/2008). Available from: http://www.opticianonline.net/professional-fees-part-2-fee-and-product-pricing-calculations/. [Accessed on 5th Sept 2015].

Salisbury, C., Montgomery, A. A., Simons, L., Sampson, F., Edwards, S., Baxter, H., Goodall, S., Smith, H., Lattimer, P. and Pickin, D. M. (2007). Impact of advanced access on access, workload, and continuity: Controlled before-and-after and simulated-patient study. British Journal of General Practice; 57(541), p. 608-614.

Schutz, H-J. and Kolisch, R. (2013). Capacity allocation for demand of different customer-product-combinations with cancellations, no-shows, and overbooking when there is a sequential delivery of service. Annals of Operations Research; 206, p. 401-423.

Sharma, A., Jofre-Bonet, M., Panca, M., Lawrenson, J. G. and Murdoch, I. (2012). An economic comparison of hospital-based and community-based glaucoma clinics. Eye; 26, p. 967-971.

Sharp, J., Moriarty, A., Warburton, T. and Dixon, J. (2003). Cataract assessment and direct referral: Stockport optometrists take the initiative. Optometry Today (issue 25/07/2003, p. 16-17). Available from: http://www.optometry.co.uk/uploads/articles/c255e1b62488b87fc29388c0ac9f4e87_sharp20030725.pdf. [Accessed on 5th Sept 2015].

Sheen, N. J. L., Fone, D., Philips, C. J., Sparrow, J. M., Pointer, J. S. and Wild, J. M. (2009). Novel optometrist- led all Wales primary eye-care services: evaluation of a prospective case series. British Journal of Ophthalmology; 93, p. 435-438.

Sheinman, J. (2006). Consensus needs on what we charge. Optician; 231, p. 11-12.

Shickle, D. and Farragher, T. M .(2014). Geographical inequalities in uptake of NHS-funded eye examinations: small area analysis of Leeds, UK. Journal of Public Health; 37(2), p. 337-45.

Shickle, D. and Griffin, M. (2014). Why don't older adults in England go to have their eyes examined? Ophthalmic and Physiological Optics; 34, p. 38-45.

Shickle, D., Griffin, M., Evans, R., Brown, B., Haseeb, A., Knight, S. and Dorrington, E. (2013) Why don't younger adults in England go to have their eyes examined? Ophthalmic and Physiological Optics; 34, p. 30-37.

Shickle, D., Todkill, D. K, Chisholm, C., Rughani, S., Griffin, M., Cassels-Brown, A., May, H., Slade, S. V. and Davey, C. J. (2015). Addressing inequalities in eye health with subsidies and increased fees for General Ophthalmic Services in socio-economically deprived communities: a sensitivity analysis. Public Health; 129, p. 131-137.

Smith, C. M. and Yawn, B. P. (1994). Factors associated with appointment keeping in a family practice residency clinic. Journal of Family Practice; 38(1), p. 25–29.

Smith, S. (2012). Delivering optometric care in the UK. PhD Thesis. Birmingham: Aston University (unpublished).

Snyder, H. and Davenport, E. (1997). What does it really cost? Allocating indirect costs. Asain Libraries; 6, p. 205-214.

Spencer, I. C., Coast, J., Spry, G. D., Smith, L. and Sparrow, J. M. (1995). The cost of monitoring glaucoma patients by community optometrists. Ophthalmic and Physiological Optics; 15(5), p. 383-386.

Spry, P. G. D., Spencer, I. C., Sparrow, J. M., Peters, T. J., Brookes, S. T,, Gray, S., Baker, I., Furber, J. E. and Easty, D. L. (1999). The Bristol Shared Care Glaucoma Study: reliability of community optometric and hospital eye service test measures. British Journal of Ophthalmology; 83, p.707-712.

Swan, J. E. (1974). Price-Product Performance Competition between Retailer and Manufacturer Brands. The Journal of Marketing; 38(3), p. 52-59.

Tang, J., Yan, C. and Cao, P. (2014). Appointment scheduling algorithm considering routine and urgent patients. Expert Systems with Applications; 41, p. 4529-4541.

The Association of Contact Lens Manufacturers (ACLM). (2013). ACLM Market Report 2012. In: Kerr, C. and McParland, M. (eds.) The ACLM Contact Lens Year Book 2013. Wiltshire: ACLM.

The Vision Care Institute. (2009). Global Attitudes and Perceptions About Vision Care: Executive Summary. Wokingham: The Vision Care Institute of Johnson and Johnson Medical Ltd.

Tracy, J.A. and Barrow, C. (2008). Understanding Business Accounting for Dummies, 2nd ed. Chichester: John Wiley & Sons Ltd.

Urbany, J. E. (2001). Justifying profitable pricing. Journal of Product & Brand Management; 10(3), p. 141-159.

Völckner, F. and Hofmann, J. (2007). The price-perceived quality relationship: A meta-analytic review and assessment of its determinants. Marketing Letters; 18(3), p.181-196.

Voss, G. B., Parasuraman. A. and Grewel, D. (1998). The roles of price, performance, and expectations in determining satisfaction in service exchanges. The Journal of Marketing; 62(4), p. 46-61.

Wang, W-Y. and Gupta, D. (2011). Adaptive Appointment Systems with Patient Preferences. Manufacturing & Service Operations Management; 13(3), p. 373-389.

Whitney, C. W., Milgrom, P., Conrad, D., Fiset, L. and O'Hara, D. (1997). The relationship between price of services, quality of care, and patient time costs for general dental practice. Health Services and Research; 31(6), p. 773-790.

Wilson, A. (2000). The use of performance information in the management of service delivery. Marketing intelligence and planning; 18(3), p. 127-134.

Wu, Y., Carnt, N. and Stapleton, F. (2010). Contact lens use profile, attitudes and level of compliance to lens care. Contact Lens and Anterior Eye; 33, p. 183-188.

Yong, C. S. (2006). Task substitution: the new of the Australian Medical Association. Medical Journal of Australia; 185(1): p. 27-28.

YouGov. (2011). 'Opticians' market report. London: YouGov plc.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. Journal of Marketing; 52, p. 2-22.

Zeithaml, V. A., Bitner, M. J. and Gremler, D. D. (2006). Services Marketing: Integrating Customer Focus across the Firm, 4th ed. New York: McGraw-Hill.

Zeithaml, V. A., Parasuraman, A. and Berry, L. L. (1985). Problems and Strategies in Services Marketing. Journal of Marketing; 49, p. 33-46.

Appendices

Appendix 1: List of peer-reviewed publications

Patel, N. I., Naroo, S. A., Eperjesi, F. and Rumney, N. J. (2015). Customer loyalty among daily disposable contact lens wearers. Contact lens and Anterior Eye; 38(1), p. 15 -20.

Appendix 2: List of conference presentations

Naroo, S. A., Rumney, N., Frampton, P. and Patel, N. (2013). Introducing specialist services into routine practice. British Contact Lens Association Clinical Conference and Exhibition. Manchester, 6-9 June 2013. London: Contact Lens and Anterior Eye, e4.

Naroo, S., Rumney, N., Frampton, P. and Patel, N. (2013). Introducing specialist services into routine practice. European Academy of Optometry and Optics Annual Conference, 5th. Malaga, 18-21 April 2013. London: European Academy of Optometry and Optics conference programme, p. 57.

Patel, N., Naroo, S. and Rumney, N. (2012). Enhanced optometric services in the UK: a review. European Academy of Optometry and Optics Annual Conference, 4th. Dublin, 20-22 April 2012. London: European Academy of Optometry and Optics, p. 118.

Patel, N., Naroo, S. A. and Rumney, N. (2013). Integrating Enhanced Services into Routine Practice. Optometry Tomorrow Annual Conference. Nottingham, 17-18 March, 2013.

Patel, N., Naroo, S. A. and Rumney, N. (2013). Professional Fee Structures: Direct Debit vs. PAYG. Optometry Tomorrow Annual Conference. Nottingham, 17-18 March, 2013.

Patel, N., Naroo, S. A., and Rumney, N. (2013). Professional fee structures for contact lens patients. British Contact Lens Association Clinical Conference and Exhibition. Manchester, 6-9 June 2013. London: Contact Lens and Anterior Eye, e6.

Patel, N., Naroo, S. A. and Rumney, N. (2013). Professional Fee Structures for Specialist Services. American Academy of Optometry, 92nd. Seattle, 23-26 October

2013. Available From: http://www.aaopt.org/professional-fee-structures-specialist-services [Accessed on 31st Aug 2015].

Patel, N., Naroo, S. and Rumney, N. (2014). Evidence for practice and service delivery models: Costs of non-routine clinical services in private practice. European Academy of Optometry and Optics Annual Conference, 6th. Poland, 15-18 May 2014. London: European Academy of Optometry and Optics, p. 41.

Patel, N., Naroo, S. A. and Rumney, N. (2014). Professional Fee Structures and Service Quality in Optometric Practice. Optometry Tomorrow Annual Conference. York, 16-17 March, 2014.

Appendix 3: SERVQUAL questionnaire, volunteer information sheet, volunteer consent form

Aston University
Birmingham

Ophthalmic Research Group
School of Life and Health Sciences
Aston University, Aston Triangle
Birmingham B4 7ET, UK

Service quality in Optometric practice

Dear Sir/Madam,

Your optometrist is interested in offering you the best service possible. Please could you complete this questionnaire, which will be independently assessed at Aston University.

What do you expect from an excellent optometrist? Please read the statements below and think about how important they are to you. All the questions require answers on a scale of 1 to 7. If you feel that the statement is *not at all essential* for an excellent optometrists answer 1, if you feel that the statement is *absolutely essential* for an excellent optometrists answer 7.

Many thanks

		Strongly disagree						Strongly agree
1)	Excellent optometrists should have up-to-date equipment	1	2	3	4	5	6	7
2)	Excellent optometrists should have visually appealing facilities	1	2	3	4	5	6	7
3)	Excellent optometrists' employees should be well dressed and appear neat	1	2	3	4	5	6	7
4)	Materials associated with excellent optometrists (e.g. pamphlets, posters, leaflets) should be visually appealing	1	2	3	4	5	6	7
5)	When an excellent optometrists promises to do something at a certain time, it should do it	1	2	3	4	5	6	7
6)	When you have problems, excellent optometrists should show a sincere interest in solving it	1	2	3	4	5	6	7
7)	Excellent optometrists should perform the service right the first time	1	2	3	4	5	6	7
8)	An excellent optometrists should provide the service at the time it promises to do so	1	2	3	4	5	6	7
9)	Excellent optometrists should insist on error-free records	1	2	3	4	5	6	7
10)	Employees of excellent optometrists should tell you exactly when services will be performed	1	2	3	4	5	6	7
11)	Employees of excellent optometrists should give you prompt service	1	2	3	4	5	6	7
12)	Employees of excellent optometrists should be always willing to help customers	1	2	3	4	5	6	7
13)	Employees of excellent optometrists should be never too busy to respond to a customer's request	1	2	3	4	5	6	7
14)	You should be able to trust the employees of excellent optometrists	1	2	3	4	5	6	7
15)	You should feel safe in your transactions with excellent optometrists	1	2	3	4	5	6	7
16)	Employees of an excellent optometrists should be polite	1	2	3	4	5	6	7
17)	Employees of excellent optometrists should have the knowledge to answer customers' questions	1	2	3	4	5	6	7
18)	An excellent optometrists should be able to give you a timely and convenient appointment	1	2	3	4	5	6	7
19)	An excellent optometrists should have opening hours to suit its customers	1	2	3	4	5	6	7
20)	Excellent optometrists should have employees who give you individual attention	1	2	3	4	5	6	7
21)	Excellent optometrists should have your best interests at heart	1	2	3	4	5	6	7
22)	Employees of excellent optometrists should understand your specific needs	1	2	3	4	5	6	7

What is your experience of the optometrists you have been to today? All the following questions require answers on a scale of 1 to 7. If you feel that the statement in *not at all essential* for an excellent optometrists answer 1, if you feel that the statement is *absolutely essential* for an excellent optometrists answer 7.

		Strongly disagree						Strongly agree
1)	My optometrists has up-to-date equipment	1	2	3	4	5	6	7
2)	My optometrists' physical facilities are visually appealing	1	2	3	4	5	6	7
3)	My optometrists' employees are well dressed and appear neat	1	2	3	4	5	6	7
4)	Materials associated with my optometrists (e.g. pamphlets, posters, leaflets) are visually appealing	1	2	3	4	5	6	7
5)	When my optometrists promises to do something at a certain time, it does so	1	2	3	4	5	6	7
6)	When you have problems, my optometrists show a sincere interest in solving it	1	2	3	4	5	6	7
7)	My optometrists performs the service right the first time	1	2	3	4	5	6	7
8)	My optometrists provides the service at the time it promises to do so	1	2	3	4	5	6	7
9)	My optometrists insists on error-free records	1	2	3	4	5	6	7
10)	Employees of my optometrists tell you exactly when services will be performed	1	2	3	4	5	6	7
11)	Employees of my optometrists give you prompt service	1	2	3	4	5	6	7
12)	Employees of my optometrists are always willing to help customers	1	2	3	4	5	6	7
13)	Employees of my optometrists are never too busy to respond to a customer's request	1	2	3	4	5	6	7
14)	You can trust employees of my optometrists	1	2	3	4	5	6	7
15)	You feel safe in your transactions with my optometrists	1	2	3	4	5	6	7
16)	Employees of my optometrists are polite	1	2	3	4	5	6	7
17)	Employees of my optometrists have the knowledge to answer customers' questions	1	2	3	4	5	6	7
18)	My optometrists is able to give me a timely and convenient appointment	1	2	3	4	5	6	7
19)	My optometrists has opening hours to suit its customers	1	2	3	4	5	6	7
20)	My optometrists has employees who give you individual attention	1	2	3	4	5	6	7
21)	My optometrists has your best interests at heart	1	2	3	4	5	6	7
22)	Employees of my optometrists understand your specific needs	1	2	3	4	5	6	7

Which of the following services did you receive from the optometrists today? (Please tick all that apply)

☐ eye examination ☐ contact lens trial ☐ contact lens aftercare

☐ ordering glasses ☐ collecting glasses ☐ ordering contact lenses

Overall, how would you rate the service from your optometrists? (Please circle)

Very poor Poor Fair Good Excellent

Which tests did you have done on your visit to the optometrists today?
(Please list all the tests you can remember having done)

This questionnaire is anonymous. Please could you complete the following information, which will be used for analysis of the results.

How often do you usually visit an optometrist?

☐ first visit ☐ less than every 5 years ☐ every 2-5 years
☐ every 2 years ☐ between 1 and 2 yearly ☐ yearly
☐ more than once a year

Are you male or female? ☐ male ☐ female

How old are you?

☐ under 21 ☐ 21-30 ☐ 31-40
☐ 41-50 ☐ 51-60 ☐ 61-70
☐ 71 or over

Have you been diagnosed with any of the following eye conditions? (Please tick all that apply)

☐ dry eye ☐ ocular allergies ☐ glaucoma
☐ cataract ☐ diabetic eye problems ☐ macular changes (AMD)

Do you wear contact lenses? Yes/ No

If you do wear contact lenses, where do you buy them from?

☐ optometrists where you have your contact lens check ☐ other optician
☐ supermarket ☐ internet ☐ other

What is the reason for your visit today?

☐ new glasses ☐ contact lenses ☐ routine
☐ blurry vision ☐ difficulty reading ☐ family history of eye problems
☐ eye health problem

Why did you choose to come to this Optometrists?

☐ existing patient ☐ referred ☐ recommended by friend/relative
☐ local ☐ website ☐ other

Would you recommend this Optometrists to a friend or relative? Yes/ No

Have you recommended this Optometrists to a friend or relative? Yes/ No

ASTON UNIVERSITY ETHICS COMMITTEE VOLUNTEER INFORMATION SHEET

Project Title
Service quality in high street optometry practices

Invitation
You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

What is the purpose of the study?
To measure and analyse service quality at a high street optometry practice.

Why have I been chosen?
This study is looking to understand the expectations and perceptions of service from a patient perspective; and so involves all those attending for a traditional eye examination or contact lens check. We are hoping to recruit 300 participants in total.

What will happen to me if I take part?
The study involves filling in a questionnaire on the day of your appointment. The first page is be completed at the start before a clinician sees you. The rest of the questionnaire can be completed at anytime after your examination. The completed questionnaire should then be placed into sealed box at reception, ready to be analysed by Aston University.

Are there any potential risks in talking part in the study?
There are no risks associated with this study.

Do I have to take part?
You are free to withdraw at any time, without giving a reason. No sanctions will be taken against you if you prefer not to participate in the study or if you withdraw from the study.

Expenses and payments
There are no payments available for participation in this study.

Will my taking part in this study be kept confidential?
All questionnaires will be completely anonymous and will only be assessed by Aston University. Overall conclusions drawn from the questionnaires will be used to further improve customer service at BBR Optometry.

What will happen to the results of the research study?
The data collected will be analysed and the results will be included in Neelam Patel's PhD thesis. The results may also be published as a research paper in a scientific journal or presented at a conference. The confidentiality of participants will be preserved.

If you wish to receive a copy of any published research paper, please let one of the investigators know.

Who is organising and funding the research?
The investigators involved are Dr Shehzad Naroo and Neelam Patel, who work at Aston University (Life and Health Sciences, Optometry) in association with Knowledge Transfer Partnerships


Aston University
Information on this page has been removed for data protection purposes

ASTON UNIVERSITY ETHICS COMMITTEE VOLUNTEER CONSENT FORM

Title of Project: Service Quality in high street optometry practices

Name of Researchers: Dr Shehzad Naroo and Neelam Patel

		Initial box
1	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions, and have had these answered satisfactorily.	
2	I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without my medical care or legal rights being affected.	
3	I understand that I will not benefit financially from taking part in the research or from its outcomes.	
4	I agree to take part in the above study.	

_____	_____	_____
Name of volunteer	Date	Signature
_____	_____	_____
Name of Person taking consent (If different from researcher)	Date	Signature
_____	_____	_____
Name of researcher	Date	Signature

.....

ASTON UNIVERSITY ETHICS COMMITTEE VOLUNTEER CONSENT FORM

Title of Project: Service Quality in high street optometry practices

Name of Researchers: Dr Shehzad Naroo and Neelam Patel

		Initial box
1	I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions, and have had these answered satisfactorily.	
2	I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without my medical care or legal rights being affected.	
3	I understand that I will not benefit financially from taking part in the research or from its outcomes.	
4	I agree to take part in the above study.	

_____	_____	_____
Name of volunteer	Date	Signature
_____	_____	_____
Name of Person taking consent (If different from researcher)	Date	Signature
_____	_____	_____
Name of researcher	Date	Signature

Appendix 4: Knowledge Transfer Partnership certificate

Knowledge
Transfer
Partnerships

ASSOCIATE CERTIFICATE

Certificate No. **KTP008195-A01**

This is to certify that

Neelam Patel

was an Associate on the Knowledge Transfer Partnership between

Aston University and BBR Optometry Limited

from **03/10/2011** to **02/10/2014** and completed the following project:

To develop a business model based on patient pathways and patient outcomes for enhanced primary ophthalmic care provision and revenue streams within retail optical practices.

Larry Martindale
KTP Operations Manager
Technology Strategy Board

THE AIM OF THE KNOWLEDGE TRANSFER PARTNERSHIP IS TO:

- Strengthen the competitiveness, wealth creation and economic performance of the UK by the enhancement of knowledge and skills and the stimulation of innovation through collaborative projects between business and the knowledge base.

WITH THE OBJECTIVES OF:

- facilitating the transfer of knowledge and the spread of technical and business skills, through innovation projects undertaken by high calibre, recently qualified, people under the joint supervision of personnel from business and the knowledge base;
- providing company-based training for graduates in order to enhance their business and specialist skills;
- stimulating and enhancing business relevant education and research undertaken by the knowledge base;
- increasing the extent of interactions by businesses with the knowledge base and their awareness about the contribution the knowledge base can make to business development and growth.

Knowledge Transfer Partnerships Technology Strategy Board A1, North Star House North Star Avenue Swindon SN2 1UE

Appendix 5: Assessment of final Knowledge Transfer Partnership report

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