

# Estimating costs of electronic conveyancing services in NSW

Public Report



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## Table of Contents

Executive Summary	i
1.0 The objectives of this report	1
1.1 Scope of work	1
1.2 eConveyancing	2
2.0 Conveyancing activity in NSW	3
2.1 Traditional conveyancing processes	3
2.2 The eConveyancing process	3
2.3 The Volume of Conveyancing Activity	4
2.4 ELNO Stakeholders	5
2.5 The Benefits of eConveyancing for Stakeholders	6
2.5.1 Conveyancing Practitioners	6
2.5.2 Incoming and Outgoing Banks	7
2.5.3 NSWLRS and Revenue NSW	7
2.5.4 Future Sources of Time and Cost Efficiencies	7
3.0 Key assumptions	8
3.1.1 ELNO market and stakeholders	8
3.1.2 Operating costs	11
3.2 Approaches to valuing intangible assets and IP	17
3.3 Efficient cost structure as modelled	17
3.3.1 Base case market share	17
3.3.2 Differences between a new entrant and established efficient ELNO	19
3.3.3 Inter-State issues and considerations	20
3.3.4 ELNO fixed and variable costs	20
3.4 Impact of market share on eConveyancing cost structures	21
3.5 Sensitivity to key assumptions	24
3.6 Implications	27
4.0 The interoperability issue	28
4.1 Interoperability options	28
4.1.1 Direct connection ELNO model summary	29
4.1.2 Central Hub ELNO model summary	30
4.1.3 Information Hub ELNO model summary	31
4.1.4 Infrastructure ELNO model summary	32
4.2 Cost implications	33
4.2.1 Capital Expenditure	33
4.2.2 Levelised Operating cost	35
4.3 Sensitivity to key assumptions	39
4.4 Findings	42
5.0 NSW Land Registry Services cost structures (for e Conveyancing)	43
5.1 NSW Land Registry services costs related to conveyancing	43
5.2 The impact of eConveyancing on the Land Registry Office	43
5.3 Strategies and cost impacts on the Land Registry Office	43
5.4 Multi-ELNO Platform Development	44
5.5 Implications	45
6.0 Revenue NSW cost structures	46
6.1 Revenue NSW services costs related to eConveyancing	46
6.2 The impact of eConveyancing on Revenue NSW	46
6.3 Cost impacts on Revenue NSW	46
6.3.1 Inquiries (by ELNO subscribers)	46
6.3.2 Support activity for ELNO product releases	48
6.3.3 Revenue NSW system changes	50
6.4 Comparison with reported cost structures	50
6.4.1 Inquiry support	50
6.4.2 Support activity for ELNO product releases	50
6.4.3 Revenue NSW system changes	52
6.5 Implications	52

7.0	Summary of findings	53
7.1	Efficient costs of a benchmark efficient ELNO	53
7.2	Sensitivities	53
7.3	Efficient costs for the Land Registry Office	53
7.4	Efficient costs for Revenue NSW	54
7.5	Interoperability	54
8.0	Conclusions	55
Appendix A		
	Conveyancing Process Diagram	A

## Table of Tables

Table 1	Market Share by number of ELNOs and markets	i
Table 2	ELNO Market share by years of operation	i
Table 3	Levelised transaction cost by ELNO	ii
Table 4	Market Share scenarios for a New Entrant and Established ELNO	2
Table 5	NSWLRS FY19 Activity Data	4
Table 6	Number of conveyancers in NSW	6
Table 7	Software development team structure	10
Table 8	Funding assumptions	11
Table 9	Assumed benchmark efficient ELNO team size	12
Table 10	Assumed organisation size	13
Table 11	Software platform operating costs	14
Table 12	Stakeholder fees	14
Table 13	Stakeholder interaction by transaction type	15
Table 14	Proportion of transaction type FY2019	16
Table 15	Market Share by number of ELNOs and markets	18
Table 16	Market Share scenarios for a New Entrant and Established ELNO	18
Table 17	Assumed number of transactions	18
Table 18	Assumed number of subscribers	19
Table 19	Assumed differences between the established and the new entrant ELNO	19
Table 20	Market share scenarios	21
Table 21	ELNO Sensitivity test parameters	25
Table 22	Platform development components by operability scenario	34
Table 23	Assumed market share with increasing number of ELNOs in the market	35
Table 24	Market share by ELNOs and national market size	36
Table 25	Interoperability sensitivity test parameters	40
Table 26	Revenue NSW costs included in this review	46
Table 27	ELNO platform software releases	48
Table 28	Revenue NSW software testing team	49
Table 29	Revenue NSW testing team effort – per release	50
Table 30	Assessed costs per release	51

## Table of Figures

Figure 1	Levelised transaction costs for a new entrant and established ELNO by market share and capital investment	ii
Figure 2	Levelised transaction cost for each interoperability model	iii
Figure 3:	ELNO Stakeholders	5
Figure 4	Income statement for the new entrant ELNO	20
Figure 5	Income statement for the established ELNO	20
Figure 6	Fixed and variable costs for established and new entrant ELNOs	21
Figure 7	Fixed and variable costs for the benchmark efficient new entrant ELNO under varying market share scenarios	22

Figure 8	Fixed and variable costs for an established ELNO under varying market share scenarios	22
Figure 9	Average transaction cost – new entrant ELNO	23
Figure 10	Average transaction cost – Established ELNO	23
Figure 11	Levelised transaction cost by customer base for New Entrant and Established ELNOs	24
Figure 12	ELNO Sensitivity test results	26
Figure 13	Total platform development capex by number of ELNO's in the market for various interoperability scenarios	34
Figure 14	Levelised NSW Industry wide transaction cost for each interoperability model	37
Figure 15	Transaction cost per ELNO per year for each interoperability model	38
Figure 16	5-year levelised transaction cost for each interoperability model	39
Figure 17	Interoperability models sensitivity tests	41
Figure 18	Reported submissions to Revenue NSW	47
Figure 19	Levelised Cost for Benchmark Efficient ELNOs	53

## Glossary

AIC	Australian Institute of Conveyancers
API	Application programming interface
AWS	Amazon Web Services
ASX	Australian Securities Exchange
COIN	Community of Interest Network
eCT	Electronic Certificate of Title
EDR	Electronic Duties Return
ELN	Electronic Lodgement Network
ELNO	Electronic Lodgement Network Operator
GUI	Graphical User Interface
LPI	Land and Property Information
LRS	New South Wales Land Registry Services
LSS	Lodgement Support Service
NSW	The State of New South Wales
MFA	Multi Factor Authentication
MOR	Model Operations Requirements
OSR	Office of State Revenue
SRO	State Registry Office
TAC	Title Activity Check

## Executive Summary

IPART has been asked to review the pricing regulatory framework for electronic conveyancing services in NSW where electronic conveyancing ('eConveyancing') is a system of settlement of real property transactions via an Electronic Lodgement Network (ELN).

To assist with this review, IPART engaged AECOM to review, estimate and report on the costs that an efficient ELN Operator (ELNO), an efficient land registry and Revenue NSW would incur in providing specified services at the quantity and level demanded by the industry.

AECOM determined the capital and operating costs for a benchmark efficient new entrant and an established ELNO based on various market share scenarios.

In each case, it has been assumed that an ELNO would deliver services across several (assumed to be three) markets (States), with the established ELNO operating in all jurisdictions throughout and the new entrant ELNO expanding into a new jurisdiction in each of the first three years.

This enables the ELNOs to recover costs from more than one jurisdiction, and for the purposes of this assessment, we have assumed the share by market as shown in Table 1.

**Table 1 Market Share by number of ELNOs and markets**

Market	Number of markets		
	1	2	3
1	100%	53%	37%
2	-	47%	33%
3	-	-	30%
<b>Total number of transactions assumed</b>	<b>736,000</b>	<b>1,392,810</b>	<b>1,998,380</b>

The assumed growth of each ELNO across all markets during each year of operation is shown in Table 2, for low, medium and high market penetration scenarios.

**Table 2 ELNO Market share by years of operation**

ELNO	Years of operation					Mean
	1	2	3	4	5	
New entrant ELNO – Low customer base	2%	5%	10%	15%	20%	10%
New entrant ELNO - Medium customer base	5%	10%	20%	30%	40%	21%
New entrant ELNO - High customer base	10%	20%	35%	50%	65%	36%
Established ELNO – Low customer base	20%	20%	20%	20%	20%	20%
Established ELNO – Medium customer base	50%	50%	50%	50%	50%	50%
Established ELNO – High customer base	80%	80%	80%	80%	80%	80%

Operating costs, the number of transactions and the resulting levelised transaction costs over a 5-year operating period for each ELNO are shown in Table 3 and Figure 1. The estimated capital cost of the new entrant is also shown in the table and is represented on the chart by the size of the bubble.

It has been assumed that the capital investment made by the established ELNO has been fully depreciated at the start of the modelled period.

**Table 3 Levelised transaction cost by ELNO**

Market share scenario	Capital Investment ('000)	Operating Costs (FY2020-FY2024) ('000 \$2019)	Total Number of Transactions (FY2020-2024)	Levelised cost per transaction (FY2020-FY2024)
New entrant ELNO – Low customer base	6,139	115,597	983,631	117.52
New entrant ELNO - Medium customer base	6,139	142,927	1,974,623	72.38
New entrant ELNO - High customer base	6,139	179,757	3,349,732	53.66
Established ELNO – Low customer base	-	147,913	1,998,380	74.02
Established ELNO – Medium customer base	-	237,930	4,995,949	47.62
Established ELNO – High customer base	-	326,146	7,993,519	40.80

**Figure 1 Levelised transaction costs for a new entrant and established ELNO by market share and capital investment**

It would generally be assumed that the first mover into a market such as this would have a higher software development cost. The second and later entrants benefit from being able to enter a market where the requirements and protocols for communication are already established and known by all parties and would be expected to have a lower development cost as a result.

In practice, however, market share is the primary driver of the difference in levelised transaction cost between a benchmark efficient New Entrant ELNO and a benchmark efficient Established ELNO, not the scale of the capital investment needed (Figure 1).

The principal market participants other than ELNOs are the LRS and Revenue NSW. Our assessment, based on our understanding of current market rates and assuming integration with five jurisdictions, is that the level of effort required for a benchmark LRS to develop a system suitable to support eConveyancing would require a capital expenditure of approximately **\$4.2 million** (in \$FY2019). A 5-year depreciation period would, in our view, be appropriate. The cost likely to be required by Revenue NSW to respond to LPI verification issues and cater for ELNO product releases and updates has also reviewed.

The prospect of more than two ELNOs in the market raises interoperability issues. We have addressed interoperability issues and costs for up to 4 possible ELNOs, where the new entrants may or may not be full-service.

Five possible interoperability scenarios were considered, using market share assumptions over the period as indicated in Figure 2, which shows market growth to saturation after 3 years with the established ELNO maintain approximately 52% share of the national market. The *no-interoperability option* requires the lowest capital investment, but rapidly delivers a higher transaction cost to the industry. The other scenarios are all lower cost but are not materially different in terms of levelised cost. The *Infrastructure ELNO* requires the lowest investment and delivers the lowest levelised transaction cost.

A consequence of the fixed number of transactions available is that additional ELNOs would be likely to have a small number of transactions to work with, making their levelised costs very high in comparison to the established ELNOs, and increasing total industry cost.

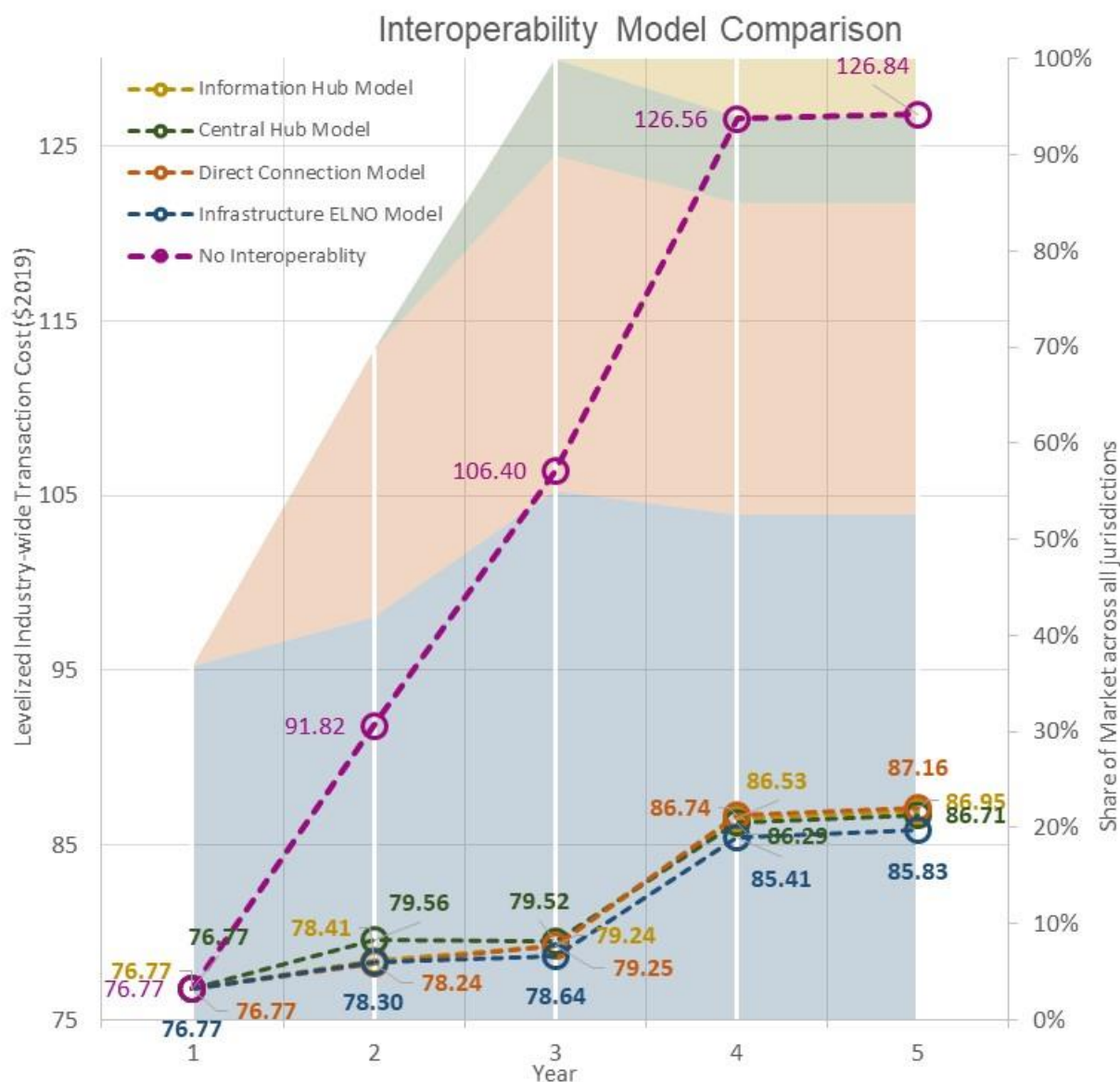


Figure 2 Levelised transaction cost for each interoperability model

## 1.0 The objectives of this report

IPART has been asked to review the pricing regulatory framework for electronic conveyancing services in NSW where electronic conveyancing ('eConveyancing') is a system of settlement of real property transactions via an Electronic Lodgement Network (ELN).

To assist with this review, IPART has engaged AECOM to review, estimate and report on the costs that an efficient ELN Operator (ELNO) and an efficient land registry would incur in providing specified services at the quantity and level demanded by the industry.

Specifically, IPART has been asked to review the state of the electronic conveyancing market, and recommend appropriate pricing regulatory frameworks which include:

- A maximum price or pricing methodology for the provision of services by an ELNO.
- A maximum price or pricing methodology for services provided to ELNOs by NSW Land Registry Services (NSW LRS).
- A maximum price or pricing methodology for services provided to ELNOs by Revenue NSW.
- In reaching the advice, IPART were to have regard to:
  - Protection of consumers from potential pricing abuses due to the current highly concentrated nature of the eConveyancing market.
  - The potential for additional ELNOs to enter the market.
  - The cost of providing the services concerned.
  - The extent to which Property Exchange Australia (PEXA) invested capital and developed intellectual property as the first ELNO.
  - The possibility of applying the NSW approach as a model for other jurisdictions.

This report has been prepared by AECOM in response to a specific scope of work defined by IPART to support its review.

### 1.1 Scope of work

AECOM was engaged to complete the following services:

- Estimation of efficient operating and capital expenditures that a benchmark efficient ELNO would incur in providing eConveyancing services for five years from 2018-19 to 2022-23.
- Estimation of efficient operating and capital expenditures which are likely to be incurred by industry participants under three scenarios of interoperability (ELNOs, conveyancers/solicitors, financial institutions, Land Registry NSW, Revenue NSW, RBA, etc).
- Estimation of efficient capital expenditure that a benchmark efficient land registry office would incur in building a new system for ELNOs for five years from 2018-19 to 2022-23.
- Estimation the efficient costs incurred by Revenue NSW in supporting ELNO's in eConveyancing

AECOM has been asked to consider a benchmark efficient ELNO and an established ELNO under the independent market share scenarios in Table 4.

**Table 4 Market Share scenarios for a New Entrant and Established ELNO**

ELNO	Years of operation				
	1	2	3	4	5
New entrant ELNO – Low customer base	2%	5%	10%	15%	20%
New entrant ELNO - Medium customer base	5%	10%	20%	30%	40%
New entrant ELNO - High customer base	10%	20%	35%	50%	65%
Established ELNO – Low customer base	20%	20%	20%	20%	20%
Established ELNO – Medium customer base	50%	50%	50%	50%	50%
Established ELNO – High customer base	80%	80%	80%	80%	80%

## 1.2 eConveyancing

Conveyancing is the process through which title and other interests in real property are transferred from one person to another. It typically, includes the following phases:

- Preparation of contracts
- Exchange of contracts
- Property searches and enquiries
- Preparation and exchange of documents
- Financial settlement
- Document lodgement
- Document registration (when legal title is transferred).

eConveyancing is an electronic solution for some of the steps involved in this process and includes both the title and financial settlements. It allows lawyers, conveyancers and financial institutions to enter a secure, online workspace via an Electronic Lodgement Network (ELN) where they can exchange data and collaborate to prepare documents, settle funds and lodge documents with land registries.

From 1 July 2019, most types of property documents in NSW will be mandated to be electronic and will be completed through and Electronic Lodgement Network Operator (ELNO).

## 2.0 Conveyancing activity in NSW

### 2.1 Traditional conveyancing processes

Traditional conveyancing processes are paper based, where the aim is to produce a paper title (with or without a mortgage) via signed and dated contracts and stamp duty documents.

Distribution of funds is conventionally completed via bank cheques to financial institutions, revenue NSW (stamp duty), vendor equity accounts, conveyancers, lawyers and statutory bodies e.g. local councils, water authorities and strata bodies.

The traditional conveyancing process can be split into three key stages:

1. Purchasers and vendors sign and date two separate identical contracts and pay a deposit to an agent. Contracts are subsequently swapped/handed over between parties, known as “exchange of contracts”. Once exchange is completed, the property is listed as sold.
2. Mortgage documents signed and certified by incoming mortgagee.
3. Settlement or closure of sale is typically completed within 6 weeks of dated contract exchange. Within this stage settlement figures are agreed between settlement agents and transfer documents produced. Authorising the change of title with new names, current original title and notices to future address service for Council, Water and Strata are furnished.

The traditional conveyancing steps compared against the ELNO process is presented in the first three columns of the flowchart (Appendix A).

### 2.2 The eConveyancing process

The eConveyancing process commences following the exchange of contracts, after terms have been agreed between purchasers and vendors:

- Data from contracts such as addresses, title references, sale prices, vendors and purchasers' names and lawyers / conveyancers details are inserted into legal practice management systems. Contracts can be signed digitally online.
- Application Programme Interface (API) integration enables the uploaded data to be transferred to the ELNO, and invitations are dispatched to vendors and purchasers' conveyancers/lawyers.
- Upon acceptance of the ELNO invitation, vendors and purchasers' conveyancers/lawyers invite incoming and outgoing financial institutions into the online ELNO workspace using dropdown selection.
- Automated documents required to complete a conveyance are shared online, signed and completed collaboratively by conveyancers and lawyers on behalf of vendors and purchasers.

Action on behalf of clients within an ELNO demands a high level of assurance/compliance from eConveyancing. This is underpinned by the conveyancers and lawyers, and achieved through two key stages within eConveyancing:

1. Identity confirmation of the vendor/purchaser client is undertaken using reasonable steps such as passports, drivers' licenses, face to face verification, technology applications or third-party agents.
2. A 'Client Authorisation form' is required (in paper or electronic form) to consent to conveyancers/lawyers signing documents on behalf of their clients within the ELNO.

An outline of the eConveyancing process using an ELNO is presented in the two central (red shaded) columns of (reference Appendix A). The ELNO settlements procedure can be split into two stages:

1. Title Settlement – transferring purchaser(s) name(s) to a new eCT and registering a mortgage if required (no paper title).
2. Financial Settlement – where funds are electronically transferred to incoming, outgoing banks, Revenue NSW, and other third parties engaging with the RBA or ASX platforms.

## 2.3 The Volume of Conveyancing Activity

Table 5 shows the volume of conveyancing activity in NSW for FY2019<sup>1</sup>. 80% of ELNO activity is processing transfers and refinancing of existing titles with a different financial institution. Both of which involve the discharge of existing mortgage and registration of a new mortgage.

**Table 5 NSWLRS FY19 Activity Data**

Number of Transactions, FY2018					
Category	Dealings Lodged	Transfers	Mortgages	Discharge Mortgages	Other
Jul	79,018	18,061	22,920	23,411	14,626
Aug	82,358	18,461	22,887	25,121	15,889
Sep	69,954	15,098	19,522	21,472	13,862
Oct	75,330	16,083	21,232	23,661	14,354
Nov	74,690	16,174	20,947	23,038	14,531
Dec	74,347	17,605	21,012	22,801	12,929
Jan	58,627	12,510	17,071	18,448	10,598
Feb	57,322	10,886	15,358	17,400	13,678
Mar	62,555	12,366	17,065	18,755	14,369
Apr	63,933	13,962	18,075	18,811	13,085
May	72,567	15,506	20,281	21,465	15,315
Jun	-	-	-	-	-
<b>Total</b>	<b>840,765</b>	<b>181,868</b>	<b>236,040</b>	<b>255,691</b>	<b>167,167</b>

<sup>1</sup> NSWLRS

## 2.4 ELNO Stakeholders

The key ELNO stakeholders interact to produce a title and funds distribution at sale closure are shown in Figure 3.

Figure 3: ELNO Stakeholders



All individuals that practice conveyancing in NSW and representatives of financial institutions involved in property transactions must subscribe to at least one ELNO platform (after 1 July 2019 when it became mandatory to complete all mainstream transactions through an ELNO).

Subscribers are assumed to be from one of three professional groups:

- Licensed conveyancers
- Legal professionals
- Financial institutions.

It has been assumed that conveyancers would all be members of the Australian Institute of Conveyancers (AIC). AIC membership at 30<sup>th</sup> June 2018 was 951, and it is assumed that all are potential subscribers.

Table 6 shows the membership of the Law Society of NSW at 31<sup>st</sup> March 2019 broken down by firm type<sup>2</sup>, and indicates that there a total of 20,713 solicitors in private practice.

The number of subscribers from financial institutions is unknown.

There appear to be 8,244 lawyers in NSW that practice conveyancing, and when combined with membership of AIC, this suggests that there are 9,195 potential ELNO subscribers in NSW.

<sup>2</sup> <https://www.lawsociety.com.au/sites/default/files/2019-05/201903%20Practising%20Solicitor%20Statistics%20-%20Mar%202019.pdf> accessed 31<sup>st</sup> May 2019

Type of subscriber	Number
Sole practitioners	4,315
Law firm	6,171
Legal Practice	10,227
<i>Coporate lawyer</i>	6,197
<i>Government Legal Practitioner</i>	3,524
<i>Community Legal centres or not practising</i>	3,728
<b>TOTAL</b>	<b>34,162</b>
Subtotal that could practise conveyancing	20,713
Proportion that practise conveyancing	39.8%
<b>Potential Subscribers (Lawyers)</b>	<b>8,244</b>
<b>Conveyancers</b>	
As at 30th June 2018 Membership of AIC NSW	951
<b>TOTAL Potential Subscriber pool</b>	<b>9,195</b>

Table 6 Number of conveyancers in NSW

## 2.5 The Benefits of eConveyancing for Stakeholders

### 2.5.1 Conveyancing Practitioners

KPMG noted that using an ELNO between exchange of contracts and settlement could save a conveyancing practitioner between 3 and 5 hours of transaction time<sup>3</sup>.

There are other benefits. ELNOs also:

- Deliver more certainty to clients and practitioners that settlements will close as scheduled.
- Remove the effort of preparing paper settlement packs and sending via post, eliminating the risk of important documents going missing or arriving late.
- Reduce the stress and worry associated with conveyancing for both clients and practitioners.
- Enhance the client experience through the use of smart phone tracking applications (such as the 'PEXA key app') which enables practitioners, vendors and purchasers to track their settlement progress and tasks to complete.
- Perform a checking and verification role, where entered data is cross-checked to help eradicate errors. Any inconsistencies in data entries such as title references, names on certificates, street locations are quickly identified, and the user notified.
- Constant checks for title activity changes on a title throughout a settlement also assist in avoiding claims against practitioner.
- Pre-register appropriately qualified and insured conveyancers/lawyers, which enhances consumer outcomes and protection, reduces client risk and the attractiveness of 'do it yourself' conveyancing services.

<sup>3</sup> Electronic Conveyancing, KPMG, February 2018

### 2.5.2 Incoming and Outgoing Banks

ELNOs enable incoming and outgoing banks to easily insert payout figures and amounts available for settlement through a 'collaborative electronic settlement table'. Practitioners book settlements online through the ELNO, reducing effort required to arrange settlement and avoiding lengthy co-ordination discussions.

It is expected that ELNOs will, in the future, facilitate a fully computerised interaction with banks, where payouts and loan figures are automatically populated. Mortgage documents will also be signed electronically by the bank on behalf of clients, through authorisation from borrowers. Copies of mortgage documents can be shared digitally via secure email. Digitisation and automation of this process by banks will drive efficiencies and lead to cost savings for their mortgage operations.

### 2.5.3 NSWLRS and Revenue NSW

Land registry provide the following services

- Land Title Verification. A service to check existence of the title.
- Registry Information Supply (RIS) which provides brief title data
- Title Activity Check (TAC) which allows the ELNOs to 'ping' in as necessary through the process to confirm the title.
- Registry Information Resupply, which is an updated version of the RIS, and used if the TAC identifies a change or if the eConveyancing transaction has completed and is being validated.
- Document Lodgement Verification which ensures that documents are provided by ELNOs free from error.
- Document Lodgement Service which records and lodges the updated title documents.
- Subscriber account management
- Significant time savings for post settlement new title registration are enabled via instantaneous notifications to councils and water authorities.
- Conversion of unencumbered titles to an Electronic Certificate of Title (eCT) is an excellent innovation to prevent fraud and forgery of NSWLRS titles.
- Assessing stamp duty via Electronic Duties Return (EDR) and conveyancing software enables duty assessment figures to be lodged and verified within the ELNO. This is much more efficient than lodging and sending a document pack to a settlement agent to process.

### 2.5.4 Future Sources of Time and Cost Efficiencies

A number of innovations or future developments for eConveyancing have already been suggested, including:

- Moving the Client Authorisation forms (where clients authorise practitioners to sign documents on their behalf in the ELNO) to a digital online process rather than paper.
- Enabling clients to give authority to Banks to sign Mortgage Documents digitally (mortgage documents are still issued in paper to borrowers and wet signed by clients).
- Settling rare forms of title in NSW (functionality to settle company title and tenants-in-common apartments).
- Include functionality for strata bodies to notify changes on strata rolls rather than the current paper-based system. Which is through a posted section 22 certificate to strata managers for purchasers of apartments.
- The biggest drawback to the current ELNO is bank interaction to insert loan payouts and approved loan amounts in the settlement table. Bank figures currently appear in the settlement table on the morning of settlement. To improve banking interaction the industry needs to agree on the timescale for bank interaction within the current and any future ELNO.

### 3.0 Key assumptions

Data from the incumbent ELNOs has been reviewed and a cost model developed to evaluate the efficient asset base and operating costs of a benchmark efficient ELNO and an established ELNO. The model has been based on the following key assumptions:

#### 3.1.1 ELNO market and stakeholders

<b>eConveyancing Market</b>	<p>A new entrant ELNO would be entering an immature mandated market, but one where the eConveyancing concept has been established by a small number of existing market participants (established ELNOs).</p> <p>The protocols and rules for interactions are established and known by all stakeholders (i.e. there is no need to embark on potentially costly market education).</p>
<b>Stakeholder interfaces</b>	<p>The entrant ELNO would need to develop interfaces with each stakeholder. The first-to-market ELNO has created intangible value by educating the industry and developing protocols and/or interfaces that benefit succeeding ELNOs but is likely to have made some investment in development directions that subsequently proved to be of little or no value. Our assessment of these external and internal intangible assets is discussed in Section 3.2.</p> <p>A benchmark efficient new entrant ELNO would benefit from the external intangible benefits and also avoid possible stranded investments by learning from the experience of the first mover. The entrant ELNO would, however, still need to enter into discussions with each stakeholder, develop the necessary APIs for interaction with the stakeholder, and integrate them into their own platform.</p> <p>For cost estimation purposes, we have assumed that the ELNO would need to interface with an entity such as the RBA, and that up to 12 financial institutions would also be fully integrated into the platform.</p>
<b>ELNO growth strategy</b>	<p>The ELNO would establish a primary place of business in NSW and would look to operate in multiple jurisdictions through the development of local satellite offices. For the purposes of this assessment, it has been assumed that both the new entrant and established ELNOs would operate in three jurisdictions and that the new entrant ELNO would go live progressively at a rate of one additional jurisdiction per year after launch. For the established ELNO it is assumed that all jurisdictions would be live from the start of the modelled period.</p> <p>This growth would be supported by a core team in the primary office with the local offices limited to marketing, user-onboarding and local administrative support. The expectation is that the marketing team would drive the growth of market share and each new-subscriber on-boarded. As each user would need to be on-boarded once, we have not grown the marketing and user support team size with market share. This means that a small and efficient team can be maintained.</p>
<b>ELNO platform development cost (capex)</b>	<p>A fundamental assumption is, as stated above, that the market exists and that there is no need to educate the market, and that protocols for interaction between parties are in existence.</p> <p>Bespoke software would be developed to provide the service. The technologies and tools to build such bespoke software tend to be relatively inexpensive or free. Microsoft, for example, offers a full end-to-end Continuous Development platform in its DevOps product in Australia for between \$70 and \$415 per user per month, depending upon optional features.</p>

This provides everything a development team would need to design, build, collaborate, test, control and release such bespoke software.<sup>4</sup>

We anticipate that a new market entrant would spend some effort researching the market to establish the requirements and shape the offering to market. This would be structured in the form of 'User Stories' that describe, in some detail, how each user would interact with the platform in terms of the actions and results.

Software would be developed to support each of these user functions.

Specifically, prerequisites to efficient development of a full ELNO we consider to be:

- A dedicated software development team with the following attributes;
  - The initial sole business aim is to become an operating ELNO cost effectively and efficiently
  - The technology and business experience to execute on that efficient approach
  - Suitable staffing in place to begin building immediately, i.e.
    - Software/Project Management
    - Product ownership
    - Business analysis
    - User Experience / User Interface designer
    - Software architecture with emphasis on financial system security
    - Application software coding (Software developers)
    - Quality Assurance / Test capability
    - A separate Software Development Operations (Dev Ops) capability
- Software is managed and built:
  - Using a typical software development method such as Agile Scrum or Kanban
  - Using suitable supporting project management tools such as Trello, Jira, Microsoft DevOps or physical wall boards
  - Using appropriate software development version management technology such as GitHub or SVN
- All third-party integrations (technology communication channels), such as financial institutions, Land Registry operations and Transfer Duty operations, and the RBA, would be with an interface developed by that third party which is:
  - Secure
  - Reliable
  - Well-defined
  - Capable of interacting with multiple registered ELNOs
  - Well suited to eConveyancing transactions.

The ELNO platform would be developed to provide the core service of an ELNO as defined by the process chart in Appendix A.

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<sup>4</sup> <https://azure.microsoft.com/en-au/pricing/details/devops/server/>

There would be opportunities for each ELNO to add value by adding functionality that differentiates it in the market, but as these functions are not required to deliver the core ELNO service we have not included an allowance for the development of additional features or functionality beyond that required for the core service.

We anticipate that this process would take up to 2 years to complete, based on the effort required to deliver the core service that an ELNO would require to establish a market share. We have assumed an ongoing team of product developers to maintain the platform required for the core service.

We have built up the software development effort required to establish the platform and arrived at a replacement cost to redesign and rebuild the software by applying a market rate for software developers together with an appropriate multiplier to allow for:

- Development management (project management)
- User experience (UX) design standardisation
- Software architecture
- Quality assurance throughout the development
- Security considerations throughout the process
- Business analysis to crystallise how the processes can work before they are built.

The software development team could be structured in various ways, and in Table 7 we show three possible configurations. A 'Lean' team would have lower initial cost but would produce a product that may require a relatively high level of development and maintenance effort. An 'Aggressive' team is the converse. We have assumed a 'typical' development team structure as the base case in the model.

**Table 7 Software development team structure**

Software development team make composition			
	Lean	Typical	Aggressive
Project Manager	1	1	1
Analyst	1	1	2
Architect	1	1	1
UX	0	1	2
App dev / UI	1	2	3
QA	1	2	3

The ELNO would also need to provide IT hardware such as PCs and local network equipment, and a reasonable bandwidth connection to the internet. For completeness, typical examples of required technologies are as follows;

- Intel i7 PC, 16Gb RAM, 512Gb+SSD per development team member
- 2x Monitors @1080p or above, 23" or above, plus suitable height adjustable stand(s) per development team member
- Cat6 / 6e (Gigabit speed) ethernet cabling
- Suitable 48+ port gigabit dedicated ethernet switch

- 2x local test environments;
  - Xeon application server, at least 32Gb RAM, 512Gb SSD
  - Xeon SQL Database server, at least 32Gb RAM, 512Gb SSD, 20Tb RAID HDD storage
- The production environment would be hosted on the cloud, such as Azure or AWS, so no hardware beyond local test environment is included above.

Our modelling indicates that the efficient capital expenditure to develop an ELNO platform, based on the assumptions presented here, would be about **\$5.55 million in \$FY2019**. The inclusion of hardware costs and capital costs during construction at an assumed pre-tax WACC rate of 5.7% give a **total capital investment of \$6.14 million (\$2019)**.

#### Asset depreciation and interest charges

Funding would be required throughout the platform development period to cover the development, staff and IT hardware and occupancy costs. It is assumed that this would be sourced from a combination of debt and equity. A WACC has been applied at quarterly intervals to calculate the cost of capital throughout this development stage.

On launch, it is assumed that the platform would be earning revenue and the development costs are then capitalised over a 5-year period, with interest on the carrying value, again calculated quarterly.

No return of or on equity has been included, other than that accounted for in the WACC. Similarly, no assessment of tax liability has been undertaken.

These parameters are summarised in Table 8.

**Table 8 Funding assumptions**

Parameter	Value	Basis
Platform development period	2 years	AECOM assessment.
Depreciable asset life (applied to software and IT hardware)	5 years	AECOM assessment
Frequency of debt capitalisation	Quarterly	AECOM assessment
WACC (pre-tax real)	5.7% (ELNO) 4.7% (LRS)	IPART assessment <sup>5</sup>

### 3.1.2 Operating costs

#### Organisation size

The staffing costs are one of the most significant cost items. We would expect a benchmark efficient ELNO to establish a minimal team initially, and to grow this team whilst the product is developed so that the full team is in place at product launch.

Table 9 shows our view of the team that an efficient new entrant ELNO would require pre and post launch.

Additional team members would be recruited to establish a satellite office for each new jurisdiction.

We have assumed that the market share that an ELNO will achieve is correlated with the size of the sales team and used transaction data supplied by the established ELNO to determine the number of subscribers and therefore for the size of the associated sales and marketing team.

<sup>5</sup> As advised by IPART on 30 October 2019

We have further assumed that on start-up, or where the market share is low, a larger sales team in proportion to the number of subscribers is required. As market share grows the size of the sales team increases, but with fewer FTEs per subscriber as a result of the increasing presence in the market.

We have recognised that a new entrant benchmark efficient ELNO would not need to replicate the same effort as the first entrant because the market would be established, but they would need to win subscribers across from the established ELNO.

Further, in our view, it's likely a new entrant ELNO would boost their sales effort slightly to win subscribers across from other platforms. At the same time, we expect that the efficiencies resulting from the use of ELNOs (compared to the current paper-based system) would see the subscriber pool consolidate and reduce in number as some subscribers take on more transactions and others fall out of the market as a result. This would reduce the size of the sales team needed. We've therefore assumed that the sales team would in effect be constant size throughout.

This means that the new entrant ELNO will grow from FY20 to FY23 via an increase in market share and increasing reach into other jurisdictions, whereas the incumbent ELNO is assumed to remain a constant size (Table 10).

**Table 9 Assumed benchmark efficient ELNO team size**

Staff Category	Function	Personnel numbers		
		Pre-launch	At launch	For each local office
Executives	Company leadership and management	8	8	1
Marketing and customer support	Market growth. Subscriber on boarding.	3	3	5
Sales Team	To sell the product to new subscribers	0	Correlated with market share growth – see discussion below	
Software Development	Development and testing of software. Usually broken into teams or squads. Includes the separate teams to test the software. Would be expected to transition into the product maintenance role post launch.	24	24	
Development Opps		0	10	
Product Development		0	10	
Overhead staff	Other support staff that are not directly involved in the product.	10	10	1
<b>Total</b>		<b>45</b>	<b>65</b>	<b>7</b>

**Table 10 Assumed organisation size**

Case	Staff Function	2020	2021	2022	2023	2024
<b>1L</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales and Marketing Team</i>	19	23	28	30	32
	<i>Satellite Offices</i>	0	7	14	14	14
	<b>Total</b>	<b>81</b>	<b>92</b>	<b>104</b>	<b>106</b>	<b>108</b>
<b>1M</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales Team</i>	20	25	29	33	38
	<i>Satellite Offices</i>	0	7	14	14	14
	<b>Total</b>	<b>82</b>	<b>94</b>	<b>105</b>	<b>109</b>	<b>114</b>
<b>1H</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales Team</i>	25	29	34	37	43
	<i>Satellite Offices</i>	0	7	14	14	14
	<b>Total</b>	<b>87</b>	<b>98</b>	<b>110</b>	<b>113</b>	<b>119</b>
<b>2L</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales Team</i>	29	29	29	29	32
	<i>Satellite Offices</i>	14	14	14	14	14
	<b>Total</b>	<b>105</b>	<b>105</b>	<b>105</b>	<b>105</b>	<b>108</b>
<b>2M</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales Team</i>	37	37	37	37	40
	<i>Satellite Offices</i>	14	14	14	14	14
	<b>Total</b>	<b>113</b>	<b>113</b>	<b>113</b>	<b>113</b>	<b>116</b>
<b>2H</b>	<i>Head Office</i>	62	62	62	62	62
	<i>Sales Team</i>	42	42	42	42	45
	<i>Satellite Offices</i>	14	14	14	14	14
	<b>Total</b>	<b>118</b>	<b>118</b>	<b>118</b>	<b>118</b>	<b>121</b>

Note: 1: New Entrant, 2: Incumbent, L/M/H refers to market share

## Software platform costs

The benchmark efficient ELNO would be cloud based, most likely through a proprietary web hosting service. These charges are driven by usage and how resilient and responsive the system needs to be as well as the type of data or files being sent through the system. We have sourced typical rates from the market.

Security provision is critical to an ELNO platform and our assessment includes the development of appropriate security provision within the platform. This includes the use of a proprietary firewall product and the services of a third-party Multi-Factor Authentication (MFA) provider. We have also allowed for an annual third part audit of the security systems as required by the MOR.

A provision of annual IT maintenance, which includes licences subscriptions including the client management databases, internet and phone services, anti-virus and security software has also been included.

Table 11 shows the assumed costs included for ongoing operation of the software platform.

**Table 11 Software platform operating costs**

Provision	Annual Cost (\$2019)	Basis
Webhosting service	10,000	Based on market cost for an MVP in Sydney
Third party firewall provision	45,000	Market cost for a proprietary firewall (F5 or similar) at 100Mbps
Third party MFA	-	Included in the webhosting service
Professional security audit	100,000	AECOM assessment
System maintenance	2,000,000	AECOM assessment

## Transaction costs

Cost are incurred by the ELNO when interacting with third parties as part of a transaction.

Table 12 shows the fees that are assumed to be incurred on interaction with each third party. The need for third-party interaction varies by transaction type and is summarised in Table 13.

**Table 12 Stakeholder fees**

Third party	Cost per transaction (\$2019)
Lodgement Support Services Fee (LSS) levied by Land Registry	7.00
Revenue Office Fees	-
Financial Settlement Costs	5.00
Title insurance	10.00

**Table 13 Stakeholder interaction by transaction type**

Transaction Type	LSS fee incurred	Financial Settlement Cost incurred	Revenue Office fee incurred
<b>Discharge</b>			
All variants	✓	✓	✗
<b>Mortgage</b>			
Mortgage with Caveat Withdrawal	✓	✗	✗
Mortgage Incoming Mortgagee	✓	✓	✗
Standalone Mortgage	✓	✓	✗
<b>Refinance</b>			
All variants	✓	✓	✗
<b>Transfer</b>			
All variants	✓	✓	✓
<b>Caveat</b>			
Caveat	✓	✗	✗
Withdrawal of Caveat	✓	✓	✗
<b>Settlement / Priority Notice</b>			
Extend Priority Notice (all variants)	✓	✗	✗
<b>Other</b>			
Lease	✓	✗	✗
Transmission	✓	✗	✗
Transmission with Settlement	✓	✓	✗
Discharge and Mortgage Settlement Incoming Mortgagee	✓	✓	✗
Waived discharge fees	✓	✗	✗

It has been mandatory since 1 July 2019 to use eConveyancing for the following types of transaction:

- Transfer
- Mortgages
- Discharges of mortgage
- Caveats
- Withdrawals of caveats
- Transmission applications

Data published by the Registrar General of NSW<sup>6</sup> and NSW Land Registry<sup>7</sup> has been used to evaluate the proportion that each of the above transaction types presents. This is summarised in Table 14.

<sup>6</sup> <https://www.registrargeneral.nsw.gov.au/eConveyancing/eConveyancing-Statistics>; accessed 27<sup>th</sup> June 2019

<sup>7</sup> <https://www.nswlrs.com.au/Dealing-Statistics> accessed 27<sup>th</sup> June 2019

**Table 14 Proportion of transaction type FY2019**

Transaction type	Percentage of all transactions
Discharge	36
Mortgage	33
Transfer	26
Caveats (other)	5
<b>TOTAL</b>	<b>100</b>

The data presented in Table 12, Table 13 and Table 14 has been used to assess the third-party costs that the ELNO would incur for a given number of transactions.

**Multiple titles**

Multiple titles occur when there is more than one title to lodge in a transaction. A benchmark efficient ELNO would need to accommodate the settlement of multiple titles from a single workspace. Each title incurs a separate lodgement support services (LSS) fee from the land registry.

The fee charged by the ELNO would be expected to be larger than that for a single title transaction, but currently, the fee charged for multiple titles does not vary by the number of titles within a transaction.

For the purposes of this assessment the number of multiple title transactions has been considered immaterial and ignored.

**Abandoned transactions**

In practice, a number of transactions do not complete. Costs incurred by the ELNO in setting up the workspace, including costs levied by third parties (notably LRS for a RIS) for any initial interactions are not therefore directly recoverable. These costs need to be recovered through the revenue from successful transactions.

For this assessment, it has been assumed that 5% of transactions are abandoned on average each year.

**Subscriber costs**

We have assumed that a benchmark efficient ELNO would incur direct costs associated with each subscriber for onboarding, training and retention. This relates to provision of facilities for workshops, seminars, training, documentation etc.

An allowance of \$600 per subscriber per year has been included in the model.

In addition, each subscriber is required to have access to a digital signing key to enable them to complete documentation securely online. An annual allowance of \$500 per subscriber per year has been used in the model.

**Occupancy charges**

The assumption is that a benchmark efficient ELNO would be located in Sydney, with an office in the CBD. An allowance has been included for rental of appropriate office space using gross floor rates typical of the current market with an assumed floor area of 10m<sup>2</sup> per person.

Additional occupancy charges have also been included at the same rate for each satellite office, based on staff numbers. For the new entrant ELNO this occupancy cost ramps up progressively with one new satellite office established each year. Occupancy costs include all satellite offices for the established ELNO throughout the modelled period.

## 3.2 Approaches to valuing intangible assets and IP

The established ELNO's have identified the following intangible assets in their submissions:

- Software development intellectual property
- Licensing and standards
- Brand
- Goodwill

In general, there are three possible approaches to valuing intangible assets:

- The value of intangible assets is assessed by calculating the present value of estimated future cashflows for the organisation, expressing that as a return on equity, and deducting a portion that represents a suitable return on tangible (fixed) assets. The difference then represents a return on notional intangible asset value, and the value of the intangible assets that would earn that return can be derived.
- The software assets are valued at cost plus a suitable return on the investment. This approach is less useful because the cost of the intangible asset may be considerably different to the value placed on it by the market (a possible purchaser).
- A value could be derived by estimating the cost to a new entrant of developing its business to a similar level and removing any fixed (tangible) assets to derive a value of the intangible assets.

The first mover into a market is likely to experience a costlier development path than later entrants who are able to learn from mistakes made by the first mover and to benefit from protocols developed by the first mover. Valuing intangible assets at cost is therefore likely to overstate their value in relation to a new entrant.

An assessment of the intangible assets was completed by valuing the investment needed by a new entrant to achieve a similar level of functionality and market share, noting that this investment is likely to be lower than would otherwise be the case because of work done by the first mover in developing working relationships with external stakeholders.

The value of the software assets has been determined from the new replacement cost of a software platform to provide the core functional service level. This is described in detail in section 3.3.2.

The value of the effort put in by the incumbent ELNO to establish licences to operate and to establish standards for data transfer would reflect the cost of the effort to undertake these activities, on the assumption that the established ELNO is efficient in this task.

## 3.3 Efficient cost structure as modelled

### 3.3.1 Base case market share

A cost model has been built for both a new entrant efficient ELNO and an established benchmark efficient ELNO based on the assumptions described above.

We have assumed that the ELNO would operate in three jurisdictions, with the established ELNO operating in three jurisdictions from the outset and the new entrant developing into an additional jurisdiction each year.

The addition of a jurisdiction increases the number of transactions over which and ELNO can recover cost. The total number of transactions and the proportion between jurisdiction is shown in Table 15.

**Table 15 Market Share by number of ELNOs and markets**

Market	Number of markets		
	1	2	3
1	100%	53%	37%
2	-	47%	33%
3	-	-	30%
<b>Total number of transactions assumed</b>	<b>736,000</b>	<b>1,392,810</b>	<b>1,998,380</b>

The new entrant ELNOs market share of the potential market is also assumed to increase with years in the market (the market share for the established ELNO is assumed to be constant) as shown in Table 16.

**Table 16 Market Share scenarios for a New Entrant and Established ELNO**

ELNO	Years of operation				
	1	2	3	4	5
New entrant ELNO – Low customer base	2%	5%	10%	15%	20%
New entrant ELNO - Medium customer base	5%	10%	20%	30%	40%
New entrant ELNO - High customer base	10%	20%	35%	50%	65%
Established ELNO – Low customer base	20%	20%	20%	20%	20%
Established ELNO – Medium customer base	50%	50%	50%	50%	50%
Established ELNO – High customer base	80%	80%	80%	80%	80%

Applying these market share assumptions given the number of transactions for each ELNO in Table 17.

It has also been assumed that the percentage of market also applies to the number of subscribers to the ELNO, based on the number of potential subscribers in NSW in Table 6, and applying the market percentages in Table 15 to assess the potential number subscribers in other markets (effectively assuming the ratio of subscribers to transactions is equal in all markets). The market percentages have therefore been applied to the potential national subscriber pool in Section 2.4 with the resulting number of subscribers also shown in Table 18.

**Table 17 Assumed number of transactions**

ELNO	Years of operation					TOTAL
	1	2	3	4	5	
New entrant ELNO – Low customer base	14,720	69,641	199,838	299,757	399,676	983,631
New entrant ELNO - Medium customer base	36,800	139,281	399,676	599,514	799,352	1,974,623
New entrant ELNO - High customer base	73,600	278,562	699,433	999,190	1,298,947	3,349,732
Established ELNO – Low customer base	399,676	399,676	399,676	399,676	399,676	1,998,380
Established ELNO – Medium customer base	999,190	999,190	999,190	999,190	999,190	4,995,949
Established ELNO – High customer base	1,598,704	1,598,704	1,598,704	1,598,704	1,598,704	7,993,519

**Table 18 Assumed number of subscribers**

ELNO	Years of operation				
	1 (FY20)	2 (FY21)	3 (FY22)	4 (FY23)	5 (FY24)
New entrant ELNO – Low customer base	184	870	1,740	2,610	3,480
New entrant ELNO - Medium customer base	460	1,740	3,480	5,220	6,960
New entrant ELNO - High customer base	919	3,480	6,090	8,700	11,310
Established ELNO – Low customer base	4,993	4,993	4,993	4,993	4,993
Established ELNO – Medium customer base	12,483	12,483	12,483	12,483	12,483
Established ELNO – High customer base	19,972	19,972	19,972	19,972	19,972

The income statement for a new entrant ELNO and an established ELNO, assuming a medium customer base is shown in 3.3.4.

### 3.3.2 Differences between a new entrant and established efficient ELNO

Table 19 presents the approach taken with the assets and costs of the established and new entrant ELNOs in the cost model.

**Table 19 Assumed differences between the established and the new entrant ELNO**

Item	Established ELNO	New Entrant ELNO
<b>Income Statements</b>		
Cost of sales	Based on market share provided by IPART (constant over the modelled period) (see Table 17)	Based on market share provided by IPART (increasing over the modelled period) (see Table 17)
Salary Costs	Assumed benchmark efficient ELNO team structure in place at launch.	Assume team builds up pre-launch and that product launches in one jurisdiction initially. Team size increases as ELNO grows into one further jurisdiction each year.
Software platform costs	Assumed benchmark efficient ELNO costs.	Assumed benchmark efficient ELNO costs.
Subscriber costs	Assumed benchmark efficient ELNO costs based on market share of subscriber pool. Market share defined by IPART which is constant (see Table 17).	Assumed benchmark efficient ELNO costs based on market share of subscriber pool. Market share defined by IPART which is increasing over the modelled period (see Table 17).
Occupancy charges	Based on efficient ELNO team size and includes costs of all jurisdictions at launch.	Occupancy costs for primary location incurred from the start of platform development. Occupancy costs for satellite locations incurred progressively as a new satellite office is added each year.

### 3.3.3 Inter-State issues and considerations

The base case in the model assumed that a benchmark efficient ELNO would operate in three jurisdictions, with the new entrant ELNO launching in NSW, then adding another jurisdiction in each of the following two years.

The sequencing of tasks and types of documents is likely to vary by jurisdiction and with each new jurisdiction there is a need to interface and develop platform interaction with the local land registry and revenue office. We have included software development effort for the establishment of APIs with each registry and revenue office in each jurisdiction. It is therefore possible to identify the development cost of each jurisdiction. Identification of the operating costs for each jurisdiction is problematic because there is no clear cost driver that is jurisdiction specific.

In our view the issue is more appropriately expressed through cost recovery as the transaction fee is the only source of revenue and would therefore be evaluated as the proportion of revenue earned by jurisdiction. In practice, transaction numbers by jurisdiction may be an appropriate proxy.

### 3.3.4 ELNO fixed and variable costs

Income statements for both the established ELNO and the benchmark efficient new entrant ELNO are shown in Figure 4 and Figure 5.

A comparison of fixed and variable costs is shown in Figure 6, where fixed costs are defined as those that do not vary by the number of subscribers or by the number of transactions.

New entrant ELNO - Medium customer base		Pre-Launch		Post-Launch				
Income Statement ('000, real \$2019)								
<b>Cost of Sales</b>								
Land Registry Fees	Variable	-	-	257	974	2,794	4,191	5,588
Revenue Office Fees	Variable	-	-	-	-	-	-	-
Financial Settlement Costs	Variable	-	-	167	631	1,810	2,716	3,621
Insurances	Variable	-	-	90	341	978	1,466	1,955
<b>Gross Margin</b>		<b>8,440</b>	<b>8,440</b>	<b>16,851</b>	<b>19,985</b>	<b>23,515</b>	<b>25,796</b>	<b>27,856</b>
<b>Expenses</b>								
	<b>Fixed/Variable</b>							
Salary Costs	Fixed	7,490	7,490	11,566	13,086	14,496	14,937	15,157
Software Platform Related Costs	Fixed	-	-	2,255	2,255	2,255	2,255	2,255
Subscriber costs	Variable	-	-	506	1,914	3,828	5,742	7,656
Occupancy charges	Fixed	950	950	950	1,230	1,510	1,510	1,510
<b>EBITDA</b>		<b>- 8,440</b>	<b>- 8,440</b>	<b>1,574</b>	<b>1,500</b>	<b>1,426</b>	<b>1,352</b>	<b>1,278</b>
<b>Depreciation and interest expense</b>								
	<b>Fixed/Variable</b>							
Depreciation	Fixed	-	-	1,232	1,232	1,232	1,232	1,232
Interest charges	Fixed	-	-	342	268	194	120	46
<b>EBT</b>		<b>- 8,440</b>	<b>- 8,440</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0</b>

Figure 4 Income statement for the new entrant ELNO

Established ELNO – Medium customer base		Pre-Launch		Post-Launch				
Income Statement ('000, real \$2019)								
<b>Cost of Sales</b>								
Land Registry Fees	Variable	-	-	6,985	6,985	6,985	6,985	6,985
Revenue Office Fees	Variable	-	-	-	-	-	-	-
Financial Settlement Costs	Variable	-	-	4,526	4,526	4,526	4,526	4,526
Insurances	Variable	-	-	2,444	2,444	2,444	2,444	2,444
<b>Gross Margin</b>		<b>-</b>	<b>-</b>	<b>32,913</b>	<b>32,913</b>	<b>32,913</b>	<b>32,913</b>	<b>32,913</b>
<b>Expenses</b>								
	<b>Fixed/Variable</b>							
Salary Costs	Fixed	-	-	15,377	15,377	15,377	15,377	15,377
Software Platform Related Costs	Fixed	-	-	2,255	2,255	2,255	2,255	2,255
Subscriber costs	Variable	-	-	13,731	13,731	13,731	13,731	13,731
Occupancy charges	Fixed	-	-	1,550	1,550	1,550	1,550	1,550
<b>EBITDA</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Depreciation and interest expense</b>								
	<b>Fixed/Variable</b>							
Depreciation	Fixed	-	-	-	-	-	-	-
Interest charges	Fixed	-	-	-	-	-	-	-
<b>EBT</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

Figure 5 Income statement for the established ELNO

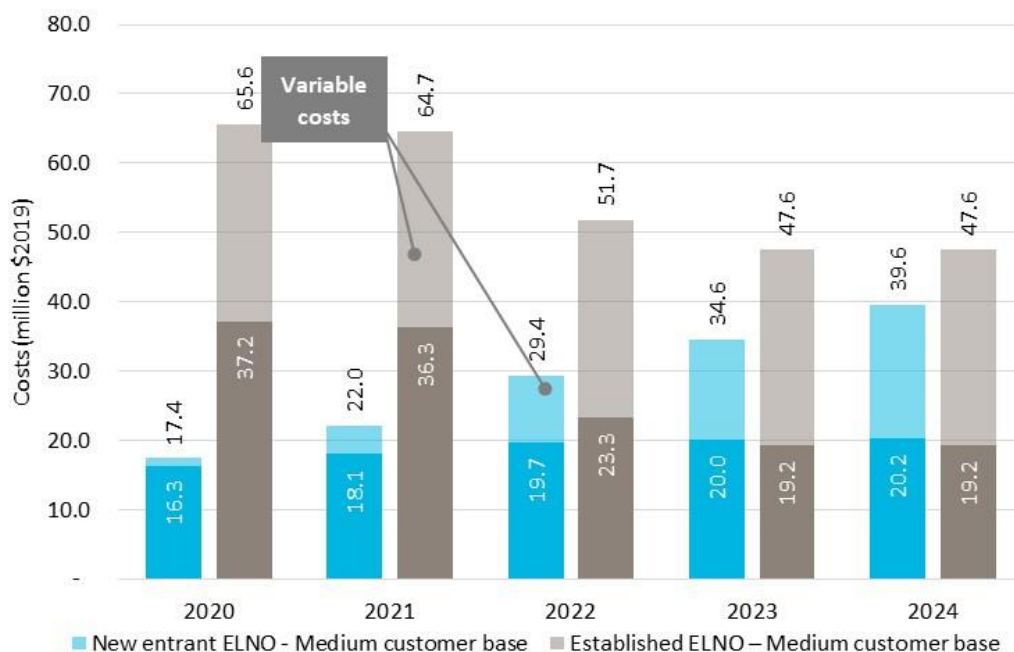


Figure 6 Fixed and variable costs for established and new entrant ELNOs

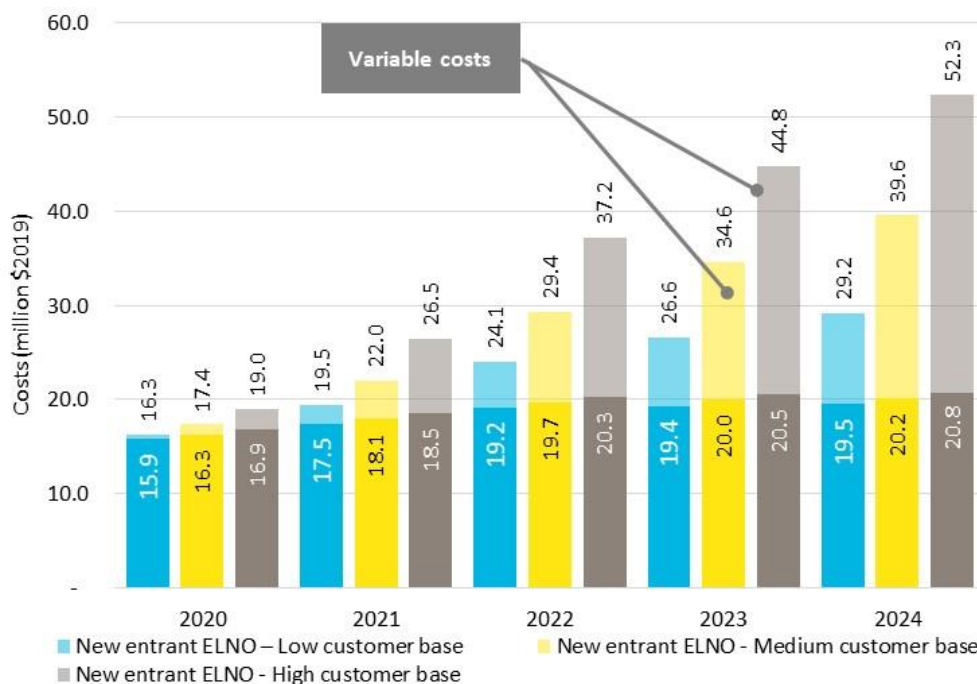
### 3.4 Impact of market share on eConveyancing cost structures

Three levels of market share have been modelled, for both the new entrant and established ELNOs as shown in Table 20.

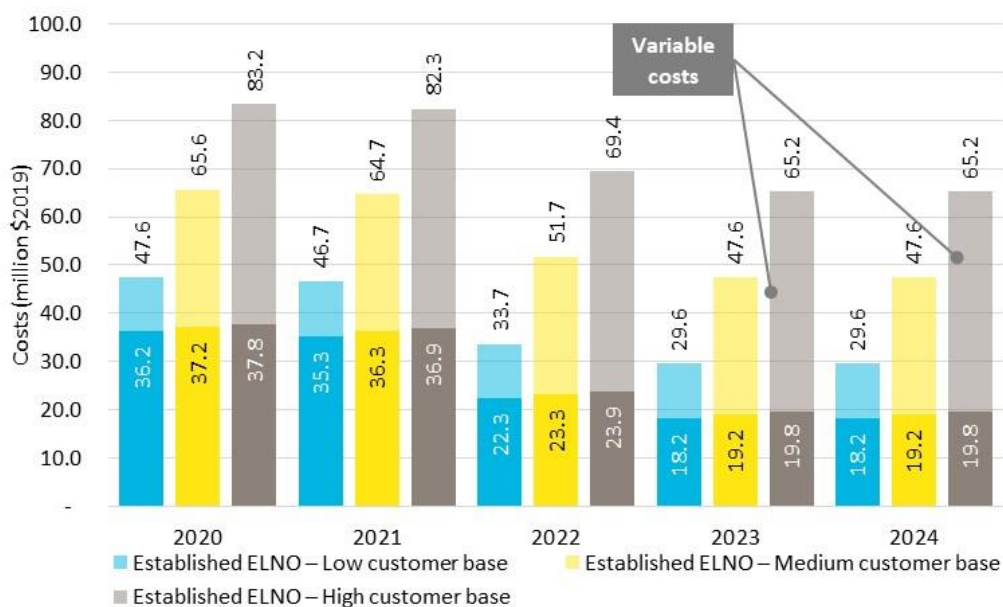
Table 20 Market share scenarios

Case	Market share scenario	2020	2021	2022	2023	2024
1L	New entrant ELNO – Low customer base	2%	5%	10%	15%	20%
1M	New entrant ELNO - Medium customer base	5%	10%	20%	30%	40%
1H	New entrant ELNO - High customer base	10%	20%	35%	50%	65%
2L	Established ELNO – Low customer base	20%	20%	20%	20%	20%
2M	Established ELNO – Medium customer base	50%	50%	50%	50%	50%
2H	Established ELNO – High customer base	80%	80%	80%	80%	80%
	Number of transactions	2020	2021	2022	2023	2024
1L	New entrant ELNO – Low customer base	14,000	66,234	19,063	285,095	380,127
1M	New entrant ELNO - Medium customer base	35,000	132,468	380,127	570,190	760,253
1H	New entrant ELNO - High customer base	70,000	264,937	665,222	950,316	1,235,411
2L	Established ELNO – Low customer base	380,127	380,127	380,127	380,127	380,127
2M	Established ELNO – Medium customer base	950,316	950,316	950,316	950,316	950,316
2H	Established ELNO – High customer base	1,520,506	1,520,506	1,520,506	1,520,506	1,520,506
	Number of Subscribers	2020	2021	2022	2023	2024
1L	New entrant ELNO – Low customer base	184	870	1,740	2,610	3,480
1M	New entrant ELNO - Medium customer base	460	1,740	3,480	5,220	6,960
1H	New entrant ELNO - High customer base	919	3,480	6,090	8,700	11,310
2L	Established ELNO – Low customer base	4,993	4,993	4,993	4,993	4,993
2M	Established ELNO – Medium customer base	12,483	12,483	12,483	12,483	12,483
2H	Established ELNO – High customer base	19,972	19,972	19,972	19,972	19,972

The fixed and variable cost structures for the scenarios for a new entrant ELNO are shown in Figure 7 and for an established ELNO in Figure 8.



**Figure 7 Fixed and variable costs for the benchmark efficient new entrant ELNO under varying market share scenarios**



**Figure 8 Fixed and variable costs for an established ELNO under varying market share scenarios**

The gradual increase in costs for the new entrant ELNO is largely because of the increased variable costs due to entering new jurisdictions and increasing numbers of transactions.

As the ELNO can only recover costs through transaction charging, the costs for each market share scenario for both the new entrant and established ELNO have been re-presented as an average recovery per transaction in Figure 9 and Figure 10, and show the effect of enabling cost recovery from the number of transactions across several jurisdictions (based on Table 17).

These show that for the new entrant ELNO, the progressive growth of market share has a significant impact on average transaction costs, despite the increasing cost base.

These results are presented as levelised transaction costs over the 2020-24 period for both the New Entrant and Established ELNO for each of the market share scenarios in Figure 11, where the bubble size represents the capital investment.

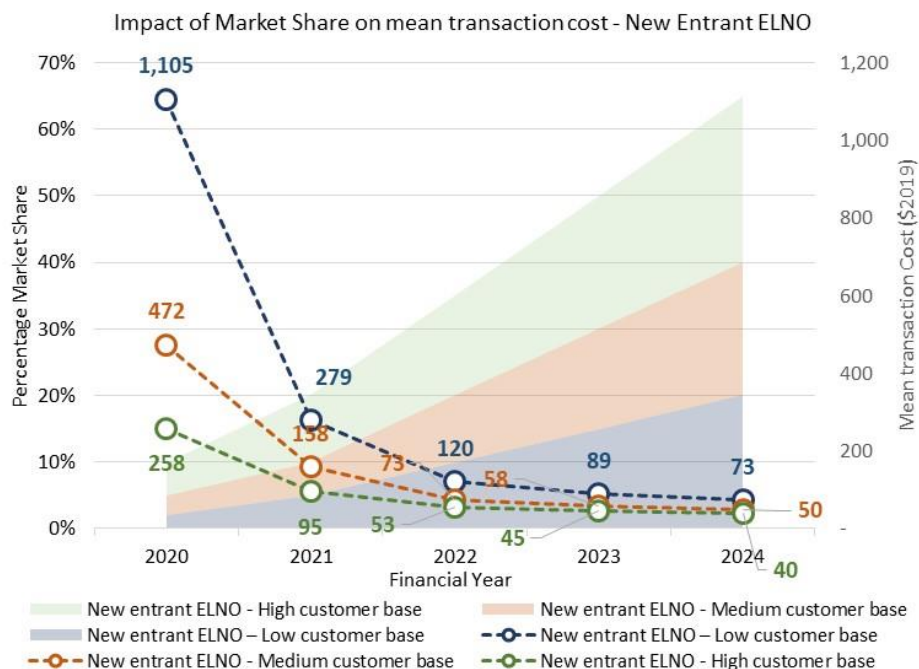


Figure 9 Average transaction cost – new entrant ELNO



Figure 10 Average transaction cost – Established ELNO

The charts illustrate the significance of market share on cost recovery.

These results are presented as levelised transaction costs over 2020 to 2024 for both the New Entrant and Established ELNO for each of the market share scenarios in Figure 11.

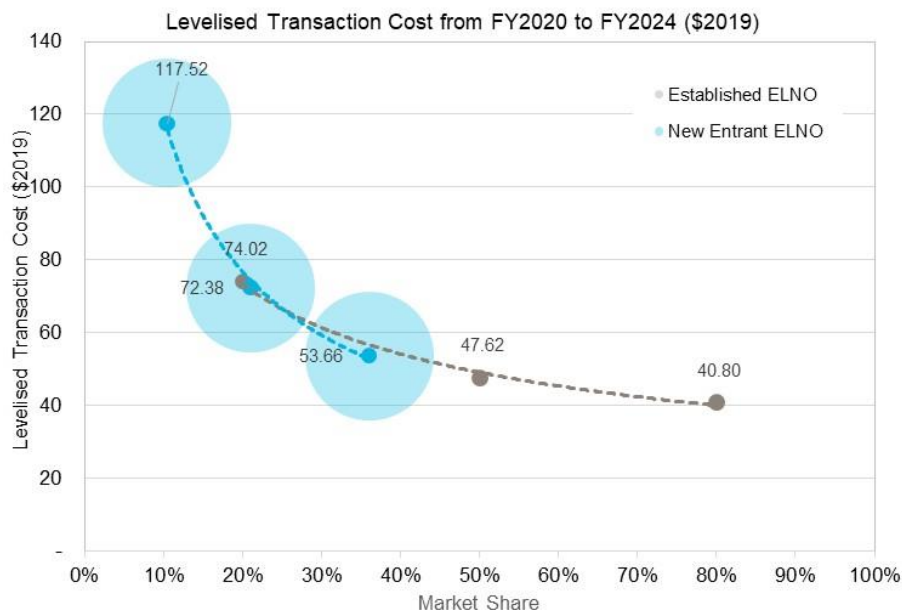


Figure 11 Levelised transaction cost by customer base for New Entrant and Established ELNOs

### 3.5 Sensitivity to key assumptions

The effect of the key assumptions on the levelised transaction cost for the new entrant benchmark efficient ELNO, is discussed as follows. In each case the parameter is varied by +/-30% so that the relative sensitivities can be seen. The tests undertaken are shown in Table 21.

#### Case 1 Effort to integrate with third-parties

Our model is based on an assumed level of effort and therefore cost associated with the development of APIs in connections with third party interfaces.

#### Case 2 Number of financial institutions

The base case assumes that the new entrant ELNO would integrate with 12 financial institutions and varies this assumption from 8.4 to 15.6 institutions (in practise this would be an integer value).

#### Case 3 Software development cost

The base case assumes that the new entrant ELNO would employ a 'typical' software team configuration (see Table 7).

This test explores the sensitivity to a team that results in lower costs or greater cost.

A lower initial capital expenditure is likely to result in a less robust product that may require additional ongoing support and maintenance costs. The model does not include an assessment of any additional maintenance costs.

The converse would be the case for a more costly team structure.

#### Case 4 Marketing effort required

The base case recognises that the second mover the market would benefit from market education and establishment created by the first market entrant. An assessment of the marketing team required for the 2<sup>nd</sup> entrant has been based on a reduction in the size of the team employed by the first. This is discussed in Section 3.1.2 where a factor of 33% was assumed.

### Case 5 Salary Cost

This explores the effect of varying the salary cost to simulate either a change in the direct salary cost, or more realistically, a different team size to that assumed in the base case.

### Case 6 Subscriber Costs

The model assumes a subscriber on-boarding cost of \$600.

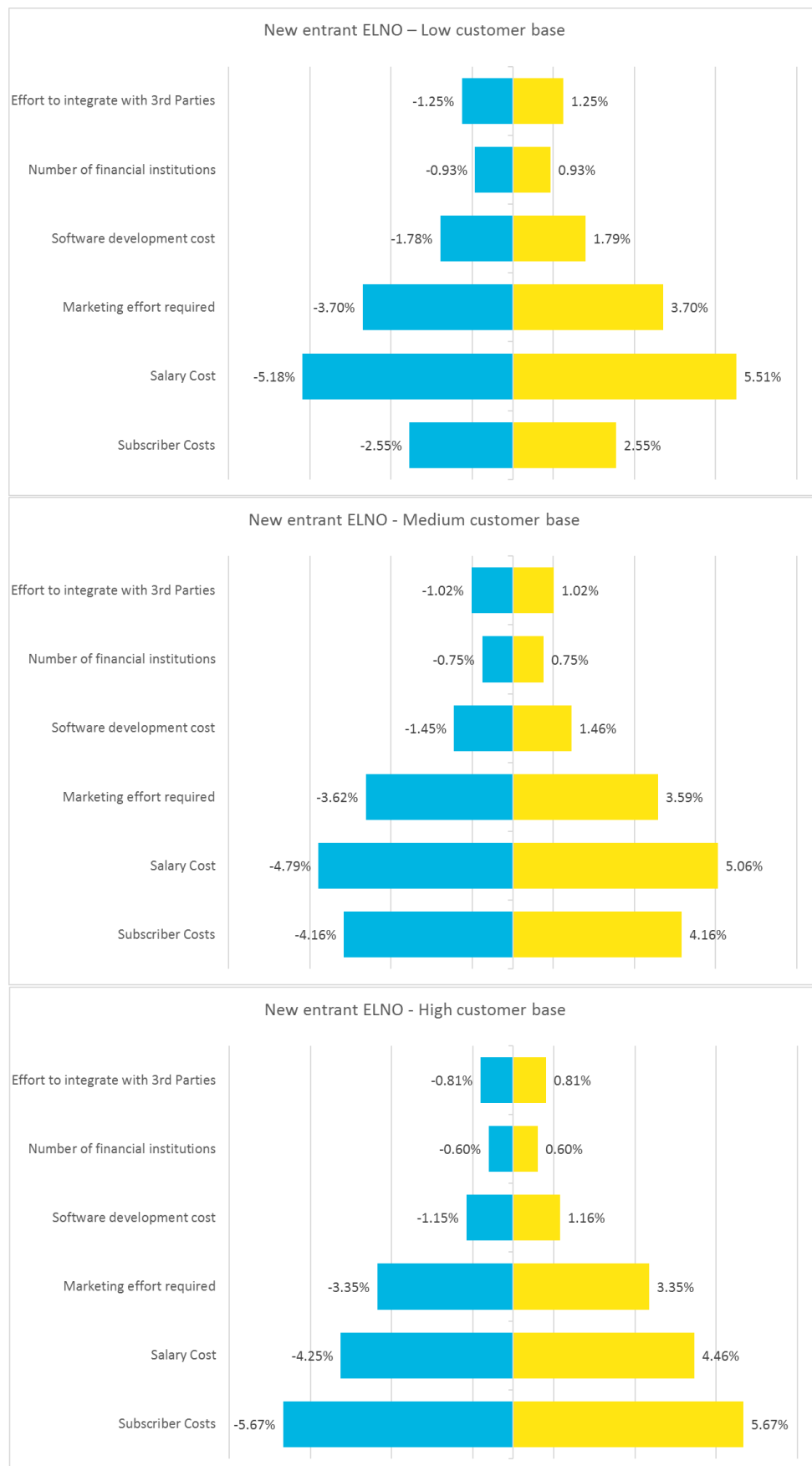
There is a further digital certificate management cost at an assumed \$500 per subscriber per year.

**Table 21 ELNO Sensitivity test parameters**

Case	Test	Parameter	Units	-30%	Base	30%
1	Effort to integrate with 3rd Parties	Interfacing cost multiplier	-	0.70	1.00	1.30
2	Number of financial institutions	Number fo financial institutions	No.	8.40	12.00	15.60
3	Software development cost	Software team multiplier	-	3.00	4.28	5.56
4	Marketing effort required	Market maturity factor	-	0.23	0.33	0.43
5	Salary Cost	Salary multiplier	-	0.70	1.00	1.30
6	Subscriber Costs	Onboarding Cost	AUD	420.00	600.00	780.00
		Digital certificate management costs	AUD	350.00	500.00	650.00

The results are shown in Figure 12 which illustrates that:

1. The results are most sensitive to *salary costs*, either through team structure of the amount of marketing effort required to attract subscribers.
2. Generally, the sensitivity reduces with increased market share, because of the increased number of transactions. The sensitivity to subscriber costs increases with increasing market share as the number of subscribers increases.



**Figure 12 ELNO Sensitivity test results**

### 3.6 Implications

The model analysis indicates a levelised transaction cost of between \$45.71 and \$93.65 for an established ELNO and of between \$53.66 and \$117.52 for a new entrant ELNO, the variation in each as a result of the assumed market share.

These costs are seen to be particularly sensitive to the following:

- The amount of effort needed to penetrate the market and the benefit that the first mover's efforts have yielded for the following market entrants.
- The size of the organisation in FTEs.

And to a lesser extent:

- The software development team size.

## 4.0 The interoperability issue

The two ELNO's currently in the market are not interoperable and therefore it is not possible for data to be shared between them. This means that a transaction can only be completed by all parties using the same ELNO platform. This allows for some competition in the market but requires the industry to subscribe to both parties to ensure that they can service their customers, increasing the total cost to the industry.

There are ongoing studies exploring mechanisms that could be implemented to facilitate interoperability between ELNOs and the impact that each could have on the competition and governance of the market. This review considers the capital and operating costs of benchmark efficient new entrant ELNO's under four potential interoperability scenarios.

### 4.1 Interoperability options

Each interoperability model is discussed in the following sections as follows:

- Direction connection model
- Central Hub ELNO model
- Information Hub model
- Infrastructure ELNO model

In all cases, it is assumed that there would be no additional effort or cost for subscribers as interoperable functionality means that each user could subscribe just to a single ELNO of their choice.

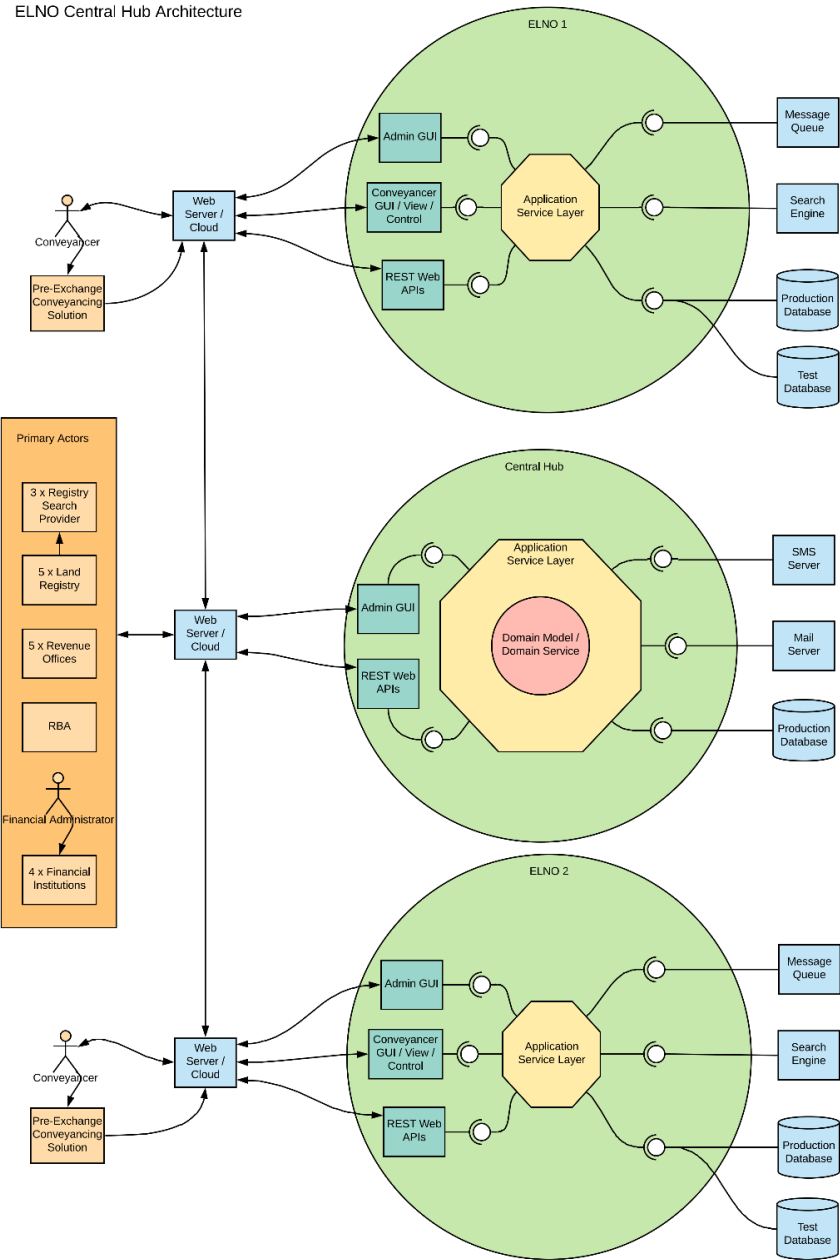
#### 4.1.1 Direct connection ELNO model summary

Option	Direct connection
<b>Premise</b>	Each ELNO develops their own APIs for integration with each primary actor and with each other ELNO.
<b>Software Architecture</b>	<p>ELNO Direct Connection Architecture</p> <p>The diagram illustrates the ELNO Direct Connection Architecture. It shows two ELNOs (ELNO 1 and ELNO 2) connected to Primary Actors and each other. Each ELNO contains an Admin GUI, Conveyancer GUI / View / Control, REST Web APIs, Application Service Layer, Domain Model / Domain Service, Message Bus Adapter, and Object Relational Mapping Adapter. Primary Actors include 3 x Registry Search Provider, 5 x Land Registry, 5 x Revenue Offices, RBA, Financial Administrator, 4 x Financial Institutions, Conveyancer, and Pre-Exchange Conveyancing Solution. External services include Message Queue, SMS Server, Mail Server, Search Engine, Production Database, and Test Database.</p>
<b>Implication for ELNO</b>	<p>Each ELNO would need to develop an active data transfer process with each primary actor, and with each other ELNO in the network.</p> <p>The entry of a new ELNO would require that each existing ELNO develop an interface with it. This means that the number of interfaces increases with the square of the number of ELNOs. The question of which entity should bear the cost of developing these interfaces when a new entrant joins the market is beyond the scope of this study. The cost of entry would therefore be a function of the number of ELNO's already in the market.</p>
<b>Implication for primary actors</b>	Each primary actor would need to interface with each ELNO individually. Each primary actor would therefore need to develop an API, which in practise would most likely be the same for all ELNOs (the primary actors effectively dictating the protocol for interaction) but would need to be open for interaction with multiple ELNOs. This is effectively the arrangement that the LRS is currently implementing.

4.1.2 Central Hub ELNO model summary

Option	Central Hub
Premise	<p>A central hub is established which completes the interaction and lodgement with each primary actor and the interfacing between ELNOs.</p> <p>The ELNO provides front end functionality and interacts directly with subscribers and allows access from users in financial institutions. The ELNO does not integrate directly with primary actors, doing so through the central hub.</p>

Software Architecture



Implication for ELNO	<p>Each ELNO would need to develop an active data transfer process with the central hub. It would not need to develop interfaces with each primary actor, nor with each other ELNO in the network.</p> <p>The entry of a new ELNO would not require any additional effort to integrate with the existing ELNOs, the cost of entry being independent of the number of ELNOs in the market.</p>
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**Implication for primary actors**

Each primary actor would need to interface with the central hub only, and not with each ELNO individually.

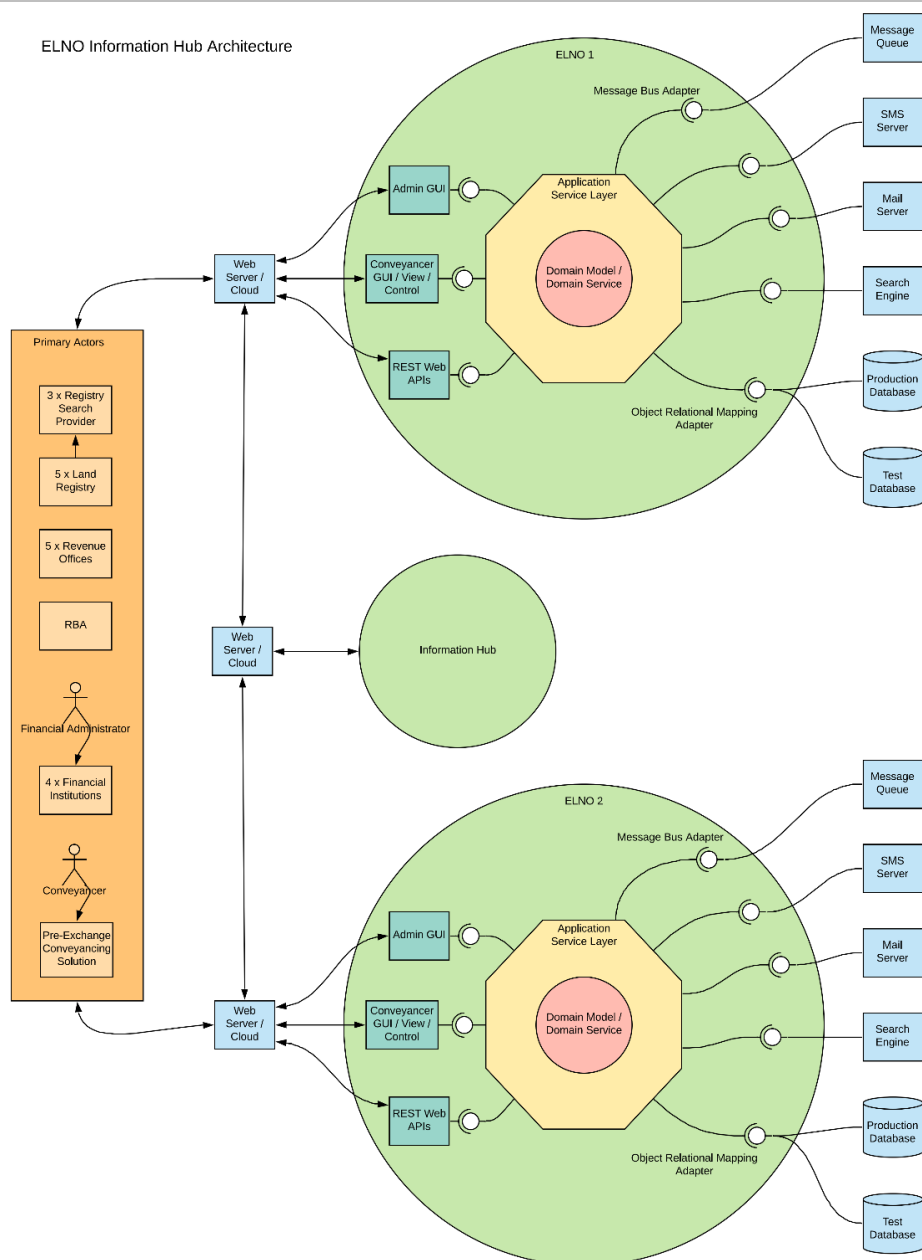
Each primary actor would need to develop an API, but it would only need to be open to interfacing with a single entity. In practice, the cost of developing an API for a single entry is not anticipated to be significantly different to one designed for interfacing with multiple entities.

**4.1.3 Information Hub ELNO model summary**

Option	Information Hub
<b>Premise</b>	<p>The information hub provides a common means of communication and data exchange between ELNOs.</p> <p>In its simplest form, this would define the communication protocol and facilitate the transfer (and potentially storage) of data. The ELNO retains the direct interaction with subscribers and with the primary actors.</p>

**Software Architecture**

ELNO Information Hub Architecture



**Implication for ELNO**

This is similar to the 'Direct communication' model but relieves the need for each ELNO to interact with each other ELNO, instead requiring each ELNO to develop a single interface with the information hub.

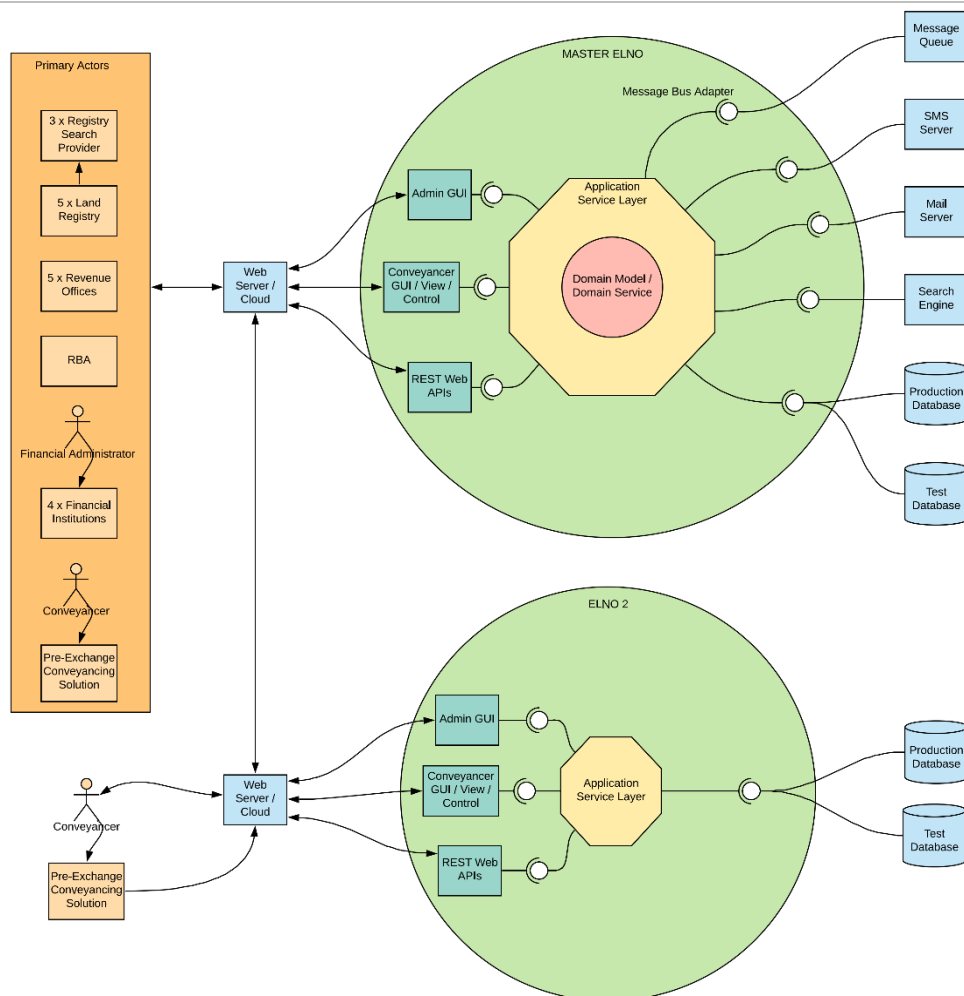
The cost of entry would therefore be independent of the number of ELNO's already in the market.

**Implication for primary actors**

This is similar to the 'Direct Communication model' as each primary actor would need to interface with each ELNO individually. Each primary actor would therefore need to develop an API, which in practise would most likely be the same for all ELNOs (the primary actors effectively dictating the protocol for interaction) but would need to be open for interaction with multiple ELNOs.

**4.1.4 Infrastructure ELNO model summary**

Option	Infrastructure ELNO
<b>Premise</b>	<p>An Infrastructure ELNO is established which is a fully functioning stand-alone ELNO. This ELNO establishes the interfaces with the primary actors and has its subscribers.</p> <p>Each additional ELNO provides a front end and manages its own pool of subscribers, but all interaction with primary actors, including lodgement of documents is completed through the Infrastructure ELNO.</p>

**Software Architecture**

<b>Implication for ELNO</b>	<p>This is similar to the 'Central Hub' model, but where the 'hub' is a fully functioning ELNO and is identified as the Master ELNO.</p> <p>The Master ELNO is the single conduit for interaction with the primary actors and provides an open interface for interaction with all other ELNOs.</p> <p>Each new market ELNO would need to secure and maintain its own subscriber base and would need to allow access from users in financial institutions but would not need to interface with the primary actors. Instead, it would integrate with the Master ELNO which would facilitate communication with the primary actors.</p> <p>The cost of entry would therefore be independent of the number of ELNO's already in the market.</p>
<b>Implication for primary actors</b>	<p>This is similar to the Central Hub Model as each primary actor would need to develop an API, but it would only need to be open to interfacing with a single entity. In practice, the cost of developing an API for a single entry is not anticipated to be significantly different to one designed for interfacing with multiple entities.</p>

## 4.2 Cost implications

### 4.2.1 Capital Expenditure

An assessment of the relative capital investment required to develop each of the interoperability models, on a cost to the industry basis for an increasing number of market participants has been completed using the efficient new entrant ELNO model. The components required to construct each interoperability for a single ELNO and for multiple (n) ELNO's is shown in Table 22.

The essential differences between the models are the costs associated with the development and implementation of APIs to enable interactions with stakeholders (referred to as Primary Actors) and the means of communication and data sharing with other ELNOs. The cost build up identifies where an API for a Hub would need to be developed and the subsequent cost of each ELNO connecting in, which has been approximated as 75% of the effort of developing the API.

The evaluation presented here represents the software development cost from a starting point of known functionality across established relationships. In practice, additional intangible effort would be required to establish and build these relationships, so that the APIs could be developed. The quantification of this effort is not included in the comparison presented below.

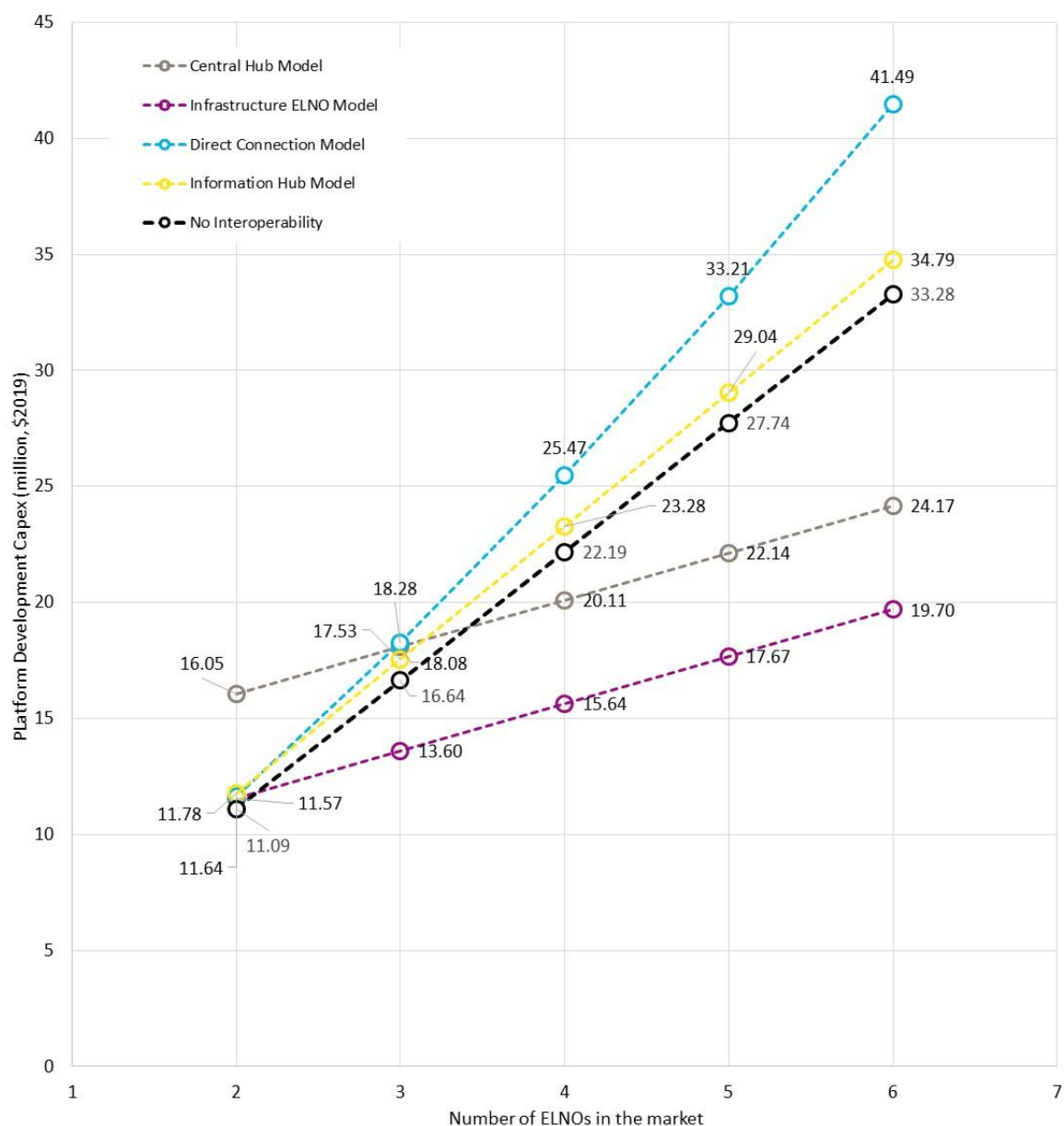
This analysis is sensitive to the assumed effort required to develop the necessary integration with stakeholders and between ELNOs, but nevertheless, on the basis of these assumptions, it shows that all options require some capital investment.

The Information Hub represents minimal additional cost per ELNO, unlike the direct communication alternative where the cost of entry increases with the square of the number of market entrants. When there are three or more ELNOs in the market, the direct connection model becomes the most capital intensive.

The Master ELNO or Central Hub are the least capital intensive, because these offer a single point of contact with the primary actors. The benefit increases with the number of ELNOs. The information hub offers minimal reduction in capex over the direct connection model when there are less than four ELNOs in the market.

**Table 22 Platform development components by operability scenario**

			Number of platform components required by interoperability model [with n ELNOs in the market]			
Model component	Software Development Cost (\$2019)	Primary Actor API interfaces	Direct Connection Model	Central Hub Model	Information Hub Model	Infrastructure ELNO Model
Model component			n	n	n	n
ELNO (with full business logic)	5.55	✓	n	2	n	2
ELNO (retail function only)	1.83	✗	-	n-2	-	n-2
Hub	4.27	✓	-	1	-	-
API development	0.27	N/A	n(n-1)	1	1	1
ELNO Connection to Hub API	0.21	N/A	-	n	n	n-1

**Figure 13 Total platform development capex by number of ELNO's in the market for various interoperability scenarios**

#### 4.2.2 Levelised Operating cost

The levelised operating costs to each ELNO entering the market have also been developed using the same efficient new entrant model, but with the following further assumptions:

1. The number of transactions is fixed at 700,000 in the first jurisdiction and all would be completed by ELNOs. Transaction costs (costs of sales) are independent of the number of ELNO's and are in effect shared across all ELNOs.
2. An ELNO would expand into three jurisdictions, adding one jurisdiction each year.
3. A new entrant ELNO would enter the market each year
4. The number of subscribers (which is a function of the Law Society and AIC membership) is independent of the number of ELNOs. Increasing the market participants gives subscribers more choice of which ELNO to use, but a fundamental basis of interoperability is that each subscriber need only sign up to a single ELNO.
5. The sales team is driven by the number of subscribers, so the cost of that component is also fixed relative to the number of subscribers but gets allocated to each ELNO in accordance with market share. It's likely though that as more ELNO's come into the market, each ELNO would boost their sales effort slightly to win subscribers across from other platforms. At the same time, we're assuming that the efficiencies resulting from the use of ELNOs (compared to the current paper-based system) would see the subscriber pool consolidate and reduce in numbers as some subscribers take on more transactions and others fall out of the market as a result, which would reduce the size of the sales team needed. We've therefore assumed that the sales team would in effect increase in direct proportion to market size.
6. Each new ELNO would incur the incremental capex of entry (depending on the interoperability model) and would depreciate that over 5 years. For the hub models, the cost of establishing the hub is included in the cost of entry for the second ELNO.
7. Each new entrant ELNO would adjust the size of its sales and user support teams (in accordance with market share) but would otherwise have the same organisational and software maintenance costs as the benchmark efficient ELNO. This means that the levelised cost per transaction increases as market share reduces, but this increase is moderated by the corresponding reduction in team size (which we're assuming would be employed by the competing ELNO that had won market share). For the purposes of illustration, the assumed market share as new entrants enter the market is shown in Table 23.

**Table 23 Assumed market share with increasing number of ELNOs in the market**

	Market Share by number of ELNOs in the market			
ELNO No	1	2	3	4
1	100.0%	60.0%	55.0%	52.5%
2		40.0%	35.0%	32.5%
3			10.0%	9.0%
4				6.0%

Which when combined with the market share data by number of jurisdictions (Table 15) give the share of the national market in Table 24.

Table 24 Market share by ELNOs and national market size

ELNO No	Market Share by number of ELNO's in the market				
	1	2	3	4	5
1	100.0%	113.5%	149.3%	142.5%	142.5%
2		75.7%	95.0%	88.2%	88.2%
3			27.2%	24.4%	24.4%
4				16.3%	16.3%
<b>Total market size</b>	<b>100.0%</b>	<b>189.2%</b>	<b>271.5%</b>	<b>271.5%</b>	<b>271.5%</b>

8. The occupancy costs would reduce in proportion to the sales and support team size, are constant for each ELNO, set to that required for the largest market share they are assumed to achieve (i.e. ELNO 2 is sufficient for a team with a 60% market share)

Figure 14 shows the industry wide levelised cost for each interoperability model for the first 5 years of the market with a new entrant ELNO for each of the first three years. Similar charts for each interoperability model are shown in Figure 15.

This shows that as the number of ELNO's increase there is an overall increase in the levelised transaction cost with any of the interoperability models, and therefore cost to the industry. This is because it is assumed to be a mandated market with a fixed number of transactions, over which all ELNOs would need to recover their costs.

It is also evident that all interoperability models present an overall reduction in transaction cost when compared to the no-interoperability case. This is because if there were no interoperability, it is assumed that each subscriber would need to be onboarded by each ELNO and that each ELNO would need to maintain digital signing capability for each subscriber. For any interoperability model it is assumed that a subscriber need only subscribe to a single ELNO.

It is also evident that there is no material difference between the interoperability models in this model. Sensitivity testing has therefore been completed to identify situations that may lead to a material difference between the models. This is discussed in Section 4.3.

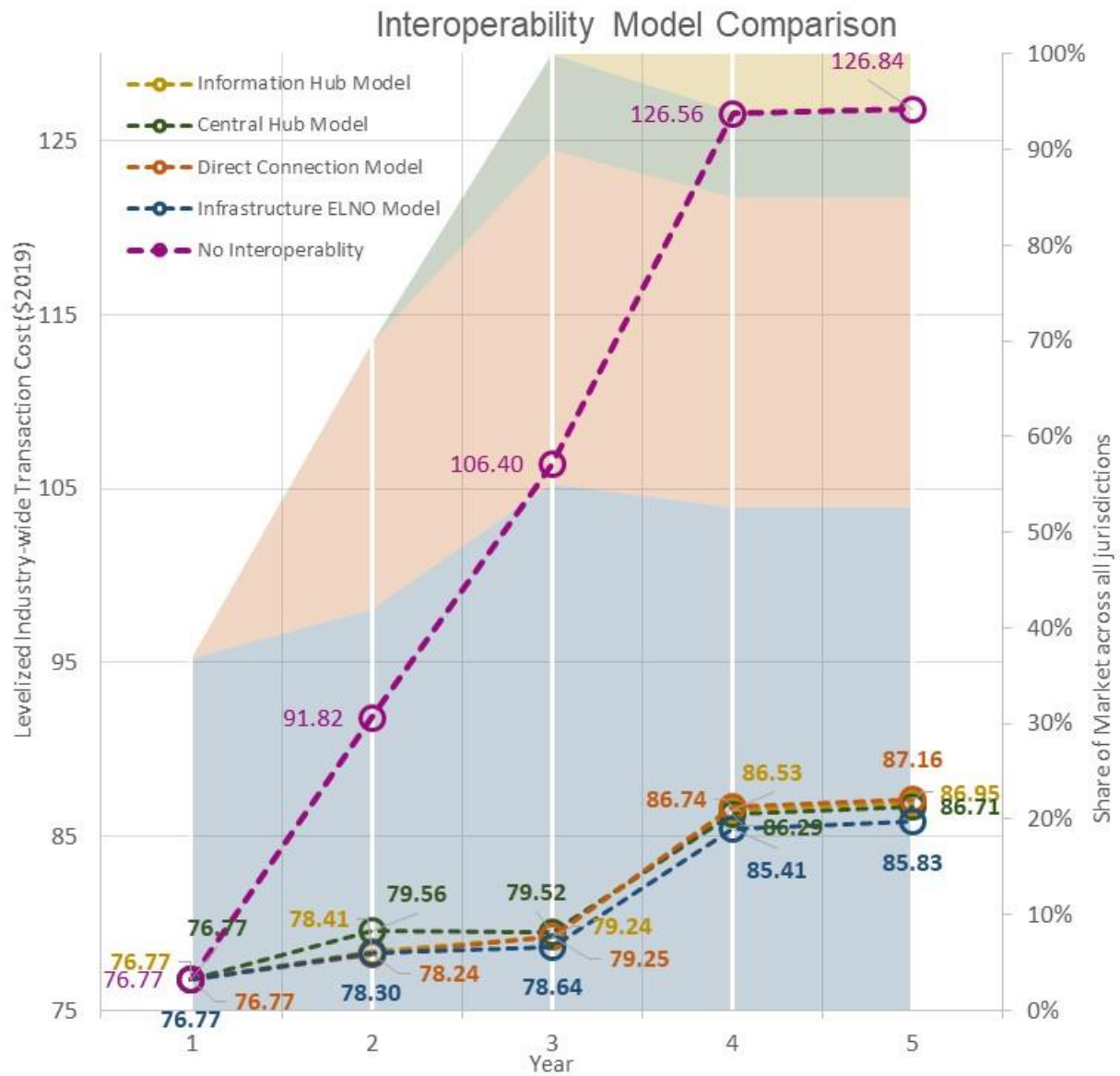


Figure 14 Levelised NSW Industry wide transaction cost for each interoperability model

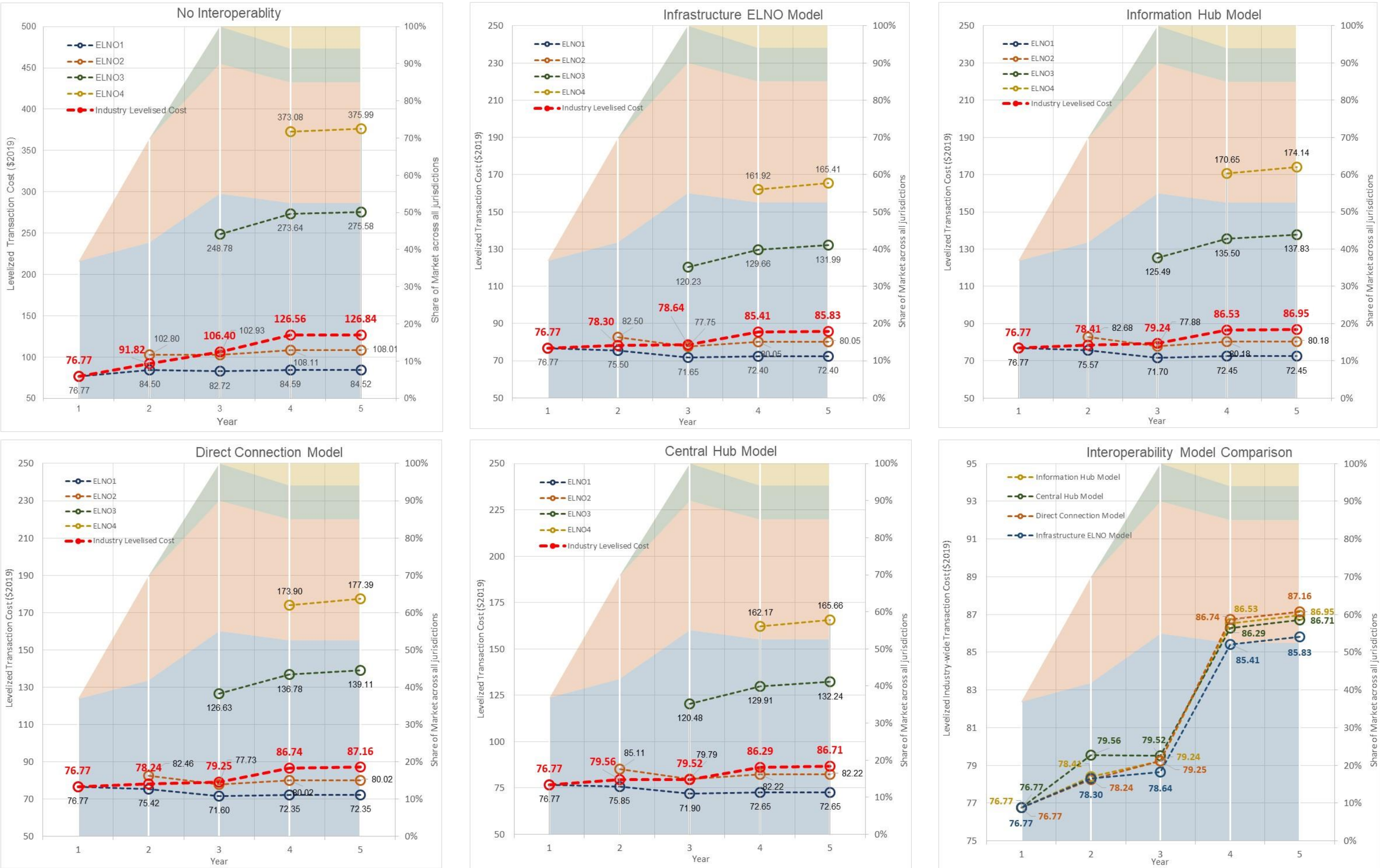
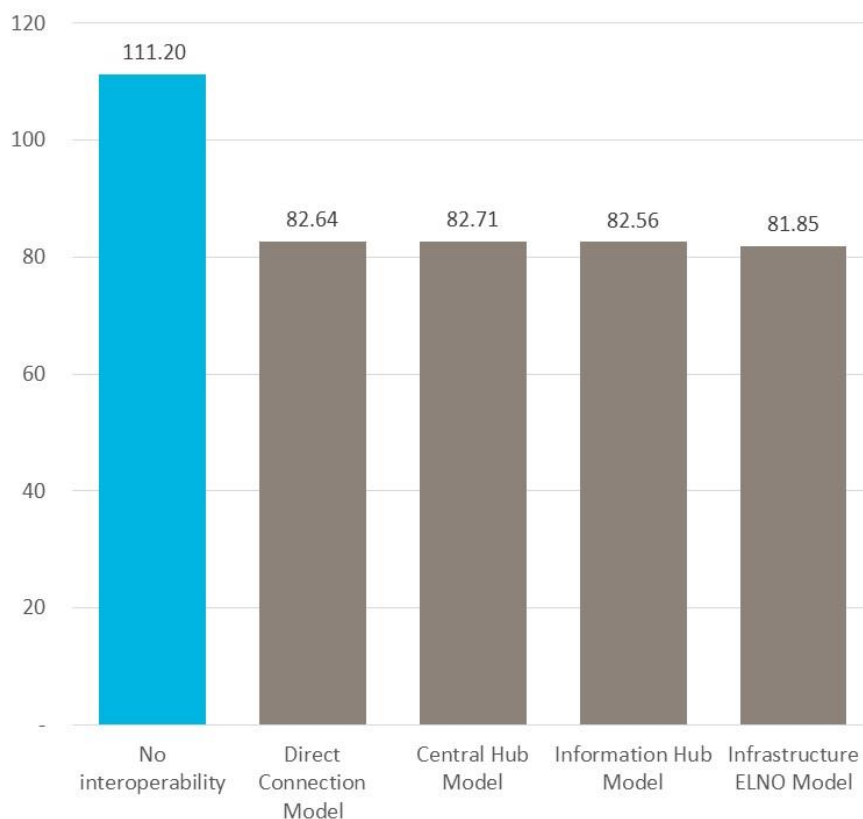


Figure 15 Transaction cost per ELNO per year for each interoperability model

### 4.3 Sensitivity to key assumptions

Figure 16 shows that there is no material difference in modelled transaction cost levelised over a 5-year period for between any of the interoperability models.



**Figure 16 5-year levelised transaction cost for each interoperability model**

Four sensitivity cases have been explored to establish when differences between models may become apparent.

#### Case 1 Software development cost

As for the ELNO, the base case assumes that the new entrant ELNO would employ a 'typical' software team configuration (see Table 7).

This test explores the sensitivity to software cost by varying the development team multiplier and therefore likely to show a greater effect on those models with a higher capital investment.

#### Case 2 Effort to integrate with ELNOs

Our model is based on an assumed level of effort and therefore cost associated with the development of APIs and connections between ELNOs and between hubs. This option will favour those within minimal connections

#### Case 3 Hub Maintenance

It is assumed that the cost of maintaining the hub would be recovered from industry and so this model should have no effect on those solutions that do not include hubs.

#### Case 4 Subscriber Costs

The model assumes a subscriber on-boarding cost of \$600. There is a further digital certificate management cost at an assumed \$500 per subscriber per year.

This test is not likely to make much differentiation between the interoperability models, but it will change to non-interoperability case.

The parameters used in the testing are shown in Table 25 and the results plotted in Figure 17.

It is clear that the results are not particularly sensitive to hub maintenance costs.

The subscriber cost has the most impact, particularly when identifying the benefit over a non-interoperability scenario. Further analysis has indicated that because of large number of potential subscribers, the annual cost per subscriber would need to be less than about \$10 per year to make the no-interoperability model of similar levelised cost. The difference in sensitivity to this test between the interoperability models is because of the relative difference in capex cost, with those options with the lower capital investment showing the greater sensitivity.

The modelling shows low sensitivity to software development costs but it can be seen that those with the most intense software effort (direct connection model and the information hub models) are the most sensitive to this cost.

**Table 25 Interoperability sensitivity test parameters**

Case	Test	Parameter	Units	-30%	Base	30%
1	Software development cost	Software team multiplier	-	3.00	4.28	5.56
2	ELNO integration effort	Effort multiplier	-	0.70	1.00	1.30
3	Hub Maintenance	Annual Maintenance costs as a proportion of ELNO annual maintenance	-	0.21	0.30	0.39
4	Subscriber Costs	Onboarding Cost	AUD	420.00	600.00	780.00
		Digital certificate management costs	AUD	350.00	500.00	650.00



**Figure 17 Interoperability models sensitivity tests**

## 4.4 Findings

Figure 13 shows that the Infrastructure ELNO is the lowest cost model as soon as there are three ELNOs in the market.

The Central Hub model requires the most investment of capex to establish, but with four or more ELNOs in the market, it becomes a low-cost option.

Otherwise the no-interoperability option presents the lowest capital investment.

However, when operating costs are also considered, this modelling suggests that any of the interoperability models offer considerable cost savings to industry over the first 5-years. This is because all subscribers would need to be supported by all ELNOs (Figure 14). This clearly shows the benefit to the industry of interoperability, but this modelling suggests there is no material difference between any of the interoperability models over the first five years for the scenario modelled.

Figure 14 also shows the increasing cost the industry with each new entrant, and a marked increase in the levelised costs when a new entrant enters a saturated market and takes market share from the incumbents.

## 5.0 NSW Land Registry Services cost structures (for e Conveyancing)

### 5.1 NSW Land Registry services costs related to conveyancing

The Land Registry Service:

*'operates the NSW land titles registry for the State Government and the people of New South Wales. The land titles registry underpins the state's secure, efficient and guaranteed system of land ownership.'*<sup>8</sup>

To facilitate this role, LRS creates and maintains land titles information and sells land information products and services.

This data maintained by LRS is checked and then updated as through the conveyancing process.

The activities that the LRS undertakes as part of the conveyancing process are shown in the process diagram in Appendix A and is summarised as follows:

- Land Title Verification. A service to check existence of the title.
- Registry Information Supply (RIS) which provides brief title data
- Title Activity Check (TAC) which allows the ELNOs to 'ping' in as necessary through the process to confirm the title.
- Registry Information Resupply, which is an updated version of the RIS, and used if the TAC identifies a change or if the eConveyancing transaction has completed and is being validated.
- Document Lodgement Verification which ensures that documents are provided by ELNOs free from error.
- Document Lodgement Service which records and lodges the updated title documents.
- Subscriber account management

### 5.2 The impact of eConveyancing on the Land Registry Office

In conventional conveyancing transactions, the title searches were requested manually by the purchasers' conveyancer and the physical lodgement of title transfer post settlement completed by the banks.

The use of an eConveyancing platform enables a title activity test (TAC) to be completed during the pre-settlement stage (i.e. between exchange of contracts and settlement) to check for change of title details which could indicate transaction risk.

The ELNO would complete this TAC daily, with the frequency increasing to hourly on the day of settlement.

Completion of initial title reconciliation, ongoing TACs and final lodgement through the incumbent ELNO platform will require a digital link between the LRS database and the ELNO platforms.

### 5.3 Strategies and cost impacts on the Land Registry Office

We have evaluated the likely effort and therefore capital expenditure that, in our view, a benchmark efficient LRS would incur to develop an interface that facilitates connection and interaction with multiple ELNOs.

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<sup>8</sup> <https://www.nswlrs.com.au/About-Us> accessed 2nd July 2019

An essential part of this task is establishing a document management system. This would require functionality to:

- Store documents and document metadata
- Apply and manage version control
- Indexing and retrieval of documents with appropriate document security.

A proprietary product could be used for this task, but our assessment is based on the construction of a bespoke system. This document management system would need to have an API and user interface to allow manual searching. The land registry would also require APIs to allow for the interaction with other state entities.

In addition, documents need to be formatted consistently across states to allow effective communication of data for cross-state transactions. As existing documents would have been developed by each state independently, they would have been in different formats and would require some effort to redesign for consistency.

As with the ELNO, it assumes that the protocols are established and known by all parties.

Our assessment, based on our understanding of current market rates and assuming integration with five jurisdictions, is that this level of effort would require a capital expenditure of **\$4.2 million (\$2019)**.

We estimate that approximately 30% of this cost would have been required for the document management system.

## 5.4 Multi-ELNO Platform Development

The LRS addresses three topics of potential relevance to our assessment in a submission to IPART based on the initial release of this report:<sup>9</sup>

1. Automation of the LRS' operational effort in relation to eConveyancing (the LRS has also provided more information directly to us on this topic).
2. The ongoing investment by the LRS in support of ELNO automation.

The LRS notes that its ongoing investment in support of eConveyancing includes:

- Upgrades to the Registry Information Supply service to enable multiple ELNOs to access registry information.
- A new feature of sub-level notification of title data transmitted to ELNOs, due in 2020.
- An automated Title Activity Check service, which is included in the LSS 1 service bundle charged to ELNO subscribers (this provides certainty of title currency during settlement by providing an alert mechanism for any changes, avoiding the need for manual searches by practitioners).

3. Cost reduction and the transfer or recovery of operational costs.

We note that the LRS is required to provide electronic lodgement services. It initially developed systems to support one ELNO only (via a direct connection), presumably not expecting multiple ELNOs. As additional ELNOs emerged, the LRS invested in a new platform that supports interoperability, and it notes that it accelerated and increased its investment in a multi-ELNO platform on the understanding that the incremental cost of this investment (not the ongoing cost of maintaining and supporting the platform) would be recouped under a pricing framework to be agreed.

In its submission, the LRS concludes that the draft IPART report provides no mechanism to recover this incremental cost. We note that the LRS benefits from ongoing operational cost reductions as the number of manual searches reduces.

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<sup>9</sup> Letter from the LRS to the Chair of IPART dated 1 October 2019

Our view is that the LRS' 1<sup>st</sup> and 3<sup>rd</sup> topics above have already been addressed in our assessment, and the clarification provided by the LRS does not require any adjustment or revision of our findings. We note that the sub-level notification feature (2<sup>nd</sup> topic above), while potentially useful for ELNOs, is not currently available and can therefore not be considered an essential service.

We are not aware of the extent of other development projects that the LRS may have been working on in parallel with the multi-ELNO platform development. We consider that while *acceleration* of this development may have delayed other work, it is unlikely to have increased the LRS costs in total other than a possible incremental increase in the cost of money. Given the scale of the investment, this possible increase in the cost of funds is unlikely to be material.

The LRS chose initially to provide a direct link for the first ELNO and then had to develop a multi-ELNO platform as the market evolved. We do not consider it reasonable that the industry should allow recovery of the additional costs incurred as a result of a business decision made by the LRS.

We do not consider that the LRS submission as presented requires revision of our analysis as presented in the previous sections of this document.

## 5.5 Implications

The modelled capital expenditure includes the development of a document management system and the document management system should not form part of the incremental cost that the LRS are incurring in adapting their system for use by multiple ELNOs. Based on our estimate that 30% of the cost of development would have been required for the document management system, this implies that the efficient cost of the multi-ELNO connection would have been approximately \$2.94 million.

A 5-year depreciation period would, in our view, be more appropriate than the 33-year period (the remaining duration of its concession) proposed by LRS in its submission on IPART's draft report.

## 6.0 Revenue NSW cost structures

### 6.1 Revenue NSW services costs related to eConveyancing

Revenue NSW facilitate the payment of Transfer Duty that results from a real estate transaction. To support this process, Revenue NSW has implemented an Electronic Duties Return (EDR) and eDuties portal, both of which are integrated with eConveyancing.

When an eConveyancing workspace is set-up in an ELNO by a subscriber, a Land and Property Information (LPI) document is created. If that LPI is liable to duty, the Office of State Revenue (OSR) are required to verify the details it contains, and confirm the amount of duty payable, all of which is completed through the eConveyancing platform. This requires that the ELNO platform interacts with the Revenue NSW system.

Incomplete or inaccurate data results in a failed verification check from Revenue NSW. The issue is identified on the eConveyancing platform and must be resolved before the transaction can proceed.

### 6.2 The impact of eConveyancing on Revenue NSW

The scope of this assessment includes the costs incurred by Revenue NSW as a result of the implementation of eConveyancing for the tasks shown in Table 26. Our assessment follows.

**Table 26 Revenue NSW costs included in this review**

Task	Revenue NSW activities
Inquiries by ELNO subscribers	Revenue NSW Staff respond to ELNO subscriber inquiries by phone or email to resolve data matching errors
Release support activities	As ELNOs release new products, document types and updates to their platforms, the changes are tested with participants whose systems are integrated with the ELNO (such as Revenue NSW and NSW LRS).
Changes to Revenue NSW systems in response to an ELNO request	An ELNO may request that Revenue NSW makes changes to its systems to accommodate the ELNO's specific requirements.

### 6.3 Cost impacts on Revenue NSW

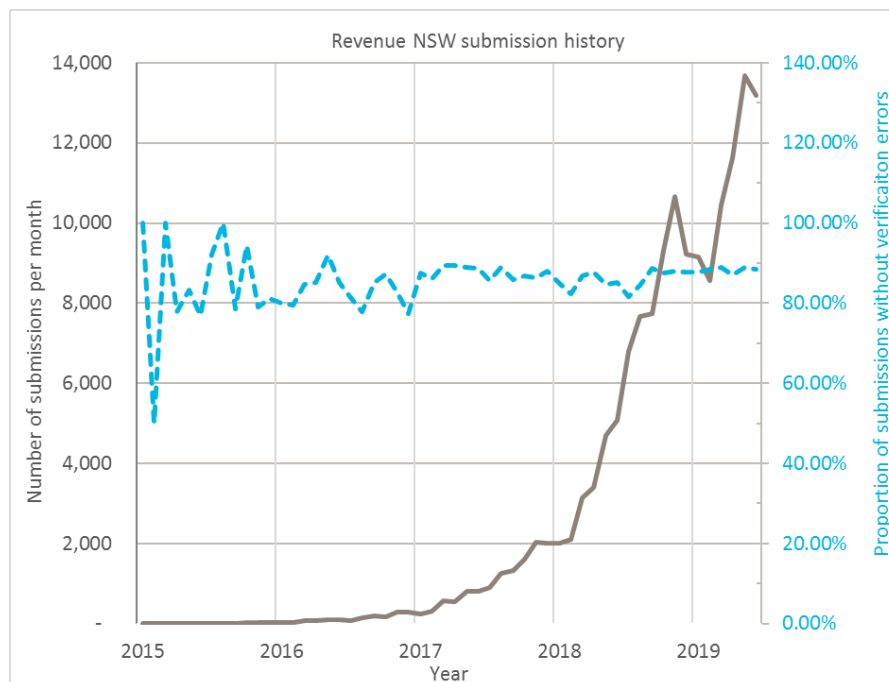
#### 6.3.1 Inquiries (by ELNO subscribers)

The cost of call centre activities is usually determined by the effort required to reach a pre-determined level of service, which is typically defined as *the proportion of calls that are answered with 20 secs* (deducting any that last for less than 5 secs to allow for mis-dials). A typical service level target is 80%. The cost of achieving this service level is a function of the number of calls and the maximum expected during any specific time interval during the day.

Figure 18 shows the increasing number of submissions made to Revenue NSW since the launch of the established ELNO platform in 2015. This figure also shows that the proportion of submissions that successfully passed verification, and therefore do not require resolution by Revenue NSW, showed some initial variability but since 2016 has stabilised at about 87%.

Revenue NSW reports that it responds to about 200-300 verification error enquiries per week (about 13,000 per year). This suggests they receive about 100,000 submissions in total per year.

Its data indicates that it received about 72,000 transactions in 2018 and about 67,000 in the first half of 2019 (pre-mandate), which suggests that about 135,000 transactions will have been received during 2019. An estimate of 100,000 annual submissions is therefore reasonable, although early data suggests 2019 could see an increase of about 30%.



**Figure 18** Reported submissions to Revenue NSW

Revenue NSW reports that it has a 22 FTE business support team located in several offices that is responsible for a wide range of Electronic Duties functions. The team includes six FTEs (one technical lead and 5 clerks) who are dedicated to eConveyancing enquiries, at a cost of approximately \$600,000.

This resourcing suggests that Revenue NSW is likely to spend between 40-50 minutes effort on average resolving each verification issue (based on either 100,000 or 135,000 transactions annually). Details of the average time taken to resolve each type of error code has not been provided, but in our view, an average of 40-50 minutes is reasonable for this activity.

On this basis, the requirement for six FTEs is therefore reasonable (and may in fact increase in the short-term post-mandate as the submission volume increases but reduce thereafter as subscribers become more familiar.)

Revenue NSW contrasted two alternative methods of charging for subscriber support in its submission to IPART, one being a fixed cost for the service recovered from all ELNOs based on their share of the number of enquiries, and the other being a per enquiry charge. Both options will over time enable full cost recovery, but they differ in that the former could result in a reduction in service levels at peak demand (because of a fixed team structure) or over-charging at other times (more staff than necessary), whereas the latter results in variable costs being charged per calendar period (but the level of service is likely to be more consistent).

We note that service operating models in the technology space tend to move relatively quickly from a pure product focus (often described as 'level 2') to a client- or customer-outcome-based model ('level 3 or 4', involving more sophisticated solutions that ultimately will become outcome-based serviced offerings). This is essentially a shift from a capital expenditure model (revenues paid up front) to an operating expense model (revenues based on outcomes delivered).

On balance, we favour Revenue NSW's latter approach because this equivalent to a 'level 3' model (which is where the help desk industry is moving), and because this will be a relatively rapidly changing environment and we favour responsiveness over cost / budget certainty. We note, however, that the ELNOs could very well disagree and put more value on cost certainty in the short term.

### 6.3.2 Support activity for ELNO product releases

Each ELNO would look to release periodic platform updates, which are likely to be in one the three categories in Table 27.

**Table 27 ELNO platform software releases**

Release Type	Scope and basis	Parties affected
Major	Changes to the ELNO platform process, or to the integration with third parties that changes the interaction between parties.	These require testing as a collective (i.e. jointly by the ELNO with input from third parties), to make sure that there are no system wide implications.
Minor	May add new features or functions, but only effects changes to the ELNO (e.g. adding a new document type to the platform).	Depending on the change, these may require the input of Revenue NSW and potentially other parties as they present a system-wide risk of change.
Maintenance	Fixes bugs and security issues. Does not add features or functionality.	ELNO only. Other parties (including Revenue NSW) would typically be informed of changes, but no action would be required.

The frequency of the different releases will vary by type and by ELNO. Maintenance releases would be issued as necessary and given the nature (with some relating to security updates) the frequency would be dictated by the quality of the software product and the response to external drivers.

The timing and frequency of minor and major releases is likely to vary between each ELNO because:

- ARNECC states what documents must be supported by the ELNOs which can mean that there is some functionality that the ELNO must include in their next release.
- Each ELNO must support the same document types (as required by ARNECC) but the scheduling of the on-boarding of each document type, and the strategy for growing into other states, is a business decision for each ELNO. The MOR requires that the ELNOs advise stakeholders of proposed changes but not all document types attract transfer duty, the timing of the support that Revenue NSW would need to provide to each ELNO will therefore vary.

Based on our experience of the industry we would expect the frequency of major and/or minor releases to vary from four times per year (quarterly) to every 2 years.

The process of testing for minor and major changes (where third-party testing is required) would typically take place in a 'sandbox' environment (i.e. a virtual space where the changes can be tested securely), likely to be the same one that was developed when the ELNO was on-boarded pre-launch, but updated to reflect current software status, and verified before testing of updates. The process of testing is likely to require the following:

1. A review of the proposed changes would be completed by each party to understand any likely impacts to their systems, to the software environment or to the data. These reviews would be shared and discussed between all parties
2. The ELNO would develop a test plan which would be reviewed and agreed between all parties. Test cases would then be developed, reviewed and agreed between parties to enable the ELNO to demonstrate the impact on all appropriate scenarios.
3. Preparation of the sandbox ready for testing. This would require Revenue NSW to create a snapshot copy of their system current at the time of the update and deploy the entire system onto another environment for testing. Any previous data would need to be purged and replaced with dummy data and tested. A sandbox would probably need to be created for each release case, for each ELNO because it would need to replicate the actual system at the time of deployment. The time of deployment would differ for each ELNO and would not be within Revenue NSW's control. In each case, dummy data may also need to be regenerated.

4. The testing would be undertaken by the ELNO and the results reviewed and verified by all parties. A testing register would be completed and signed off to formally record the acceptance of the changes
5. Following deployment of the release there would be a short period of testing to confirm that the changes are working as intended. This would be necessarily short because the changes to the platform are live.

The testing programme would be led by the ELNO with other stakeholders providing support as necessary. The team provided by Revenue NSW would need a range of skills to enable effective testing and resolution of issues, noting too that it is possible that Revenue NSW will be required to respond to releases from multiple ELNOs simultaneously, and this needs to be completed without affording any ELNO an advantage.

We would expect the testing and verification process to require intense effort, given the associated financial risks, and would therefore anticipate the Revenue NSW review team would be constructed as shown in Table 28.

**Table 28 Revenue NSW software testing team**

Role	Number in the team
Project Manager	1
Business Analyst	1
Software Developer	2
Dev Ops	1
Quality Assurance Tester	2
<b>Total</b>	<b>7</b>

We have assessed the number of software development sprints that would be required, on average, to complete these numbered tasks above and assessed the total team effort required per release as 0.62FTEs (see Table 29).

In this context, a release could be either a minor or a major release. In practice, a similar level of testing is likely to be required in either case because both could impact system-wide processes that would need to be checked.

We note that it is common in the software industry to designate minor releases (bug fixes and minor functionality improvements) using decimal numbers and major releases (significant functionality improvements) using integer numbers. It therefore makes sense to price testing support along those lines, since minor releases will generally not have any significant functionality differences to earlier releases in the same sequence.

The ELNOs can be expected to continue a period of relatively rapid development as they bring their products to maturity, and to begin to slow down the rate of development as the easier or more obvious improvements are delivered, and as competition in the industry stabilises. The timeframe for this change is difficult to estimate, however, because it depends on the opportunity to innovate and the extent of competition in the market and is therefore highly specific to the industry concerned.

The incumbent ELNO released version 11 of its software system in November 2019, 6 months after its release of version 10. Version 3 had been released in November 2015, so the ELNO has averaged 2 major releases each year since 2015. New entrants are likely to follow a similar pattern, and the introduction of competition to the market is likely to keep the incumbent developing at that rate for some time. A major release takes substantial effort, so the release rate is unlikely to speed up. We therefore consider it prudent to assume that each ELNO will release two major releases each year for the next few years.

**Table 29 Revenue NSW testing team effort – per release**

Task	Sprints required (2 weeks effort)	Total Effort (weeks)
Review proposed changes and consider impact to systems	1.00	14.00
Agree and develop testing scenario		
Establish sandbox. Purge data.		
Develop new test data and test.		
Revenue NSW monitor ELNO complete testing.	1.00	14.00
Revenue NSW review and verify results		
Completion of testing register.		
Sign-off of testing and agreement of production schedule.		
Post deployment testing process.	0.03	0.35
<b>Total effort per release (weeks)</b>		<b>28.35</b>
<b>Annual FTE effort per release</b>		<b>0.62</b>

### 6.3.3 Revenue NSW system changes

The nature and frequency of any changes to Revenue NSW systems would be dictated by each ELNO's development strategy. The nature and effort required to design and implement each change would vary by the nature and extent of the change required.

## 6.4 Comparison with reported cost structures

### 6.4.1 Inquiry support

Revenue NSW has allocated six FTEs (five clerks and one technical lead) to respond to ELNO inquiries.

The median annual salary for Clerk Grades under the Award<sup>10</sup> is \$50,667 (with a 2.5% increase for FY2020). Assuming that the technical lead is a mid-grade administrative officer with more than one year's experience, the median salary from the Award (escalated to FY2020) is \$97,192.

Applying appropriate allowances for superannuation and WorkCover, gives an annual direct salary cost of \$386,100. Revenue NSW reports an annual cost per head of \$608,000, which includes attributable on-costs such as fringe benefits (insurances, leave, etc), business expenses incurred in support of staff (rent, ICT, etc) and administrative costs (such as legal fees, accounting fees, etc). Revenue NSW's salary multiplier of 1.57 is, in our experience, similar to the salary multipliers used by comparable public sector organisations.

### 6.4.2 Support activity for ELNO product releases

An experienced team would be necessary to provide the depth of technical support to the ELNO through this process. We have therefore assumed that the team would consist of the equivalent of senior administrative grades (7-14), which based on Award rates<sup>11</sup> escalated by 2.5% to FY2020, and including allowances for superannuation and WorkCover, gives a median direct annual salary cost per FTE of \$129,922. Applying the direct cost multiplier assessed above gives a total annual salary per FTE of \$204,586.

Applying this cost to the effort in Table 29, gives a total cost per release of \$126,087, as shown in Table 30.

<sup>10</sup> Crown Employees (Public Sector – Salaries 2018) Award, Treasury Circular TC18-09

<sup>11</sup> Crown Employees (Public Sector – Salaries 2018) Award, Treasury Circular TC18-09

**Table 30 Assessed costs per release**

<b>FTE Salary Costs (\$2019)</b>	
Assumed Annual Salary <sup>1</sup>	117,948
Allowance for Superannuation	11,205
Allowance for Workcover	769
<b>Annual Salary Direct Cost</b>	<b>129,922</b>
Industry Multiplier	1.57
<b>Annual Salary total cost (per FTE)</b>	<b>204,586</b>
FTE Effort required per release	0.62
<b>Total Salary Cost per release</b>	<b>126,087</b>

Note 1: Based on median salary for administrative grades 7-14

Revenue NSW indicated originally that its maximum cost per product release is likely to be about \$125,000. Our assessment at Table 30 indicates costs of about \$126,087, which is close to the cost estimate provided by Revenue NSW.

Major (1 = major) and minor (1.1 = minor) releases to an ELNO platform typically require intense testing across software platforms to confirm that the system functions are retained across a range of agreed test scenarios. This would require Revenue NSW to:

- understand the potential impacts of the ELNO releases.
- agree the testing programme with the ELNO.
- actively support the ELNO through the testing, by reviewing and agreeing to the test plan and the subsequent review and verification of the results.

Maintenance (1.1.1 = maintenance) releases are generally corrections to eliminate minor issues in the software, and therefore do not generally require significant testing.

This approach to managing system releases is standard in the software industry.

We agree that in practice there is little difference in the testing effort and cost required between a minor or major release, and that an allowance for two major and two minor releases annually is reasonable.

The proportion of pre-mandate submissions with verification errors has remained relatively constant in recent years and with transaction numbers likely to increase post-mandate, it is expected that there will be a short-term increase in the absolute number of verification issues that Revenue NSW experiences, which an appropriate increase in costs.

Revenue NSW advised that they anticipate a total of four (two major and two minor) releases per ELNO per year and that cost would be incurred each time. The original proposal was to provide free support for the first four releases in a year by each ELNO, and to charge for further releases.

In its response to IPART's draft report, Revenue NSW proposed a change to this arrangement because the high cost of a frequent (such as monthly) release schedule would be likely to deter ELNOs from operating in an innovative and agile way.

It proposes to separate costs associated with Revenue NSW system changes from the product testing, and to enter into different arrangements for each:

- It proposes a charge of \$38,000 and \$21,000 for each subsequent major and minor release after the first for the year (which would be provided at no cost to the ELNO).
- It proposes to negotiate contractual arrangements to recover costs associated with Revenue NSW system changes, which are likely to affect all ELNOs (not just one).

In principle the proposed splitting of the two forms of costs seems a better outcome for the industry, in that Revenue NSW will recover its costs spent supporting the industry in a more accurate way, and the ELNOs will be less discouraged from a rapid rate of product innovation.

Given the relatively wide range of release frequency anticipated, Revenue NSW's use of the average of the range as it's limit of 'free' testing seems reasonable.

#### **6.4.3 Revenue NSW system changes**

Revenue NSW do not report any anticipated costs for this task, presumably because the nature, extent and timing of any bespoke changes would be in response to the ELNO development strategy and therefore not possible to determine in advance.

Revenue NSW has not commented on the cost of any system testing as a result of such bespoke changes.

### **6.5 Implications**

The level of effort and cost that Revenue NSW has been employing to resolve verification issues with transactions submitted through ELNO's appears reasonable and costs align with the Award rates and typical sector multipliers.

The proportion of pre-mandate submissions with verification errors has remained relatively constant in recent years and with transaction numbers likely to increase post-mandate, it is expected that there will be a short-term increase in the absolute number of verification issues that Revenue NSW experiences, which an appropriate increase in costs.

Testing of minor and major releases to an ELNO platform will require intense testing across software platforms to confirm that the system functions are retained across a range of agreed test scenarios. This would require Revenue NSW to understand the potential impacts of the ELNO releases, to agree the testing programme with the ELNO and to actively support the ELNO through the testing, by reviewing and agreeing to the test plan and the subsequent review and verification of the results. Revenue NSW has estimated a cost of about \$125,000 per ELNO for each major and each minor release. In our view, this cost is reasonable and reflective of the effort involved.

## 7.0 Summary of findings

### 7.1 Efficient costs of a benchmark efficient ELNO

The levelised costs for a benchmark efficient ELNO under the market share scenarios in Table 4 are shown in Figure 19, where the bubble size represents capital investment.

It is evident that the levelised transaction cost is very dependent on market share with an increase in market share of the new entrant ELNO from 10% to 36% leading to a 65% reduction in transaction cost.

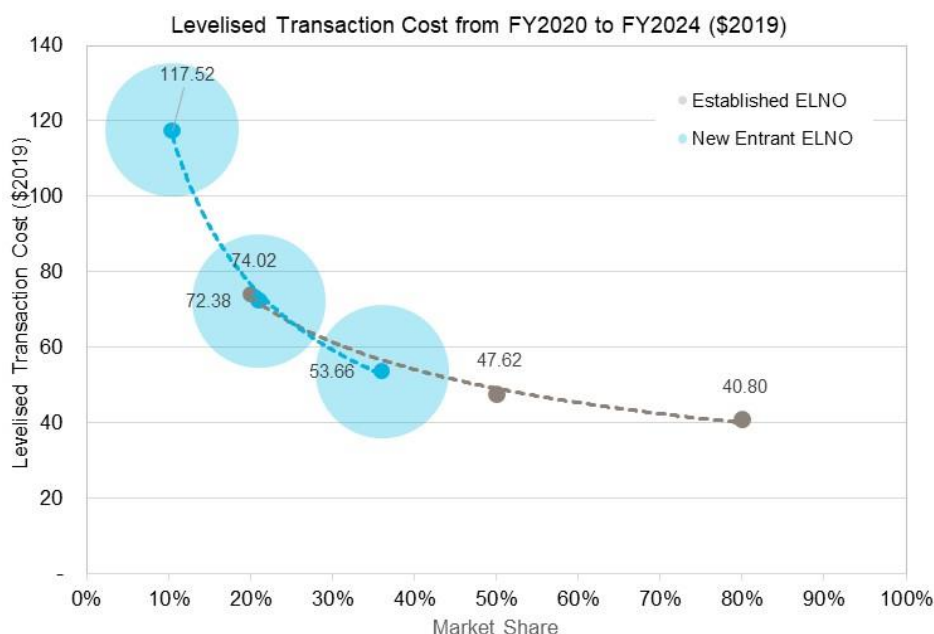


Figure 19 Levelised Cost for Benchmark Efficient ELNOs

### 7.2 Sensitivities

The assessment of costs is particularly sensitive to the following:

- The results are most sensitive to salary costs, either through team structure or the amount of marketing effort required to attract subscribers. Varying the salary cost by +/-30% resulted in a variance in levelised transaction cost of between 4.25% to 5.51% depending on market share. Varying the marketing effort by a similar amount resulted in changes to the levelised transaction cost of between 3.4% to 3.7%.
- Generally, the sensitivity to other factors reduces with increased market share, because of the increased number of transactions. The sensitivity to subscriber costs increases with increasing market share as the number of subscribers increases, resulting in changes to the levelised transaction cost of between 2.55% for the low customer base to 5.67% with a high customer base.

### 7.3 Efficient costs for the Land Registry Office

The efficient capital expenditure for the LRS is modelled as \$4.2 million (\$2019) assuming integration across five jurisdictions.

In our view, it is typical for software products to be depreciated over five-years.

## 7.4 Efficient costs for Revenue NSW

Revenue NSW data shows that about 13% of submission fail the transfer duty verification on initial submission and require some effort from Revenue NSW to work with the subscriber and the ELNO to resolve.

Revenue NSW has estimated an annual cost of \$608,000 for resolving these errors, which in our view is reasonable, and may in fact increase over the short term as the volume of submissions increases post-mandate.

Revenue NSW also actively support the testing of the ELNO platform releases, to make sure that any changes made to the ELNO platform are fully tested and issues resolved prior to release. We estimate that the cost to Revenue NSW of supporting each release is likely to be about \$126,000, which aligns well with the cost estimated by Revenue NSW.

## 7.5 Interoperability

In addition to the no-interoperability model, four other scenarios have been modelled.

With three ELNO's in the market, the Infrastructure ELNO requires the lowest investment. The Central Hub model requires the most investment to establish, but with four or more ELNOs in the market, it becomes a low-cost option, although not as low a cost as the Infrastructure ELNO.

Otherwise the no-interoperability option presents the lowest capital investment.

However, when operating costs are also considered, this modelling suggests that any of the interoperability models offer considerable cost savings to industry over the first 5-years when compared to a market with no interoperability, but this modelling suggests there is no material difference between any of the interoperability models over the first five years for the scenario modelled.

The increasing cost to industry with each new entrant is also evident, and a marked increase in the levelised costs when a new entrant enters a saturated market and takes market share from the incumbents.

## 8.0 Conclusions

The capital cost for a benchmark efficient ELNO is \$5.55 million.

A fundamental basis of the benchmark efficient ELNO is that development would start in an industry where the requirements and protocols for communication were established and known by all parties.

We estimate the benchmark efficient levelised transaction cost to range between \$42.14 and \$77.07 for an established ELNO and from \$55.69 to \$122.89 for a new entrant ELNO, depending on market share. In both cases it has been assumed that the ELNO would operate in three jurisdictions, with the new entrant trading in a new jurisdiction in each of the first three years.

Four interoperability scenarios were considered, and the assessment has shown that with three or more ELNO's in the market, the Infrastructure ELNO requires the lowest investment. The Central Hub model requires the most investment to establish, but with four or more ELNOs in the market, it becomes a low-cost option, although not as low a cost as the Infrastructure ELNO.

Otherwise the no-interoperability option presents the lowest capital investment.

However, when operating costs are also considered, this modelling suggests that any of the interoperability models offer considerable cost savings to industry over the first 5-years when compared to a market with no interoperability, but this modelling suggests there is no material difference between any of the interoperability models over the first five years for the scenario modelled.

Further, as a consequence of the fixed number of transactions, increasing the number of ELNO's in the market would lead to an increase in total industry cost, particularly when an ELNO enters a saturated market.

Our assessment, based on our understanding of current market rates, and assuming integration with five jurisdictions indicates this level of effort required for a benchmark LRS to develop a system suitable to support eConveyancing would require a capital expenditure of **\$4.2 million (\$2019)**.

A 5-year depreciation period would, in our view, be an appropriate depreciation period.

The level of effort and cost that Revenue NSW has been employing to resolve verification issues with transactions submitted through ELNO's appears reasonable and costs align with the Award rates and typical sector multipliers.

Revenue NSW has estimated a cost of about \$125,000 per ELNO for each major and each minor release. In our view, this cost is reasonable and reflective of the effort involved.

# Appendix A

## Conveyancing Process Diagram

