The scenario analysis of the possible BOE and CEC Panda alliance

Omdia provides a scenario analysis of BOE and CEC Panda's potential strategic management alliance.

Publication Date: May 21, 2020

David Hsieh

Key findings

- The analysis is based on the scenario of BOE and CEC Panda forming an alliance. However, it does not indicate that such an alliance is already confirmed or currently taking place. BOE and CEC Panda have been discussing the merger, but the negotiation is taking a longer time than expected. As a result, a scenario analysis of their management alliance now emerges. However, this alliance is not yet confirmed and is still dependent on the ongoing negotiations. It is also possible that both companies decide to remain independent, and there might not even be an alliance or a merger.
- BOE's management of CEC Panda will involve all its three fabs in China: Nanjing Gen 6 a-Si TFT-LCD fab C1, Gen 8.5 oxide TFT-LCD fab C2, and Chengdu Gen 8.6+ oxide TFT-LCD fab C4; the capacity shares after the combination of BOE and CEC Panda are expected to increase to 27.3% in 2021, and making it the leading capacity owner, far ahead of all other LCD makers.
- Once strategically combined, BOE will be stronger thanks to CEC Panda's capacity and market position, and this will improve the company's leading position in the large-area display markets, especially the IT and TV display markets, particularly after South Korean LCD makers phase out of the LCD market.
- The Gen 6/Gen 8.5/Gen 8.6+ and Gen 10.5 fab capacity portfolio will enrich the newly combined BOE and CEC Panda's ability in the large-area display markets, especially the IT and TV display markets, with almost full coverage of all major TV display sizes including the 32-, 39-, 43-, 50-, 55-, 58-, 65-, 70-, and 75-inch. Furthermore, the combination will provide BOE with the capability of both advanced super dimension switch (ADS) and vertical alignment (VA) liquid crystal technology, thereby allowing the combined BOE and CEC Panda to fulfill all kinds of customer requirements in both the IT and TV display markets.

CEC Panda was originally targeted for a merger

As analyzed in the Omdia Display Dynamics article *The consolidations of Chinese display makers may occur* (please refer to the link in the Further reading section of the Appendix for more details), the financial situation, the strategy shift, and the business adjustment may result in the consolidations of display makers in mainland China. The Chinese government will play a role in the consolidations. HKC and CEC Panda may be targets for mergers and acquisitions in mainland China.

In the past several months, the merger and acquisition target has been CEC Panda. However, Omdia predicts that there might not be a merger or an acquisition but there could be a strategic alliance instead.

The biggest challenge for CEC Panda is profitability. According to the Omdia *Panel Maker Financial Analysis Tracker* (please refer to the link in the Further reading section of the Appendix for more details), Huadong Technology (a CEC Panda listed company) has had serious deficits in the past few quarters. This has become a financial challenge, especially in 2019, because of the oversupply and

collapsing panel prices. The operating profit includes the Chinese government's incentives and subsidies; if the incentives are not considered, the profitability could be worse.

CEC Panda's Chinese fabs are in Nanjing and Chengdu. The aim of the local governments to increase the local GDPs is going well thanks to CEC Panda's investment, which stimulates the local economies. On the other hand, the profitability may be a burden for CEC Panda. The government and CEC Panda might seek alternatives for the company's future.

CEC Panda has one Gen 6 fab, one Gen 8.5 fab, and one Gen 8.6 fab, mostly with oxide TFT-LCD technology, and its product mix of monitors, notebooks, and LCD TVs is quite complete. Japan's Sharp handed the oxide technology to CEC Panda years ago, therefore, there is no patent issue. CEC Panda has also been developing its own oxide technology throughout the last several years, and it is developed enough to target the high-end LCD arena. These are CEC Panda's advantages.

In recent months, there has already been a lot of rumors in China regarding CEC Panda's merger and acquisition. During the negotiation, BOE, China Star (including the parent group, TCL), and Tianma were all involved in the bidding to acquire CEC Panda.

BOE may be strategically involved in management

As analyzed in the Omdia Display Dynamics article *Possible LCD company consolidation in China - Analysis on CEC Panda* (please refer to the link in the Further reading section of the Appendix for more details), it appears that CEC Panda wants to strip its display business to reduce costs and sell all three of its LCD factories to other Chinese panel makers, such as BOE and China Star (CSOT).

However, even after years of depreciation, the total remaining value of CEC Panda's factories were still high. Therefore, it might be hard for a new owner to buy those factories based on the remaining value.

As a result, the Omdia research indicates the following possible scenarios:

- To improve CEC Panda's LCD business, BOE will assist in managing the company. However, whether there will be a further merger between BOE and CEC Panda in the future has yet to be decided. The immediate objectives of BOE's involvement in the management of CEC Panda is to turn the company's LCD business around and lead it toward profitability.
- As CEC Panda, which belongs to the CEC group, is a government-owned LCD supplier in China, any efforts of getting BOE's assistance in managing CEC Panda must be agreed upon by the government.
- CEC Panda remains an independent display maker, but BOE will be involved in the company's management (sales, marketing, production, procurement, and financial) while staying away from human resources-related matters. BOE is expected to send a management team to work onsite at CEC Panda. BOE and CEC Panda will remain two independent companies. However, they will start to align their businesses, which includes strategy, production, capacity, and procurement. Hence, BOE and CEC Panda will be strategically aligned.

- BOE will continue to assist CEC Panda until the company improves its financial performance. Then, the next step, such as a merger and acquisition, will be considered. As it is difficult for display makers to get involved in the monetary transition in China during the post-COVID-19 era, it is, therefore, reasonable to form the BOE and CEC Panda business and management alliance first.

There might not be a merger or an acquisition, but BOE and CEC Panda will form a bigger display maker alliance from the aspects of strategy, operation, and management, based on the Omdia scenario analysis.

With the combination of BOE and CEC Panda's capacities and capabilities, it will help both companies:

- Become the top global capacity owners far ahead of other panel makers, especially in the large-area display market.
- Access oxide TFT-LCD capacity and technology, which would increase their dominance in the IT display market.
- ADS/IPS and VA technologies will allow BOE and CEC Panda to fulfill all kinds of customer requirements, especially in the IT and TV display markets. ADS refers to advanced super dimension switch, IPS refers to in-plane switching, and VA refers to vertical alignment. ADS/IPS and VA are two mainstream technologies for the wide view angle (WVA) liquid crystal technology. BOE specializes in ADS/IPS while CEC Panda focuses mainly on VA.

BOE and CEC Panda combined will have the largest TFT-LCD capacity, which will strengthen its position as the top IT and TV panel supplier in both shipment unit and shipment area; this will largely reshape the entire supply chain of the large-area display markets, particularly the TV display market.

The dominant large-area TFT-LCD share will be over 30%

According to the Omdia *Large Area Display Market Tracker - Q4 2019* (please refer to the link in the Further reading section of the Appendix for more details), in terms of the large-area (9-inch and above) TFT-LCD shipment share, BOE's unit share is anticipated to grow from 26% in 2019 to 26.9% in 2020. CEC Panda's share is expected to increase from 3.6% in 2019 to 5.1% in 2020.

With the combination of BOE and CEC Panda, the share will be 32% in 2020, which will be far ahead of the second-placed group, such as LG Display, AUO, and China Star, in which the share is approximately 14%.

The combination will strengthen BOE and CEC Panda, allowing it to dominate the share in the large-area TFT-LCD market.

Table 1: Large-area TFT-LCD shipment unit shares in 2019 and 2020

Supplier	2019	2020
BOE	26.0%	26.9%
Innolux Corp.	16.1%	15.1%
LG Display	17.5%	14.4%
AUO	14.2%	14.2%
China Star	5.5%	6.1%
Samsung	6.4%	5.9%
CEC Panda	3.6%	5.1%
HKC Display	2.6%	4.8%
Sharp	3.8%	3.9%
CHOT	1.4%	1.4%
InfoVision	0.9%	0.9%
HannStar	0.8%	0.7%
Tianma	0.4%	0.4%
Panasonic LCD	0.3%	0.1%
Japan Display	0.4%	0.1%
Mitsubishi	0.1%	0.1%
CPT	0.1%	
Grand total	**100.0%**	**100.0%**

Source: Omdia

Meanwhile, the dominance will not only be in the unit shipment, but also the major large-area TFT-LCD application perspectives—LCD TVs, notebook PCs, and LCD monitor displays.

Table 2: Large-area TFT-LCD shipment unit shares by application in 2020

Maker	LCD TV display shares	Maker	Notebook display shares	Maker	LCD monitor display shares
BOE	20.1%	BOE	28.2%	BOE	23.9%
China Star	15.2%	AUO	21.4%	LG Display	20.2%
Innolux	14.6%	Innolux	19.4%	AUO	15.6%
HKC Display	12.0%	LG Display	15.7%	Samsung	14.8%
LG Display	11.0%	CEC Panda	5.0%	Innolux	13.4%
AUO	7.7%	Sharp	4.8%	CEC Panda	8.0%
Samsung	7.3%	InfoVision	3.1%	HKC Display	2.0%
CEC Panda	5.9%	Samsung	0.8%	China Star	1.6%
CHOT	3.8%	Others	1.6%	Others	0.5%
Sharp	2.2%				
Panasonic LCD	0.1%				
Others	0.0%				

Source: Omdia

BOE's 2020 LCD TV panel shipment unit share is 20.1%, and CEC Panda's is 5.9%. The combination of BOE and CEC Panda's share will reach 26%, which will be far ahead of the second-biggest supplier China Star's unit share of 15.2%.

Meanwhile, BOE's 2020 LCD monitor panel shipment unit share is 23.9%, and CEC Panda's is 8.0%. The combination of BOE and CEC Panda's share will reach 31.9%, which will be far ahead of the second-biggest supplier LG Display's unit share of 20.2%.

Additionally, BOE's 2020 notebook PC panel shipment unit share is 28.2%, and CEC Panda's is 5.0%. The combination of BOE and CEC Panda's share will reach 33.2%, which will be far ahead of the second-biggest supplier AUO's unit share of 21.4%.

BOE was already the leading supplier of all the major application displays, while CEC Panda also has shipments in these markets. After this strategic combination, BOE and CEC Panda will capture over 25% of the shares in the IT and TV display markets, making it the dominant panel supplier of the mainstream application displays.

For the IT display market, the strategically combined BOE and CEC Panda will have more than 30% of the market share. Also, with both ADS/IPS and VA technology capabilities, BOE and CEC Panda can fulfill most of the customer's needs.

The synergy of combining IPS and MVA

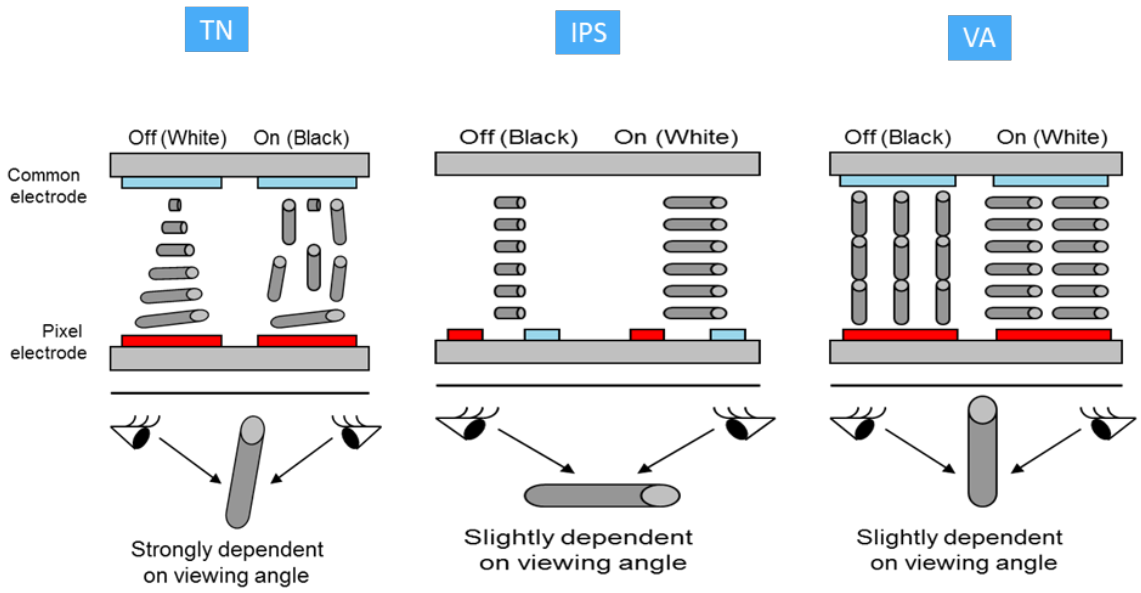
For LCDs, there are three mainstream liquid crystal technologies, as shown in the figure below.

The TN type has a narrow view angle while the IPS series and VA series are for WVAs. For large-area display applications such as TV, desktop monitor, and notebook PC, the WVA technology is especially crucial.

These mainstream technologies are as follows:

- Twisted nematic (TN)
- The IPS series includes IPS, fringe field switching (FFS), and ADS.
- The VA series includes VA, multi-domain vertical alignment (MVA), and pattern vertical alignment (PVA).

Figure 1: TN vs. IPS vs. VA liquid crystal structure



Source: Omdia

For LCD TV panel makers, it is impossible to make both the IPS or VA simultaneously because the process, materials, recipe, and capital investment are all different.

The advantages and disadvantages of the IPS series (including IPS, FFS, and ADS) are presented below.

Table 3: Advantages and disadvantages of IPS/FFS/ADS

Advantages	Disadvantages
WVA	Low aperture ratio
High contrast ratio	Higher power consumption
Fast response time	Different array process/lower yield
No compensated film	Possible light leakage
Good color performance	
Possibly lower production cost	

Source: Omdia

The advantages and disadvantages of the VA series (including VA, MVA, and PVA) are presented below.

Table 4: Advantages and disadvantages of VA/MVA/PVA

Advantages	Disadvantages
WVA	High cost
High contrast ratio	Color shift
Fast response time	Needs compensation film
No rubbing	
Process is similar to TN	
No light leakage issue	

Source: Omdia

For TV OEMs and brands, their choice of either the IPS panel or VA panel is dependent on their models and sales regions. For example, the VA panel might have a better contrast ratio for the comparatively darker environment while in some regions, the consumers prefer a darker living room. In the meantime, the IPS panel has a better WVA with a lower color shift, but it may have a brightness leakage issue. In some regions in Asia, the consumers like a brighter living room but prefer the picture performance of the IPS mode.

For notebook and desktop monitors, both the IPS and VA are prevalent but IPS is more dominant.

The following shows the panel makers' LCD TV panel liquid crystal mode:

- IPS/FFS/ADS: LG Display, BOE, and Panasonic LCD
- VA/MVA/PVA: Samsung Display, AUO, Innolux, China Star, CEC Panda, Sharp, CHOT, and HKC

CEC Panda produces mainly VA-mode LCDs, while BOE focuses on IPS-mode LCDs. As analyzed in the Omdia Display Dynamics article *BOE wants to expedite its 8K TV panel shipments with ADS technology* (please refer to the link in the Further reading section of the Appendix for more details), the ADS, which is a derivative of the IPS, has been a strength of BOE but the lack of VA TV panels has also hampered the company in the expansion of its business with more TV models and OEMs.

The BOE and CEC Panda alliance will diversify its production technology, significantly enhancing its oxide TFT capabilities and adding VA to its product lineup.

TFT-LCD capacity share will be 27% in 2021

The strategic alliance between BOE and CEC Panda will also benefit the group, making them the largest TFT-LCD capacity owner and putting them far ahead of their competitors.

BOE is the largest flat panel display (FPD) producer, accounting for 19.4% of the world's 334.8 million square meters of TFT capacity in 2020. Adding CEC Panda's 5.2% of global capacity will increase its share to 24.6% in 2020.

The combined BOE and CEC Panda will solidify its position as by far the largest diversified FPD manufacturer in the world with the Innolux, Sharp, and Foxconn group placed in a distant second with 17.3%.

The following table, according to the Omdia *AMOLED and LCD Supply Demand & Equipment Tracker - Q4 2019* (please refer to the link in the Further reading section of the Appendix for more details), shows BOE's TFT-LCD capacity share will be 22.1% of the global total in 2021 and CEC Panda's share will be 5.2% in 2021. The combined shares will be 27.3%, which will be far ahead of the second-placed China Star at 11.9%.

Table 5: TFT-LCD capacity shares in 2021 (area base)

Makers	2021
BOE	22.1%
China Star	11.9%
Innolux	10.8%
AUO	10.0%
LG Display	9.9%
HKC Display	8.4%
Sharp	6.9%
Samsung Display	5.5%
CEC Panda	5.2%
CHOT	2.7%
Tianma	1.5%
JDI	0.7%
Others	4.5%
Total	**100.0%**

Source: Omdia

TV product strategy and synergy with oxide

If the strategic alliance between BOE and China Star comes into effect, then it will have a great product mix, especially for the LCD TV panel products, which will cover all sizes as well as all the different models.

Based on the Omdia analysis:

- After the strategic combination, BOE and CEC Panda will have almost a full generation lineup except for Gen 7 fabs. Both companies will have these fabs: Gen 4.5 (one fab), Gen 5 (one fab), Gen 6 (two fabs), Gen 8.5 (five fabs), Gen 8.6+ (one fab) and Gen 10.5 (two fabs).
- In the TV display market, the combined BOE and CEC Panda will have more flexibility as it will have both IPS and VA technology in the Gen 8.5 fabs and Gen 8.6+ fab, which can fulfill of the various customer needs.
- In the monitor display market, with CEC Panda's Nanjing Gen 8.5 oxide TFT-LCD fab, it can have more flexibility in supplying high-resolution and high-frame rate monitor displays; the VA mode capacity in the Gen 8.5 fabs and Gen 8.6+ fab could also be used

to produce curved monitor displays, which is a rising trend in the gaming monitor market while BOE lags behind in its development.

- In the notebook display market, the oxide TFT-LCD capacity in CEC Panda's Nanjing Gen 8.5 fab will also be of great help to production flexibility.
- The production mix of CEC Panda's Nanjing Gen 8.5 fab is quite in line with the combined BOE and CEC Panda's strategy of increasing IT display production in its Gen 8.5 fabs and will certainly help increase the combined BOE and CEC Panda's competence in these market segments.

Table 6: BOE and CEC Panda's full coverage of mainstream TV sizes

TV panel sizes	CEC Panda	BOE
21.5"		*
23.6"		*
23.8"	* (MMG)	
28"		*
32"	*	*
39"	*	
43"	* (MMG)	*
49"		*
50"	* (MMG)	
55"	*	*
58"	*	
65"	*	*
70"	* (MMG)	
75"		*
86"		*

Notes: MMG refers to multi-model glass.

Source: Omdia

Appendix

Further reading

[Display Dynamics] The consolidations of Chinese display makers may occur (March 2020)

Panel Maker Financial Analysis Tracker (May 2020)

[Display Dynamics] Possible LCD company consolidation in China - Analysis on CEC Panda (April 2020)

Large Area Display Market Tracker - Q4 2019 (April 2020)

AMOLED and LCD Supply Demand & Equipment Tracker - Q4 2019 (April 2020)

[Display Dynamics] BOE wants to expedite its 8K TV panel shipments with ADS technology (April 2020)

Author

David Hsieh, Senior Research Director, Display

askananalyst@omdia.com

Citation Policy

Request external citation and usage of Omdia research and data via citations@omdia.com.

Omdia Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Omdia's consulting team may be able to help you. For more information about Omdia's consulting capabilities, please contact us directly at consulting@omdia.com.

Copyright notice and disclaimer

CONTACT US

omdia.com

askananalyst@omdia.com