



## E Ink Holdings (8069.TW/8069 TT)

### ESL penetration to surge on wage hikes & new retail trends

#### Outperform · Initiated

Price as of September 12 (NT\$)	172.0
12M target price (NT\$)	237.0
Previous target price (NT\$)	N/A
Revised up (%)	N/A
Upside (%)	37.8

#### Key message

We initiate coverage of E Ink Holdings with an Outperform rating and 12-month target price of NT\$237 as we expect the firm to benefit from rising ESL penetration amid wage hikes and new retail trends, while electronic paper display (EPD) sales are set to resume growth thanks to the launch of color solutions.

#### Trading data

Mkt cap (NT\$bn/US\$m)	196.2 / 6,127
Outstanding shares (mn)	1,140
Foreign ownership (mn)	417.8
3M avg. daily trading (mn)	6.76
52-week trading range (NT\$)	161.0 –248.5

Performance	3M	6M	12M
Absolute (%)	-24.1	-4.5	-27.6
Relative (%)	-21.8	-11.2	-39.5

#### Quarterly EPS

NT\$	1Q	2Q	3Q	4Q
2022	1.28A	2.08A	3.72A	1.61A
2023	1.54A	2.12A	1.64F	1.63F
2024	1.59F	2.28F	3.01F	2.60F

#### Share price chart



Source: TEJ

#### Event

According to SES-imagotag (FR), cumulative global shipments of electronic shelf labels (ESL) nearly reached 700mn units as of end-2022, roughly implying a 7% penetration rate. In light of wage hikes and new retail trends, we forecast ESL adoption by retailers will surge, which will drive a global ESL shipment 2023-25 CAGR of 28%. E Ink Holdings is set to benefit significantly from the trend.

#### Impact

**Walmart to speed up ESL adoption amid wage hikes & new retail trend.** The minimum hourly wage in New York posted a 2013-22 CAGR of 6.2% to US\$13.2, while the price of ESL has fallen below US\$6 per unit, implying the ESL investment payback period is less than two years. Given the new retail trend of integration of online and physical channels, which has created demand for synchronization of online and offline price tags, we expect E Ink's ESL shipments to Walmart (US) to accelerate in 1H24, with the sales weighting of ESL likely to rise 49% and 31% YoY to 67% and 70% in 2024-25F, respectively.

EPD sales to resume growth on launch of color solutions. Global shipments of electronic paper display (EPD) products, including e-notes and e-readers, declined to a peak of 23mn units due to the launch of iPad and Android tablets in 2011. Thanks to new e-pencil and touch features, alongside government support for educational applications, in 2021-22, global EPD shipments stabilized at 10-11mn units. We estimate the launch of color EPD will prompt segment sales growth of 11% on average in 2024-25, with sales weightings of 32% and 28%, respectively.

**Large color signage is a growing business.** EPD boasts low power consumption, visibility under direct sunlight, and properties similar to traditional paper. E Ink's color large e-poster and signage solutions (E Ink Gallery™) have attracted a growing number of clients in recent years. After production capacity for large ESL (maximum of 100") is fully installed in 3Q24, we forecast the product line will contribute 2% of sales in 2025.

#### Valuation & Action

We expect E Ink to benefit from rising penetration of ESL, and thus initiate coverage with an Outperform rating and 12-month target price of NT\$237, based on 25x 2024F EPS. In light of robust sales growth and better operating margin in the next two years, we are confident E Ink's share price and valuation will soar.

#### Risks

End-demand weaker than expected; major policy change or market fluctuations.

#### Key financials and valuations

	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
Revenue (NT\$m)	19,651	30,061	28,636	38,886	47,957
Gross profit (NT\$m)	8,588	16,230	14,750	20,352	25,455
Operating profit (NT\$m)	3,023	9,199	7,317	11,256	15,084
Net profit (NT\$m)	5,150	9,912	7,907	10,802	13,903
EPS (NT\$)	4.53	8.69	6.93	9.47	12.19
Cash DPS (NT\$)	3.20	4.50	3.59	4.90	6.31
EPS growth (%)	42.6	91.9	(20.2)	36.6	28.7
PE (x)	38.0	19.8	24.8	18.2	14.1
PB (x)	5.6	4.5	4.1	3.7	3.3
EV/EBITDA (x)	17.2	9.6	11.1	8.1	6.4
Net debt to equity (%)	1.4	4.3	4.4	1.3	Net cash
Dividend yield (%)	1.9	2.6	2.1	2.9	3.7
Return on average equity (%)	15.7	25.1	17.3	21.6	24.8

Source: Company data, KGI Research estimates

## Investment thesis

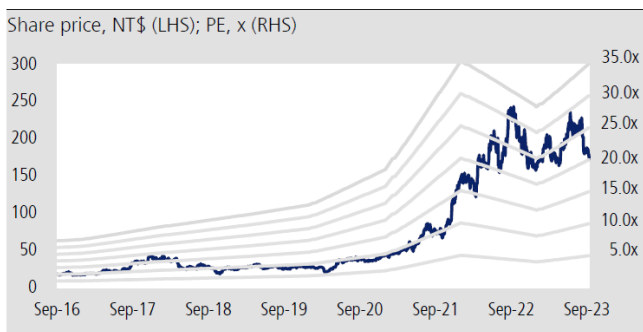
We initiate coverage of E Ink Holdings with an Outperform rating and 12-month target price of NT\$237, based on 25x 2024F EPS, as we forecast the firm will deliver respective 37% and 29% EPS growth in 2024-25, driven by rising ESL penetration amid wage hikes and a new retail trend.

## Initiate coverage with Outperform & 12-month target price of NT\$237

We initiate coverage of E Ink Holdings with an Outperform rating and 12-month target price of NT\$237, based on 25x 2024F EPS, as we expect the firm to deliver respective 37% and 29% EPS growth in 2024-25, with long-term growth drivers being:

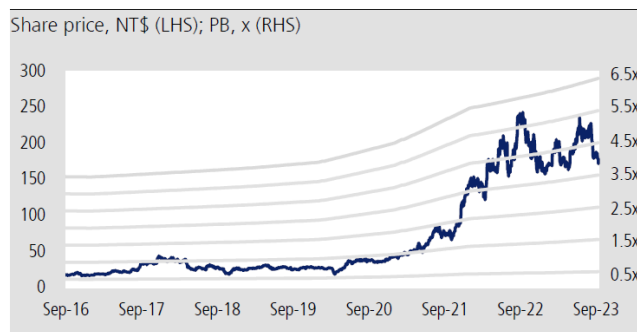
(1) faster adoption of ESL by retailers amid rising wages and new retail trends. We forecast global shipments of ESL modules will post a 2023-25 CAGR of 28%; (2) the launch of color EPD, which should help resume segment sales growth; and (3) introduction of color large label solutions. In light of robust sales growth and better operating margin ahead, we are confident E Ink will see its share price and valuation soar (Figures 1-4).

**Figure 1: E Ink's PE ratio to rise**



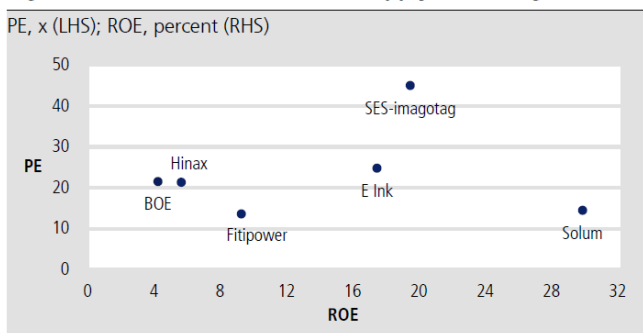
Source: Bloomberg ; KGI Research

**Figure 2: E Ink's PB ratio to rise**



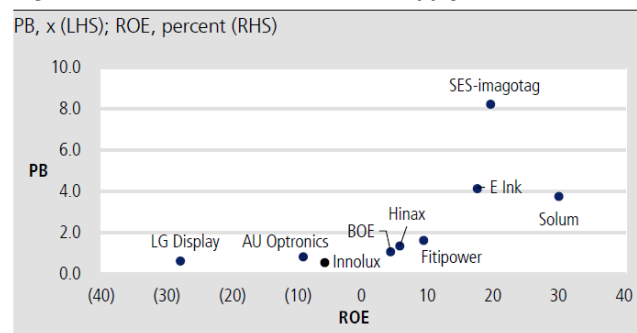
Source: Bloomberg ; KGI Research

**Figure 3: PE ratios of E Ink & EPD supply chain to grow**



Source: Bloomberg ; KGI Research

**Figure 4: PB ratios of E Ink & server supply chain to rise**



Source: Bloomberg ; KGI Research

**Figure 5: Peer comparison – Valuations**

Company	Ticker	Mkt Cap (US\$m)	Price (LCY)	EPS (LCY)			PE (x)			PB (x)			ROE (%)			Dividend yield (%)		
				2022	2023F	2024F	2022	2023F	2024F	2022	2023F	2024F	2022	2023F	2024F	2022	2023F	2024F
<b>Display</b>																		
E Ink	8069 TT	6,124	172.00	8.69	6.93	9.47	19.8	24.8	18.2	4.49	4.13	3.72	25.1	17.3	21.6	2.6	2.1	2.9
AU Optronics	2409 TT	4,050	16.85	(2.39)	(2.05)	0.38	N.M.	N.M.	44.5	0.70	0.82	0.81	(10.1)	(9.2)	1.8	4.7	-	-
Innolux	3481 TT	3,883	13.70	(2.76)	(1.53)	0.29	N.M.	N.M.	46.5	0.5	0.5	0.5	(10.1)	(5.9)	1.2	0.0	0.0	0.0
BOE	000725 CH	20,604	3.96	0.19	0.18	0.32	20.8	21.5	12.3	1.16	1.07	0.95	5.5	4.1	9.0	1.4	1.9	2.3
HANNSTAR DISPLAY	6116 TT	1,092	11.90	(0.86)	N.A.	N.A.	N.M.	N.A.	N.A.	0.72	N.A.	N.A.	(5.2)	N.A.	N.A.	N.A.	N.A.	N.A.
LG Display	034220 KS	3,566	13,230.00	(8,584.00)	(6,753.93)	(118.52)	N.M.	N.M.	N.M.	0.48	0.62	0.62	(26.7)	(27.9)	(1.6)	N.A.	4.3	2.4
<b>IC</b>																		
FITIPOWER	4961 TT	911	156.50	16.49	11.50	12.72	9.5	13.6	12.3	1.68	1.63	1.45	18.5	9.2	6.8	6.2	N.A.	N.A.
ULTRA CHIP INC	3141 TT	218	93.00	7.01	N.A.	N.A.	13.3	N.A.	N.A.	2.82	N.A.	N.A.	22.1	N.A.	N.A.	2.6	N.A.	N.A.
<b>SI</b>																		
SES-imagotag	SESLFP	2,118	123.80	1.20	2.75	5.28	103.2	45.0	23.5	10.02	8.22	6.19	10.0	19.4	27.0	N.A.	0.2	0.9
Pricer	248070 KS	1,113	29,550.0	954.00	2,034.90	2,423.70	31.0	14.5	12.2	4.96	3.76	2.89	16.9	29.8	27.0	N.A.	N.A.	N.A.

Source: Bloomberg ; KGI Research

E Ink Holdings, a member of the Yuen Foong Yu Group, was founded in 1992 and is the largest e-paper maker in the world. In 2009, it merged with E Ink (US), a firm with e-ink technology capable of mass producing e-paper. In 2016, it exited the LCD business. In 2023, the firm co-organized the E-paper Industry Alliance with partners in the e-paper ecosystem as a platform to develop business opportunities for e-paper applications.

### Company background

E Ink Holdings, a subsidiary of Yuen Foong Yu Group, was established in 1992. Its current paid-in capital stands at NT\$11.4bn and it has 2,700 employees. The company is a leading global developer and supplier of e-paper based on electrophoretic technology. Its main products are consumer electronics. Product applications include e-readers, electronic shelf labels, e-notes, e-paper mobile devices, and e-paper digital boards.

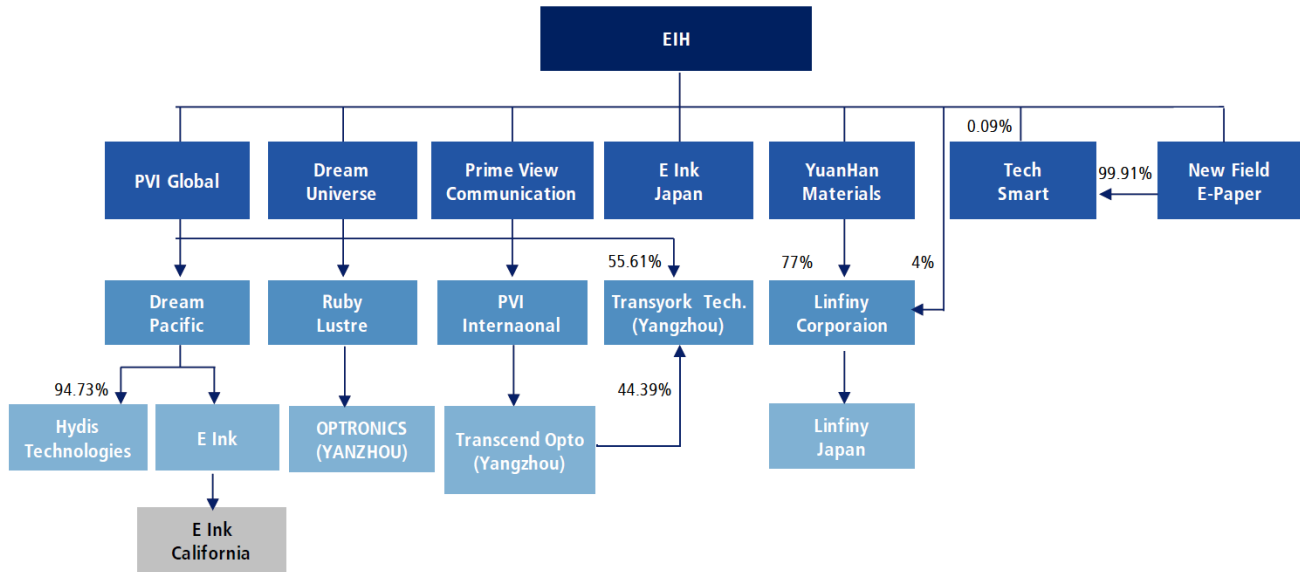
In its early days, E Ink Holdings focused on the production of small- and medium-sized panels. In 2009, it merged with E Ink (US), an e-paper R&D and mass production firm that sourced technology from MIT Media Lab and sold products globally under the E Ink brand. At the end of 2016, E Ink Holdings exited the LCD business to focus on the R&D and manufacture of e-paper (Figure 6-7). In 2023, it co-organized the E-paper Industry Alliance with partners in the e-paper ecosystem, such as BOE (CN), a China-based panel maker, and Xingtai Technology (CN), an affiliate of Holitech (CN), to develop business opportunities for e-paper applications, targeting eight major smart applications (i.e. education, office, retail, transport, logistics, factory, healthcare, and civil aviation).

**Figure 6: Company history**

Time	Event	Time	Event
1975	- The concept of ePaper is initially proposed.	2012	- Acquired shares in SiPix Technology, Inc., resulting in a more completed E-Paper Microcup technology and patent layout - E Ink innovation center is established in Boston, USA, accelerating development of E-Paper material, E Ink and E-Paper product application
1992	- Established in Hsinchu Science Park, the firm is the first TFT-LCD company in Taiwan which focuses on small- and medium-sized panel.	2013	- E Ink™ tri-color e-paper display received "Gold Display Component of the Year" at the 2013 Display of the Year Awards (DYA) presented by the Society for Information Display (SID)
1996	-Massachusetts Institute of Technology (MIT) developed the Electro-Phoretic Display (EPD), also known as "E Ink."	2015	- Announcement of E Ink Prism™ color-changing e-paper technology.
2002	Permission granted by MOEA Investment Commission to establish Transcend Optronics (Yangzhou) Co., Ltd. as an indirect investment in China through an investment business in a third region.	2016	- Officially bowed out the LCD business to focus on E-Paper development and manufacturing
2004	- officially listed on the Taipei Exchange in March ◦ - 'Permission granted by MOEA Investment Commission to establish Liqi Optronics (Yangzhou) Co., Ltd. as an indirect investment in China through an investment business in a third region. ◦ - Jointly developed the first E-book Reader in Taiwan with Sony, with introduction taken place in Japan	2017	- Linfinity Corporation established by E Ink as a joint venture on e-paper displays with SONY Semiconductor.
2005	- Acquired Philips' EPD business.	2018	- E Ink formed strategic partnership with the French company SES-imagotag.
2007	Amazon introduced the first Kindle Reader around the world, adopting E-Paper -MOU signed to acquire Korean panel maker BOE Hydis Technology Co., Ltd.	2019	- SiPix was acquired by E Ink subsidiary Yuanhan Materials to streamline the organization of the E Ink Group and improve the operating efficiency of the subsidiary. ◦
2008	-Hydis Technologies Co., Ltd. shares were formally acquired on July 4. Premium of over NT\$20bn had been accumulated as global licensing of FFS technology is commenced.	2020	- Plans to increase e-paper production at Hsinchu plant to meet market demand passed by the Board of Directors
2009	- Signed contract with E Ink, an U.S. E-ink maker, and its shareholders' representative to acquire 100% of its company shares - Hydis subsidiary signed bond purchasing contract, collateral contract, investment contract, and cross-licensing contract with LG Display ◦	2021	- E Ink Kaleido™ Plus, the latest generation of the print color technology, announced. - E Ink TM 3100 four-color e-paper technology (black, white, red and yellow) announced. - Subsidiary Transcend Optronics invested in the construction of a new factory develop its business in upstream materials for e-paper modules. - Expansion of production capacity for e-ink materials by subsidiary E Ink Corporation. - Announcement of E Ink Gallery™ Plus, the latest generation of the full color ePaper module
2010	- Permission granted by MOEA Investment Commission to establish Transyang Electronics (Yangzhou) Co., Ltd. as an indirect investment in China through an investment business in a third region ◦ - Company name changed to E Ink Holdings Inc. ◦	2022	- Announcement of the latest E Ink Kaleido™ 3 print color ePaper technology, E Ink Spectra™ 3100 Plus 5-color ePaper (black, white, red, yellow and orange) and E Ink Gallery™ 3 color ePaper technology. - E Ink and subsidiary Yuanhan Materials participated in the private investment of Integrated Solutions Technology, Inc(IST).
2011	- Permission granted by MOEA Investment Commission to establish Transmart Electronics (Yangzhou) Co., Ltd. as an indirect investment in China through an investment business in a third region. - Reached agreement with LG Display to terminate investment contract related to Hydis ◦	2023	- Introduced the revolutionary E Ink Spectra™ 6, a new color electronic paper replacing traditional paper signs. - Launched E Ink Kaleido™ 3 Outdoor, a color printing electronic paper technology that provides the best low-carbon display solution for outdoor public message boards.

Source: Company data, KGI Research

Figure 7: Group deployment

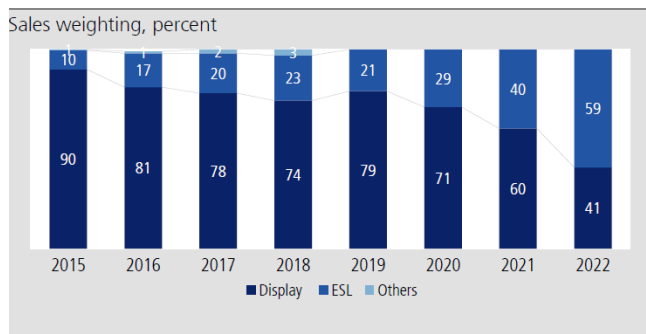


Source: Company data; KGI Research

Under a new retail trend, the sales weighting of consumer electronics (e-notes & e-readers) in the end application field has fallen YoY in recent years amid rising applications for the Internet of Things (IoT).

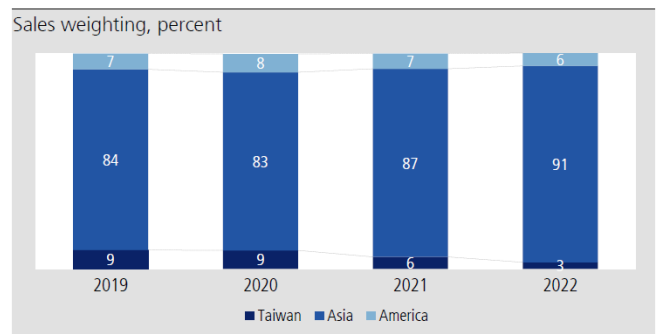
In 2022, IoT applications overtook their consumer electronics counterparts, with the sales weighting of the former rising to 59% while that of the latter falling to 41%. By region, Asia enjoyed the lion's share with 91% of the market in 2022, followed by the Americas at 6%, and Taiwan at 3%. The customer mix started to change in 2022 along with changes to the product portfolio, with the largest customer accounting for a lower 14%. The top three customers contributed 40% of sales while the rest combined contributed 60% last year (Figure 8-10).

Figure 8: Sales mix by application in 2015-22



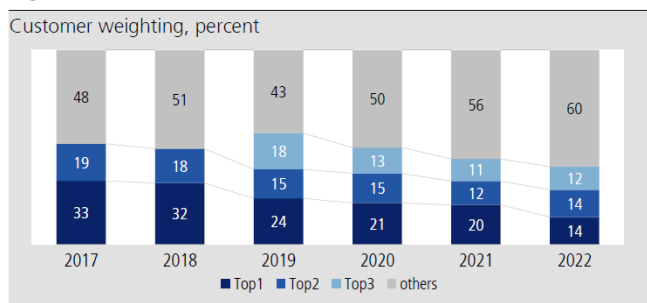
Source: Company data; KGI Research

Figure 9: Sales mix by region 2019-22



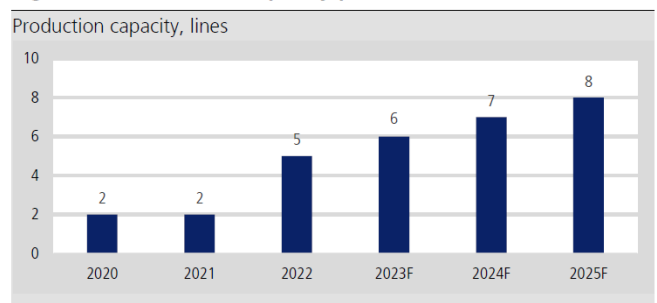
Source: Company data; KGI Research

Figure 10: Customer mix in 2017-22



Source: Company data; KGI Research

Figure 11: Production capacity plan for 2020-25



Source: Company data; KGI Research

**Capacity planning.** The firm currently had two existing production lines before capacity expansion. In 2022, four production lines were added in Hsinchu, with the fourth line set to contribute in 3Q23. A new building will be simultaneously constructed as the fifth production line is built in Hsinchu, with construction to be completed in 2024F. The sixth production line is still in the planning phase, and is expected to be completed in 2025. The firm will eventually have a total of eight production lines (Figure 11).

**Production process for EPD.** The production process can be divided into two stages, front panel lamination (FPL) and electronic paper display (EPD). FPL is special coatings and lamination conducted through coil coating machines, while EPD is lamination between FPL, TFT substrate, and other components like driver IC, optical film, and touch panels. EPD testing and related optical feature measurement are performed later. E Ink content includes black, multi-color, variable color, flexible, touch, and wireless power supply (Figure 13).

**Figure 12: Production process for EPD**



Source: Company data; KGI Research

**Figure 13: E Ink content**

<b>Monochrome Ink Technology</b>	The E Ink Carta™ 1200 released in 2021 improved its response rate and contrast by 20% and 15% respectively compared to its predecessor (Carta 1000).
Spectra™6	E Ink Spectra™ 6 is the latest technology in the Spectra series. It uses white, red, yellow, and blue charged color inks, controlled by voltage, to create high-saturation black, white, red, yellow, blue, and green colors. The resolution has been improved to 200ppi
Spectra™3100 & 3100 Plus	Four-color electronic ink system that uses black, white, red, and yellow particles to provide vibrant and saturated colors. It can display a wide range of information and content, making it suitable for high-quality retail environments and shelf labels.
<b>Color Ink Technology</b>	
Kaleido™ Plus & 3 & 3 Outdoor	It utilizes the Print Color Technology, combining electronic ink technology with a color filter array, to transform black-and-white electronic paper into a rich palette of 4096 colors using RGB mixing principles. It is suitable for larger temperature ranges in outdoor environments
E Ink Gallery™ Plus & 3	The E Ink Gallery range uses four colors of electronic ink particles for a full-color display. E Ink Gallery Plus is intended for indoor commercial signage in department stores and restaurants. E Ink Gallery 3 focused on improving page turning speed display resolution. It is suitable for eReader and eNotebook market applications.
<b>Color Changing Film for Architecture and Art Design</b>	E Ink Prism™ is a dynamic color display technology
<b>Flexible EPD</b>	E Ink Mobius™ is a flexible EPD
<b>Front Light and Touch Panel Technologies</b>	When combined with E Ink ComfortGaze™ front light technology, electronic paper enable comfortable reading even at night. In terms of touch-enabled electronic paper displays, in addition to the commonly used capacitive touch technology, E Ink is actively developing touch patterns suitable for electronic paper to improve the signal-to-noise ratio. Collaborating with manufacturers, they are developing various touch modules to enhance product performance and versatility.
<b>EPD with Energy Harvesting Technology</b>	For short-distance applications, NFC receivers can be used in eWallets, electronic IDs. In long-range applications, they can be applied to transportation application systems, retail electronic shelf labels, and so on.

Source: Company data; KGI Research



## E Ink production lines

Application product lines encompass seven major categories:

### (1) E-readers

A trend toward larger e-book readers with added handwriting functionality has been established. In the realm of classic black and white e-readers, the sizes of mainstream models have evolved to 6.8-7.0". E Ink released a 8" advanced color e-reader (Gallery™ 3) in 2022. In 2023, we expect the release of e-readers equipped with advanced color EPD in various regional markets worldwide. The advanced color e-reader (Gallery™ 3) supports handwriting too. The screen size of mainstream products is primarily 7.8". Size will extend to 10.3" and beyond in the future.

### (2) E-notes

E-note technology offers handwriting with data editing, storage, and data management functions. E Ink launched a new generation of its E Ink Kaleido™ Plus in 2021 and E Ink Kaleido™ 3 color in 2022. The development of the education markets in China, India, and Japan is expected.

### (3) Electronic shelf labels (ESL)

ESL technology allows real-time price changes and updates. In 2020, E Ink launched the E Ink Gallery Palette™ 4000, which offers seven colors. They also released the latest generation of black, white, red, and yellow four-color Spectra™ 3100 in 2021, followed by the black, white, red, yellow, and orange five-color Spectra™ 3100 Plus in 2022. In 2023, they introduced Spectra 6, a color EPD technology. These products are suitable for in-store advertising, indoor signage, or as replacements for any paper-based posters.

### (4) Smart display card

Since 2006, the world's major financial security product and service providers have been developing functions like dynamic displays or biometrics to enhance credit card security. There are also all-in-one smart cards that can hold all of a consumer's credit cards, membership cards, or reward cards on one card. And the combination of EPD and cold storage technology has emerged as a trend in the form of cryptocurrency wallet cards.

### (5) Luggage/Logistics tags

The current solution integrates EPD and wireless transmission technologies, such as Bluetooth or NFC to transmit and receive ID codes assigned to flight numbers for luggage. Passengers and flight details are also displayed on the tag. The system offers airlines an effective way of tracking luggage and troubleshooting problems during luggage transport.

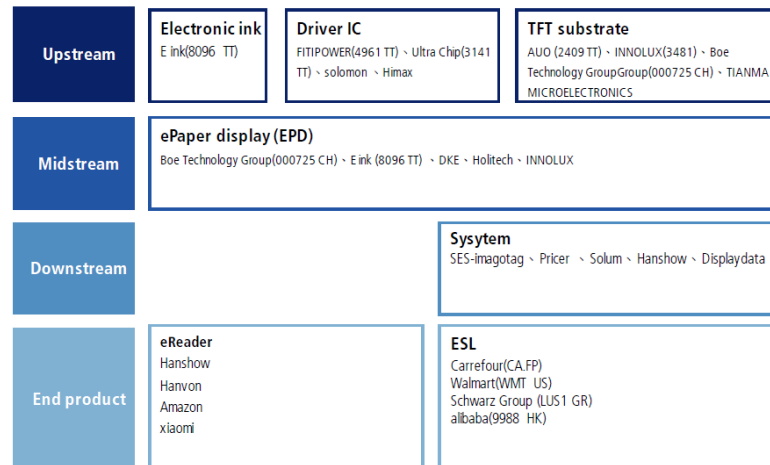
### (6) Mobile devices

For dual-screen applications, EPD was introduced to the innovative product sector of PC convertibles by offering a new 3-in-1 user experience that combined dynamic keyboards, handwriting, and reading in 2018.

### (7) Digital signage

Drawing on the existing strengths of EPD, such as low-power, readability in direct sunlight, and paper-like attributes, E Ink has secured a commanding advantage in the digital signage market. Developed multi-size color electronic paper digital signage E Ink Gallery™, officially entering the colorful digital signage market.

Figure 14: E-Paper supply chain



Source: Company data; KGI Research

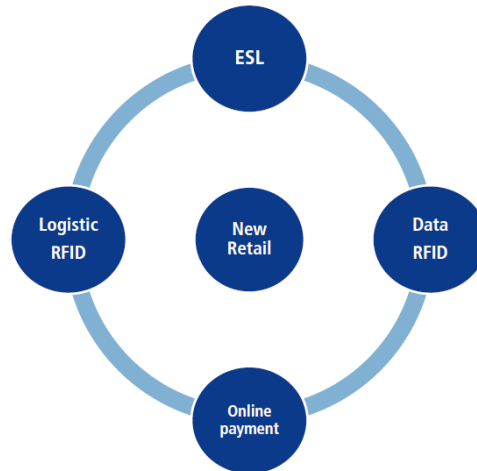
The EPD supply chain encompasses upstream electronic ink operators, mid-stream module suppliers, and downstream brand operators. ESL technology is key to online and off-line integration in the new retail ecosystem supply chain. We project a 2023-25 accumulated global ESL module shipment CAGR of 28%, with total shipments of 1.6bn units in 2025, for penetration of 16%.

### Industry summary

The EPD supply chain encompasses upstream electronic ink operators (E Ink Holdings), TFT substrate firms (AUO, 2409 TT, NT\$16.85, N; BOE TechnologyGroup, CN), and driver IC firms (Fitipower, 4961 TT, NT\$156.5, NR; UltraChip, 3141 TT, NT\$93, NR), as well as midstream module suppliers (Boe TechnologyGroup, CN; DKE, CN), and downstream brands, such as ESL system solution operators (SES-imagotag, FR; Pricer, SE), e-note and e-reader makers (Hanshow, CN; Amazon, US), and electronic label retailers, (Walmart, US) (Figure 14).

**ESL technology is key to online & off-line integration under the new retail ecosystem supply chain.** New retail is more focused on consumer demand and experience, and integrates models such as data analysis, logistics, cash flow, and even online and off-line sales channels. The new retail trend integrates advantages of online and off-line channels to compensate for shortcomings. ESL is a key solution which allows retailers to offer promotions in physical stores and online stores simultaneously.

According to data from SES-imagotag, the global ESL market scale is around 10bn units, with accumulated shipments of around 700mn units as of 2022, for a penetration rate of 7%. We project 2023-25 accumulated global ESL module shipments will arrive at a respective 910mn, 1.22bn, and 1.6bn units, for a penetration rate of 9.1%, 12.7%, and 16% (Figure 17), and forecast ESL module 2023-25 market value CAGR of 21%, with market value of US\$7.5bn in 2025.

**Figure 15: ESL technology plays key role in new retail ecosystem supply chain**


Source: Company data; KGI Research

**Wage hikes & declining ESL prices to shorten investment payback schedule; we predict mass adoption of ESL by Walmart in 1H24.**

In the new retail ecosystem, ESL allows merchants to synchronize price tags simultaneously in the online and physical marketplaces for sales promotions, while RFID is used to collect customer information. We identify wages (labor costs) and the price of ESL as the primary swing factors for investment payback schedule. Our analysis is as follows:

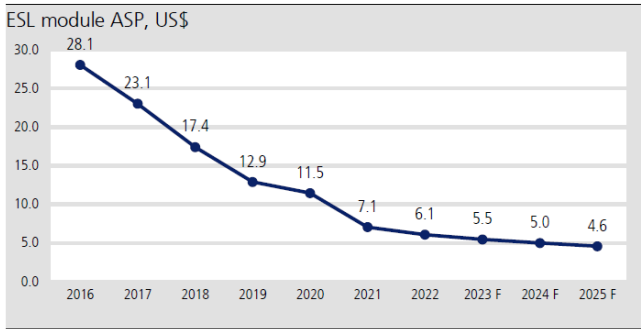
(1) Labor costs have been rising globally, with minimum hourly wages in New York, South Korea, and Shanghai rising at respective 2013-22 CAGRs of 6.2%, 4.7%, and 4.6% to US\$13.2, US\$7.3, and US\$3.0, while the minimum hourly wage in France was static at US\$11.9 (Figure 18).

(2) ESL prices are determined by hardware (i.e. ESL modules, small base stations, and handheld terminal devices) and software costs, with a 70:30 ratio. A medium-sized supermarket should have about 15-60k stock keeping units (SKU). Assuming the average cost of ESL is US\$6 per SKU and 5% of 60k SKU require frequent price tag updates (twice a day), while the weighted average update frequency of a price tag is 41.7 times per year, with each manual update taking 30 seconds, and labor cost is US\$10 per hour, this means for the owner of a supermarket, investment in ESL can be recovered in 2.4 years (Figures 20-23).

(3) In recent years, ESL prices have been declining at double-digit rates YoY, and we estimate average unit cost will fall below US\$5 by 2024 (Figure 16). Assuming an ESL lifecycle of 5-7 years, we believe shop owners will be more interested in using ESL when the investment payback period is less than two years. It makes sense that the US and Europe have been the first to adopt ESL, as local hourly wages are higher at US\$10-13, and medium and large supermarkets are more common. Led by France, Europe is currently the largest consumer of ESL, and we see huge growth potential in the US market (Figure 20-25).

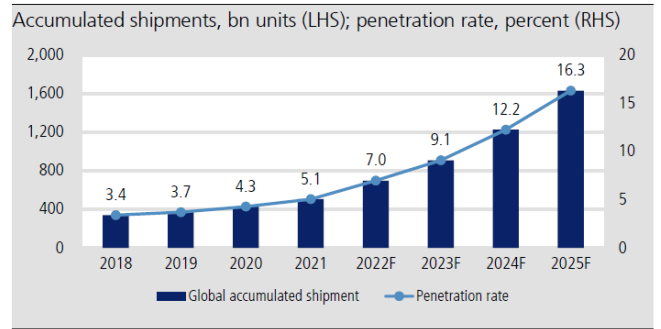


Figure 16: ESL module ASP trend



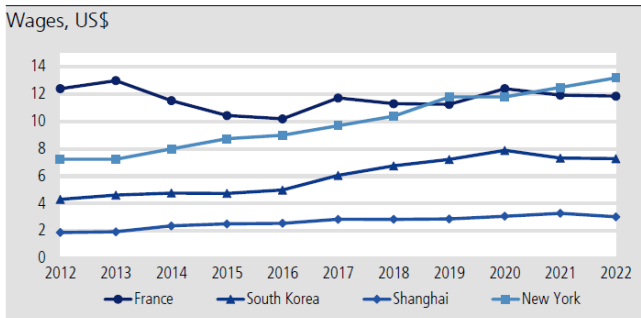
Source: SES-imagotag ; Pricer; KGI Research

Figure 17: Global accumulated ESL shipment & penetration rate forecasts



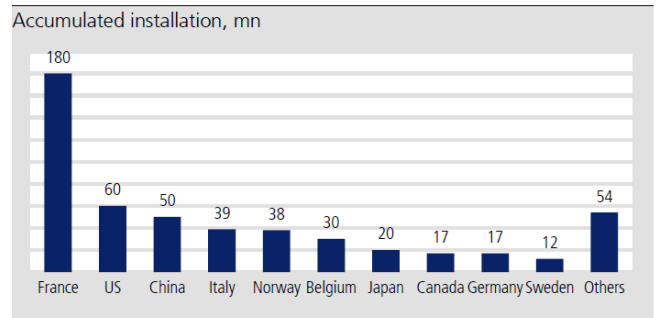
Source: SES-imagotag ; Pricer; KGI Research

Figure 18: Minimum hourly wage trend



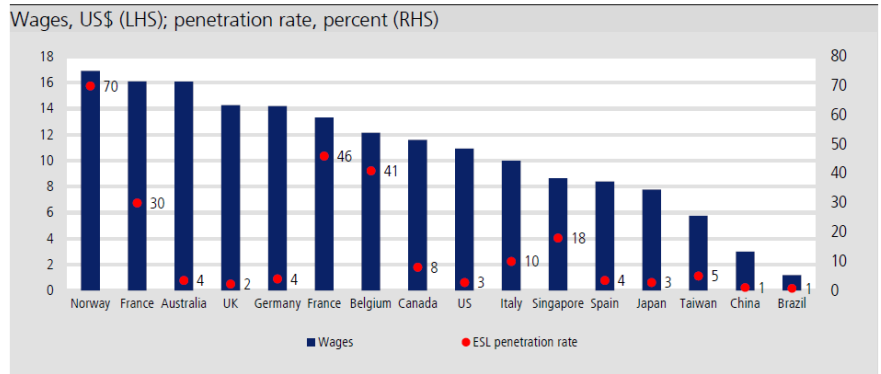
Source: Bloomberg; KGI Research

Figure 19: 2022 top-10 countries to adopt ESL



Source: Pricer; KGI Research

Figure 20: Comparison of global hourly wages & ESL penetration rates



Source: Pricer; KGI Research

Figure 21: ESL cost forecast for 60k SKU per store

	Unit price (US\$)	Total price (US\$)
60K SKU ESL cost	6	306,000
Gateway cost (1:1000 ESL)	600	36,000
Software cost(total amount %)	30%	148,629
Handheld controller (1:5000 ESL)	400	4,800
<b>ESL total cost</b>		<b>495,429</b>

Source: KGI Research

Figure 22: Required tag update time forecasts for 60k SKU store

	2 times / day	1.5 times / quarter
Replacement frequency between two SKUs	5%	95%
SKU label replacement per year	720	6
Average SKU tag replacement frequency (year)		41.7
Time spent on replacement per unit product (s)		30
Time spent on replacement per unit product per year (s)		1,251
Time spent on replacing 60k SKU per year (hr)		20,850

Source: KGI Research

**Figure 23: Estimated payback period of SKU in different supermarket types**

Supermarket type	Large	Medium	Small	Walmart US 2020	Walmart US 2023F
SKU per store	60,000	37,500	15,000	120,000	120,000
ESL ASP (US\$)	6.0	6.0	6.0	11.5	6.0
Hourly wage (US\$)	10.0	10.0	6.0	11.8	14.0
Times spent on changing tags per year (hr)	20,850	13,031	5,213	41,700	41,700
Wage spent on changing tag per year (US\$)	208,500	130,313	31,275	492,060.0	583,800
ESL total cost (US\$)	495,429	341,786	143,143	1,792,286	990,857
Payback period years	2.4	2.6	4.6	3.6	1.7

Source: KGI Research

**Figure 24: Estimated Walmart retail store & SKU count in the US**

Walmart US	SKU per store (thousand)	Number of stores	Total SKU (thousand)
Supercenters	142	3,572	507,224
Discount stores	120	364	43,680
Neighborhood markets	29	781	22,649
Total		4,717	573,553

Source: Walmart; KGI Research

**Figure 25: Comparison of sales & store count of leading global retailers**

Region	Retail	2022 sales (US\$bn)	Global store number	Region	Retail	2022 sales (US\$bn)	Global store number
US	Walmart	585	10,490	Europe	Schwarz Group	160	13,756
	Amazon.com	353	589		Aldi	130	13,325
	Costco	219	842		Carrefour	108	14,474
	The Home Depot	157	2,317		Ahold Delhaize	95	7,793
	The Kroger Co.	148	2,856		Rewe	71	11,453
	Walgreens Boots Alliance	124	13,153		Tesco	65	4,610
	Target	108	1,948		Leclerc	49	2,037
	CVS Health Corporation	107	9,728		IKEA	47	465
	Lowe's Companies	94	1,738		Casino	37	11,157
China	Alibaba	96	839	Japan	Seven & I	95	40,325
	AS Watson	30	16,002		Aeon	73	11,775
	Dairy Farm	25	6,592		Fast Retailing	26	3,327

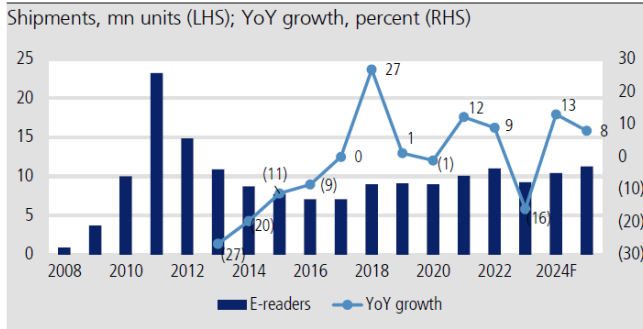
Source: NRF; KGI Research

**Introduction of color EPD to help segment sales resume growth in 2024-25F.**

Global sales of e-readers reached a peak of 23mn units in 2011 following the launch of the Amazon (US) Kindle in 2007 and aggressive promotion in subsequent years. However, between 2011 and 2017, e-reader shipments fell at a CAGR of 18% as a result of competition from the iPad and Android tablets, convertible commercial NB, and the launch of large-display handsets in 2014.

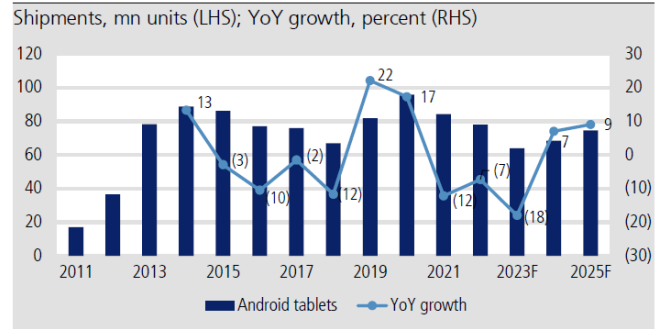
In 2017-22, shipments of e-readers posted a CAGR of 9% due to the COVID-19 pandemic and robust demand from China for educational applications. We forecast shipments of e-notes and e-readers will fall 16% YoY in 2023 given global economic weakness, but shipments will resume growth in 2024-25 as the launch of color EPD will stimulate demand from educational institutions in China, India, and Japan (Figures 26-29).

Figure 26: EPD shipments



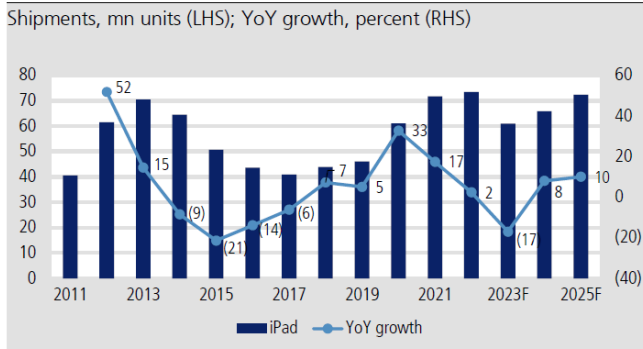
Source: Runto; KGI Research

Figure 27: Android tablet shipments



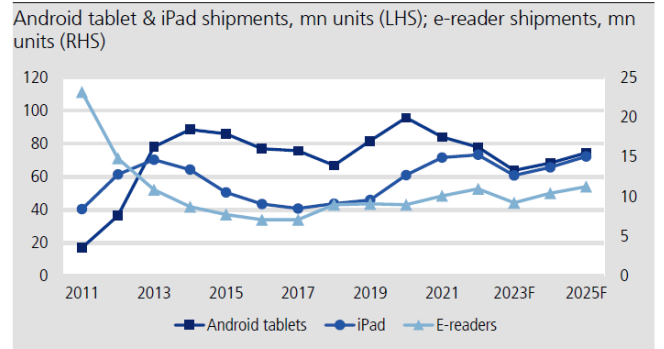
Source: Gartner; KGI Research

Figure 28: Shipments of iPad



Source: Gartner; KGI Research

Figure 29: EPD, iPad, &amp; Android tablet shipments



Source: Runto; Gartner; KGI Research

## Business analysis

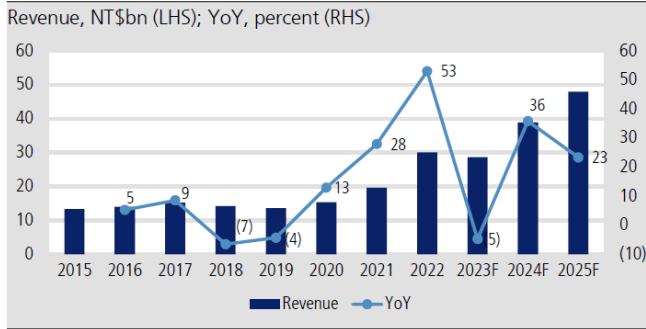
We expect E Ink to be the beneficiary of Walmart's accelerating ESL adoption amid rising wages and new retail trends, coupled with EPD transition and large-sized ESL market demand driven by color and diversified displays. We forecast E Ink's 2024-25 EPS will grow a respective 37% and 29% to NT\$9.5 and NT\$12.2.

## 2024-25 solid sales & earnings outlook to bolster valuation uptrend

**Walmart accelerating ESL adoption amid rising wages & new retail trends.** Walmart raised its minimum wage to US\$14 an hour in January, 2023. SES-imagotag announced to partner with Walmart in April, and will establish 500 pilot stores to install ESL in the next 12 to 18 months in the US. 60mn ESL are expected to be installed, registering a sales contribution of 300mn euros, equivalent to an ASP of US\$ 5.36. Walmart has 4,717 stores in the US, with mid-to large sized stores being the mainstay. If penetration is fully completed in the pilot stores in the next 5-7 years, the potential market for SKU may be 570mn units (Figure 24). This may be a demonstration for large retailers, and may expedite ESL adoption from well-known distributors around the globe (Figure 25). We expect amid trends such as wage hikes and new retail channels, bolstered by 1H24F ramp-ups from the US retail giant Walmart, 2024-25 ESL weightings may be pushed up to 69% and 72%.

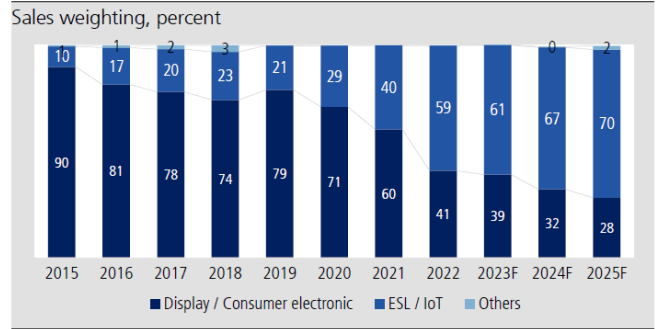
**EPD transition & rising label market demand boosted by color & diversified display applications.** We estimate 2024-25 sales CAGR of EPD products, including e-notes and e-readers, of 11% on the transition from black and white to color (Gallery™ 3, Kaleido™ Plus and Kaleido™ 3), accounting for a respective 32% and 28% of sales. ESL products have transitioned from three colors to four colors, and are gradually being adopted by large label brands, especially after the latest full-color Spectra 6 technology is introduced. After the production capacity of large-sized ESL modules (maximum of 100") is fully installed in 2Q-3Q24F, we estimate the product line will contribute 2% of 2025 sales. We forecast E Ink's 2024-25 EPS will grow a respective 37% and 29% to NT\$9.5 and NT\$12.2 (Figure 30-37).

Figure 30: 2024-25F average sales growth of 29.5%



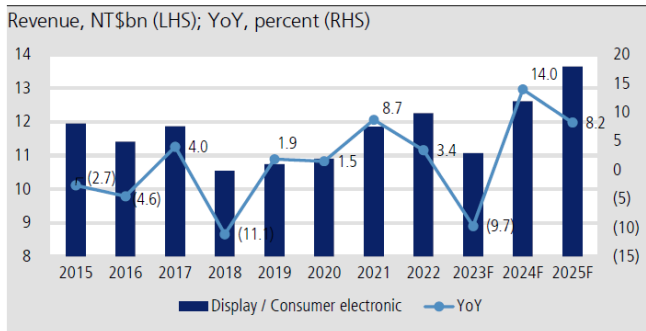
Source: Company data; KGI Research

Figure 31: 2024-25F ESL sales weightings to rise to 67% & 70%



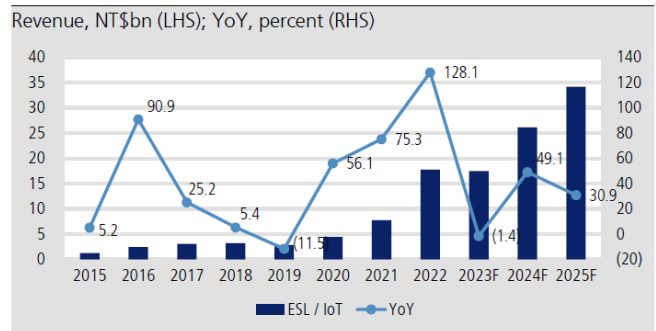
Source: Company data; KGI Research

Figure 32: 2024-25F EPD average sales growth of 11% YoY



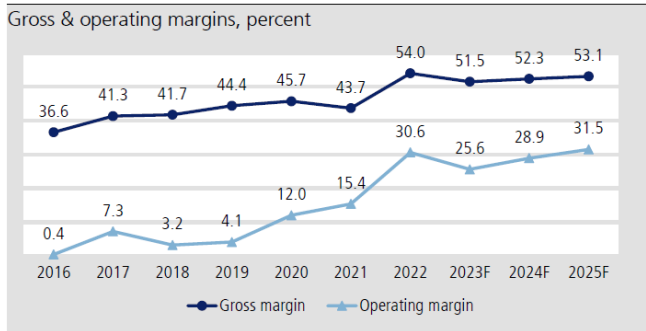
Source: Company data; KGI Research

Figure 33: 2024-25F ESL average sales growth of 40% YoY



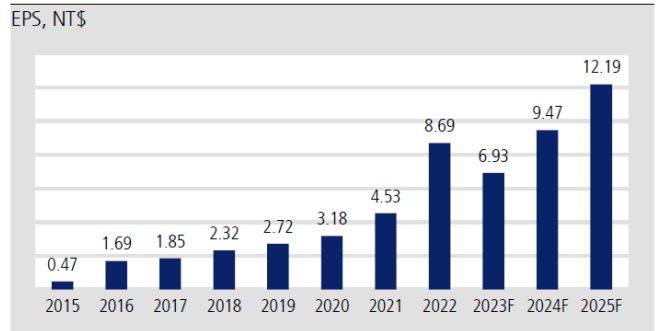
Source: Company data; KGI Research

Figure 34: Gross & operating margin trends



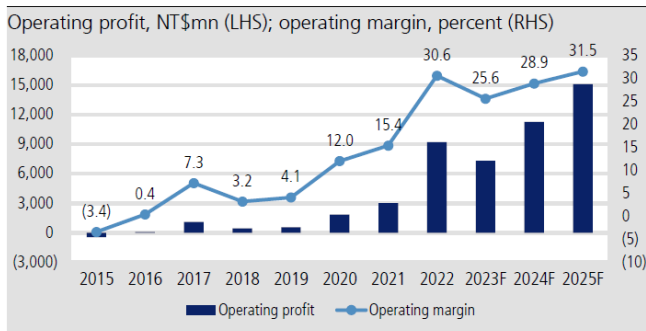
Source: Company data; KGI Research

Figure 35: 2024-25F EPS to resume growth



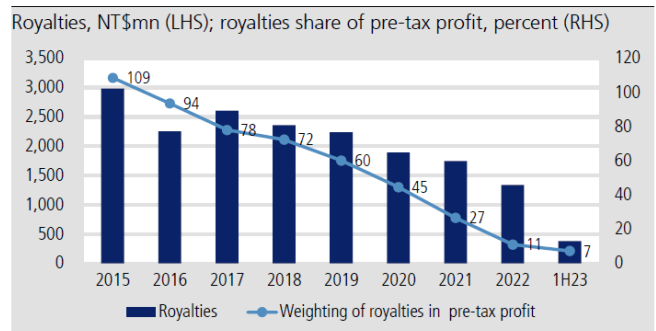
Source: Company data; KGI Research

Figure 36: 2015-25F operating profit & operating margin



Source: Company data; KGI Research

Figure 37: Weighting of royalties in pre-tax earnings declining

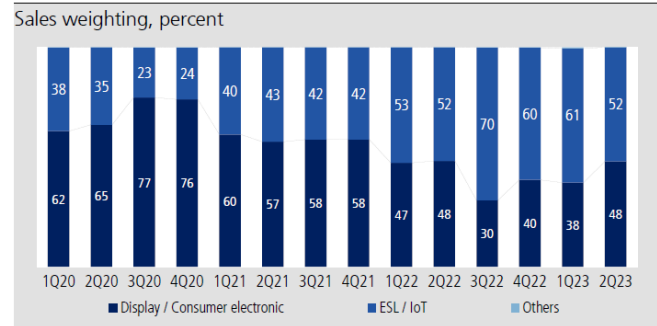


Source: Company data; KGI Research

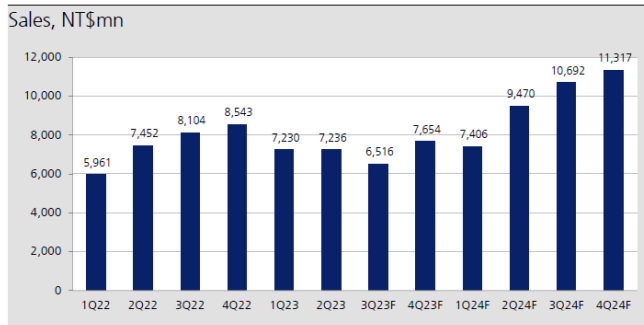
**Figure 38: Company profile**

Established in 1992, E Ink Holdings is the world's largest e-paper manufacturer, and produces electronic paper displays (EPD) via its electrophoretic ink technology. E Ink is a subsidiary of the Yuen Foong Yu Group, and acquired electronic ink and e-paper producer E Ink (US) in 2009, before exiting the LCD market in 2016. Consumer electronics accounted for 60% of 2021 sales, while IoT contributed the remaining 40%.

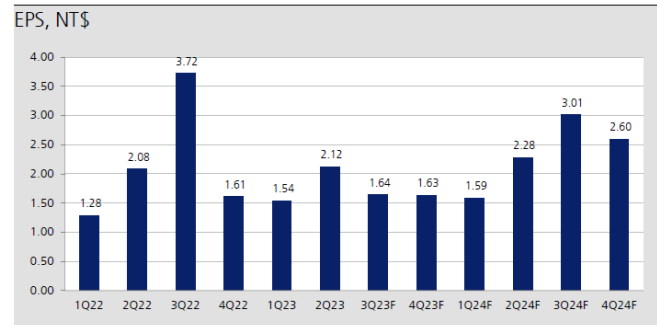
Source: KGI Research

**Figure 39: Sales mix**

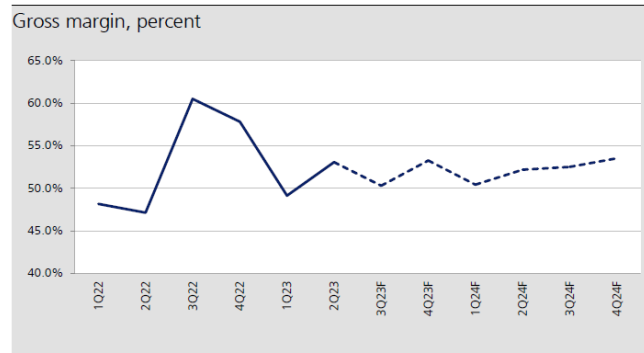
Source: KGI Research

**Figure 40: Sales**

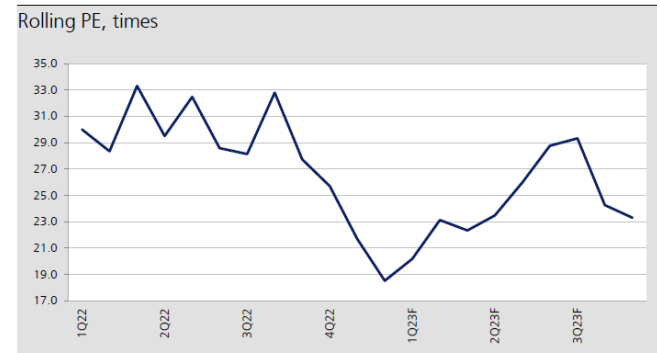
Source: KGI Research

**Figure 41: EPS**

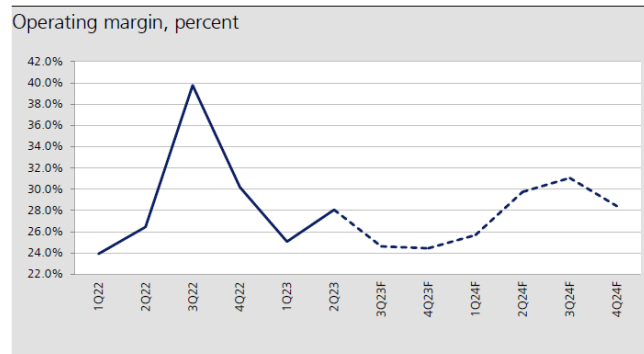
Source: KGI Research

**Figure 42: Gross Margin**

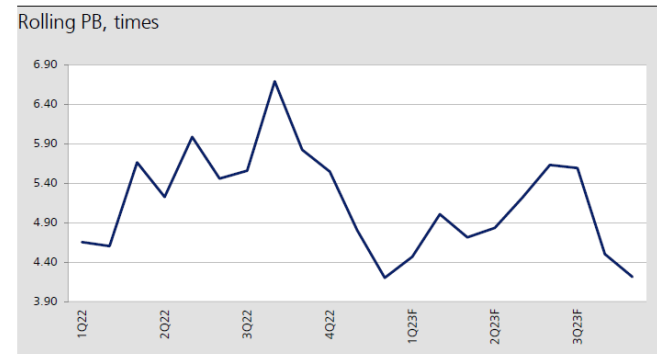
Source: KGI Research

**Figure 43: Rolling PE**

Source: KGI Research

**Figure 44: Operating Margin**

Source: KGI Research

**Figure 45: Rolling PB**

Source: KGI Research



## Income statement

	Quarterly								Annually		
	Mar-23A	Jun-23A	Sep-23F	Dec-23F	Mar-24F	Jun-24F	Sep-24F	Dec-24F	Dec-23F	Dec-24F	Dec-25F
<b>Income statement (NT\$m)</b>											
<b>Revenue</b>	<b>7,230</b>	<b>7,236</b>	<b>6,516</b>	<b>7,654</b>	<b>7,406</b>	<b>9,470</b>	<b>10,692</b>	<b>11,317</b>	<b>28,636</b>	<b>38,886</b>	<b>47,957</b>
Cost of goods sold	(3,676)	(3,395)	(3,238)	(3,576)	(3,670)	(4,528)	(5,077)	(5,260)	(13,885)	(18,534)	(22,502)
<b>Gross profit</b>	<b>3,553</b>	<b>3,841</b>	<b>3,278</b>	<b>4,078</b>	<b>3,736</b>	<b>4,943</b>	<b>5,616</b>	<b>6,058</b>	<b>14,750</b>	<b>20,352</b>	<b>25,455</b>
Operating expenses	(1,741)	(1,811)	(1,674)	(2,207)	(1,834)	(2,125)	(2,295)	(2,842)	(7,433)	(9,096)	(10,371)
<b>Operating profit</b>	<b>1,812</b>	<b>2,030</b>	<b>1,604</b>	<b>1,871</b>	<b>1,902</b>	<b>2,818</b>	<b>3,321</b>	<b>3,216</b>	<b>7,317</b>	<b>11,256</b>	<b>15,084</b>
Depreciation of fixed assets	(259)	(288)	(520)	(1,014)	(641)	(641)	(641)	(641)	(2,081)	(2,562)	(2,940)
Amortisation of intangible assets	(51)	(46)	(53)	(62)	(53)	(53)	(53)	(53)	(212)	(212)	(212)
<b>EBITDA</b>	<b>2,122</b>	<b>2,365</b>	<b>2,177</b>	<b>2,947</b>	<b>2,596</b>	<b>3,511</b>	<b>4,014</b>	<b>3,909</b>	<b>9,611</b>	<b>14,031</b>	<b>18,237</b>
Interest income	208	289	289	289	289	289	289	289	1,075	1,156	1,156
Investment income	22	109	230	-	22	80	320	-	362	422	422
Other non-op income	247	206	200	206	230	230	230	230	859	920	920
<b>Non-operating income</b>	<b>477</b>	<b>604</b>	<b>719</b>	<b>495</b>	<b>541</b>	<b>599</b>	<b>839</b>	<b>519</b>	<b>2,295</b>	<b>2,498</b>	<b>2,498</b>
Interest expense	(68)	(74)	(74)	(74)	(74)	(74)	(74)	(74)	(290)	(296)	(296)
Investment loss	(33)	(28)	(15)	(15)	(15)	(15)	(15)	(15)	(91)	(60)	(60)
Other non-op expenses	76	405	(15)	(15)	(15)	(15)	(15)	(15)	451	(60)	(60)
<b>Non-operating expenses</b>	<b>(25)</b>	<b>303</b>	<b>(104)</b>	<b>(104)</b>	<b>(104)</b>	<b>(104)</b>	<b>(104)</b>	<b>(104)</b>	<b>70</b>	<b>(416)</b>	<b>(416)</b>
<b>Pre-tax profit</b>	<b>2,264</b>	<b>2,938</b>	<b>2,219</b>	<b>2,262</b>	<b>2,339</b>	<b>3,313</b>	<b>4,056</b>	<b>3,631</b>	<b>9,683</b>	<b>13,338</b>	<b>17,166</b>
Current taxation	(498)	(501)	(333)	(385)	(515)	(696)	(608)	(654)	(1,717)	(2,472)	(3,199)
Minorities	(11)	(16)	(16)	(16)	(16)	(16)	(16)	(16)	(59)	(64)	(64)
<b>Normalised net profit</b>	<b>1,755</b>	<b>2,421</b>	<b>1,870</b>	<b>1,861</b>	<b>1,808</b>	<b>2,601</b>	<b>3,431</b>	<b>2,961</b>	<b>7,907</b>	<b>10,802</b>	<b>13,903</b>
Extraordinary items	0	(0)	-	-	-	-	-	-	-	-	-
<b>Net profit</b>	<b>1,755</b>	<b>2,421</b>	<b>1,870</b>	<b>1,861</b>	<b>1,808</b>	<b>2,601</b>	<b>3,431</b>	<b>2,961</b>	<b>7,907</b>	<b>10,802</b>	<b>13,903</b>
EPS (NT\$)	1.54	2.12	1.64	1.63	1.59	2.28	3.01	2.60	6.93	9.47	12.19
<b>Margins (%)</b>											
Gross profit margin	49.2	53.1	50.3	53.3	50.4	52.2	52.5	53.5	51.5	52.3	53.1
Operating margin	25.1	28.1	24.6	24.4	25.7	29.8	31.1	28.4	25.6	28.9	31.5
EBITDA margin	29.4	32.7	33.4	38.5	35.0	37.1	37.5	34.5	33.6	36.1	38.0
Pretax profit margin	31.3	40.6	34.1	29.5	31.6	35.0	37.9	32.1	33.8	34.3	35.8
Net profit margin	24.3	33.5	28.7	24.3	24.4	27.5	32.1	26.2	27.6	27.8	29.0
<b>Sequential growth (%)</b>											
Revenue growth	(15.4)	0.1	(10.0)	17.5	(3.2)	27.9	12.9	5.8			
Gross profit growth	(28.1)	8.1	(14.7)	24.4	(8.4)	32.3	13.6	7.9			
Operating profit growth	(29.7)	12.0	(21.0)	16.6	1.7	48.2	17.9	(3.2)			
EBITDA growth	(26.0)	11.4	(7.9)	35.3	(11.9)	35.3	14.3	(2.6)			
Pretax profit growth	3.8	29.7	(24.5)	1.9	3.4	41.6	22.4	(10.5)			
Net profit growth	(4.4)	37.9	(22.8)	(0.5)	(2.8)	43.8	31.9	(13.7)			
<b>YoY growth (%)</b>											
Revenue growth	21.3	(2.9)	(19.6)	(10.4)	2.4	30.9	64.1	47.9	(4.7)	35.8	23.3
Gross profit growth	23.8	9.3	(33.2)	(17.5)	5.1	28.7	71.3	48.5	(9.1)	38.0	25.1
Operating profit growth	27.1	3.0	(50.2)	(27.5)	4.9	38.8	107.0	71.9	(20.5)	53.8	34.0
EBITDA growth	28.6	6.7	(37.5)	2.8	22.3	48.5	84.4	32.7	(5.9)	46.0	30.0
Pretax profit growth	25.8	(5.3)	(55.6)	3.6	3.3	12.8	82.8	60.5	(19.9)	37.8	28.7
Net profit growth	20.1	2.0	(55.9)	1.3	3.0	7.4	83.5	59.1	(20.2)	36.6	28.7

Source: Company data, KGI Research estimates

## Balance sheet

NTSmn	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
<b>Total assets</b>	<b>57,010</b>	<b>65,126</b>	<b>70,812</b>	<b>82,120</b>	<b>94,432</b>
<b>Current assets</b>	<b>19,263</b>	<b>25,165</b>	<b>27,616</b>	<b>35,947</b>	<b>48,129</b>
Cash & ST securities	11,350	15,254	17,910	23,191	32,658
Inventory	4,142	4,405	4,422	5,887	7,167
Accounts receivable	3,248	4,700	4,477	6,064	7,498
Other current assets	524	805	805	805	805
<b>Non-current assets</b>	<b>37,747</b>	<b>39,961</b>	<b>43,197</b>	<b>46,173</b>	<b>46,304</b>
LT investments	22,316	21,944	21,981	22,084	22,170
Net fixed assets	5,275	8,033	11,232	14,105	14,150
Other assets	10,156	9,984	9,984	9,984	9,984
<b>Total liabilities</b>	<b>21,312</b>	<b>20,863</b>	<b>22,677</b>	<b>28,712</b>	<b>34,255</b>
<b>Current liabilities</b>	<b>17,840</b>	<b>13,408</b>	<b>14,095</b>	<b>16,632</b>	<b>19,982</b>
Accounts payable	3,124	1,992	2,000	2,662	3,241
Interest bearing ST liabilities	8,412	5,157	6,874	7,250	8,416
Other current liabilities	6,304	6,259	5,221	6,720	8,326
<b>Non-current liabilities</b>	<b>3,473</b>	<b>7,455</b>	<b>8,582</b>	<b>12,080</b>	<b>14,273</b>
Long-term debt	847	5,601	6,728	10,227	12,420
Other L-T liabilities	993	859	859	859	859
<b>Total equity</b>	<b>35,698</b>	<b>44,263</b>	<b>48,135</b>	<b>53,408</b>	<b>60,177</b>
Share capital	11,404	11,404	11,404	11,404	11,404
Retained earnings reserve	8,488	14,780	18,593	23,802	30,507
Minority interests	531	576	635	699	763
Preferred shareholders funds	-	-	-	-	-

## Key ratios

	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
<b>Growth</b>					
Revenue growth	27.9%	53.0%	(4.7%)	35.8%	23.3%
Operating profit growth	63.7%	204.3%	(20.5%)	53.8%	34.0%
EBITDA growth	35.3%	149.9%	(5.9%)	46.0%	30.0%
Net profit growth	43.0%	92.5%	(20.2%)	36.6%	28.7%
EPS growth	42.6%	91.9%	(20.2%)	36.6%	28.7%
<b>Profitability</b>					
Gross profit margin	43.7%	54.0%	51.5%	52.3%	53.1%
Operating margin	15.4%	30.6%	25.6%	28.9%	31.5%
EBITDA margin	20.8%	34.0%	33.6%	36.1%	38.0%
Net profit margin	26.2%	33.0%	27.6%	27.8%	29.0%
Return on average assets	10.0%	16.2%	11.6%	14.1%	15.7%
Return on average equity	15.7%	25.1%	17.3%	21.6%	24.8%
<b>Stability</b>					
Gross debt to equity	25.9%	24.3%	28.3%	32.7%	34.6%
Net debt to equity	1.4%	4.3%	4.4%	1.3%	Net cash
Interest coverage (x)	71.6	75.1	34.4	46.1	59.0
Interest & ST debt coverage (x)	0.4	0.7	0.6	0.6	0.7
Cash flow interest coverage(x)	50.5	37.0	36.3	38.0	50.6
Cash flow/int. & ST debt (x)	0.6	1.1	1.5	1.5	1.7
Current ratio (x)	1.1	1.9	2.0	2.2	2.4
Quick ratio (x)	0.8	1.5	1.6	1.8	2.0
Net debt (NT\$m)	508	1,923	2,111	704	(5,404)
<b>Per share data</b>					
EPS (NT\$)	4.53	8.69	6.93	9.47	12.19
CFPS (NT\$)	4.12	5.29	9.21	9.86	13.14
BVPS (NT\$)	30.84	38.31	41.65	46.22	52.10
Adj BVPS (NT\$)	30.92	38.31	41.65	46.22	52.10
SPS (NT\$)	17.28	26.36	25.11	34.10	42.05
EBITDA/share (NT\$)	3.59	8.96	8.43	12.30	15.99
Cash DPS (NT\$)	3.20	4.50	3.59	4.90	6.31
<b>Activity</b>					
Sales / avg assets	0.38	0.49	0.42	0.51	0.54
Days receivable	60.3	57.1	57.1	57.1	57.1
Days inventory	136.7	116.2	116.2	116.2	116.2
Days payable	103.1	52.6	52.6	52.6	52.6
Cash cycle	93.9	120.7	120.7	120.7	120.7

Source: Company data, KGI Research estimates

## Profit &amp; loss

NTSmn	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
<b>Revenue</b>	<b>19,651</b>	<b>30,061</b>	<b>28,636</b>	<b>38,886</b>	<b>47,957</b>
Cost of goods sold	(11,063)	(13,831)	(13,885)	(18,534)	(22,502)
<b>Gross profit</b>	<b>8,588</b>	<b>16,230</b>	<b>14,750</b>	<b>20,352</b>	<b>25,455</b>
Operating expenses	(5,565)	(7,031)	(7,433)	(9,096)	(10,371)
<b>Operating profit</b>	<b>3,023</b>	<b>9,199</b>	<b>7,317</b>	<b>11,256</b>	<b>15,084</b>
<b>Non-operating income</b>	<b>2,939</b>	<b>3,151</b>	<b>2,295</b>	<b>2,498</b>	<b>2,498</b>
Interest income	203	435	1,075	1,156	1,156
Investment income	504	665	362	422	422
Other non-op income	2,233	2,051	859	920	920
<b>Non-operating expenses</b>	<b>587</b>	<b>(266)</b>	<b>70</b>	<b>(416)</b>	<b>(416)</b>
Interest expense	(93)	(163)	(290)	(296)	(296)
Investment loss	(101)	(78)	(91)	(60)	(60)
Other non-op expenses	781	(24)	451	(60)	(60)
<b>Pre-tax profit</b>	<b>6,549</b>	<b>12,085</b>	<b>9,683</b>	<b>13,338</b>	<b>17,166</b>
Current taxation	(1,337)	(2,145)	(1,717)	(2,472)	(3,199)
Minorities	(62)	(28)	(59)	(64)	(64)
Extraordinary items	-	(0)	0	-	-
<b>Net profit</b>	<b>5,150</b>	<b>9,912</b>	<b>7,907</b>	<b>10,802</b>	<b>13,903</b>
<b>EBITDA</b>	<b>4,087</b>	<b>10,215</b>	<b>9,611</b>	<b>14,031</b>	<b>18,237</b>
EPS (NT\$)	4.53	8.69	6.93	9.47	12.19

## Cash flow

NTSmn	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
<b>Operations cash flow</b>	<b>4,690</b>	<b>6,031</b>	<b>10,505</b>	<b>11,248</b>	<b>14,980</b>
Net profit	5,150	9,912	7,907	10,802	13,903
Depreciation & amortisation	1,064	1,016	2,294	2,775	3,153
Decrease in working capital	(2,461)	(2,691)	213	(2,388)	(2,136)
Other operating cash flow	938	(2,206)	91	60	60
<b>Investing cash flow</b>	<b>(8,018)</b>	<b>(3,670)</b>	<b>(5,620)</b>	<b>(5,811)</b>	<b>(3,343)</b>
Sale of ST investment	(6,817)	(1,421)	-	-	-
New investments	(55)	(200)	(128)	(164)	(146)
Capital expenditure	(1,832)	(3,101)	(5,280)	(5,435)	(2,985)
Others investing cashflow	687	1,052	(212)	(212)	(212)
<b>Free cash flow</b>	<b>(1,301)</b>	<b>2,587</b>	<b>3,034</b>	<b>3,909</b>	<b>10,092</b>
<b>Financing cash flow</b>	<b>(94)</b>	<b>(2,538)</b>	<b>(2,229)</b>	<b>(156)</b>	<b>(2,170)</b>
Increase in short term debt	(1,592)	424	-	-	-
Increase in long term loans	784	4,904	2,844	3,874	3,359
New ordinary shares issued	-	-	-	-	-
Ordinary dividends paid	(3,063)	(3,649)	(5,132)	(4,094)	(5,593)
Other financing cashflow	3,668	(4,217)	59	64	64
<b>Forex effects</b>	<b>(781)</b>	<b>261</b>			
<b>Total cash generated</b>	<b>(4,203)</b>	<b>84</b>	<b>2,656</b>	<b>5,281</b>	<b>9,467</b>

## ROIC

	Dec-21A	Dec-22A	Dec-23F	Dec-24F	Dec-25F
1 - COGS/revenue	28.3%	23.4%	26.0%	23.4%	21.6%
- Operating exp./revenue					
<b>= Operating margin</b>	<b>15.4%</b>	<b>30.6%</b>	<b>25.6%</b>	<b>28.9%</b>	<b>31.5%</b>
1 / (Working capital/revenue	(0.1)	0.1	0.1	0.1	0.1
+ Net PPE/revenue	0.3	0.3	0.4	0.4	0.3
+ Other assets/revenue)	0.0	0.0	0.0	0.0	0.0
<b>= Capital turnover</b>	<b>4.6</b>	<b>3.0</b>	<b>2.1</b>	<b>2.2</b>	<b>2.6</b>
Operating margin	15.4%	30.6%	25.6%	28.9%	31.5%
x Capital turnover	4.6	3.0	2.1	2.2	2.6
x (1 - tax rate)	79.6%	82.2%	82.3%	81.5%	81.4%
<b>= After-tax ROIC</b>	<b>56.9%</b>	<b>76.5%</b>	<b>43.3%</b>	<b>51.9%</b>	<b>67.3%</b>

Source: Company data, KGI Research estimates

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