
What are the issues associated in putting an LCD fab in India or Brazil, Russia or high-growth regions

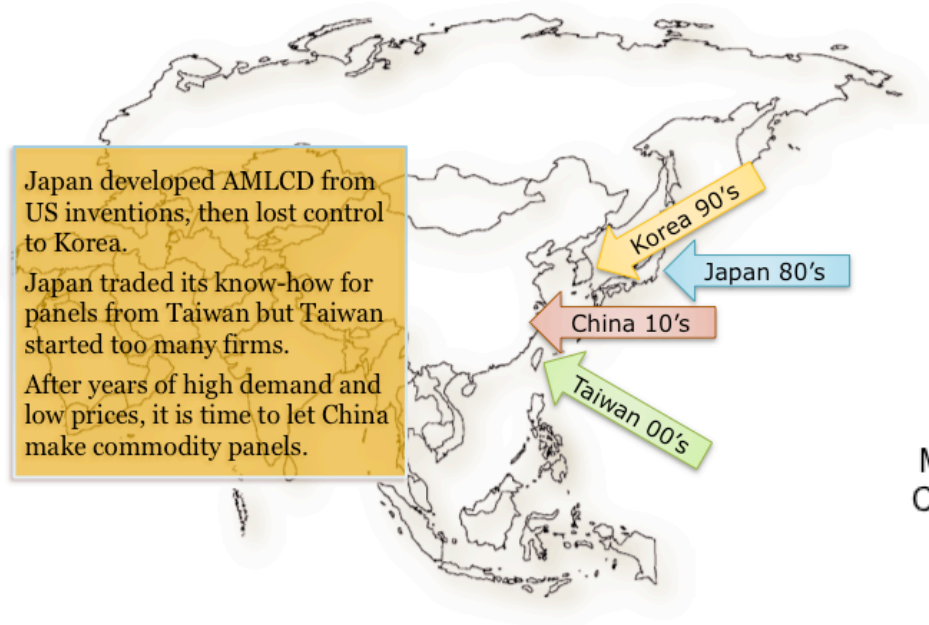
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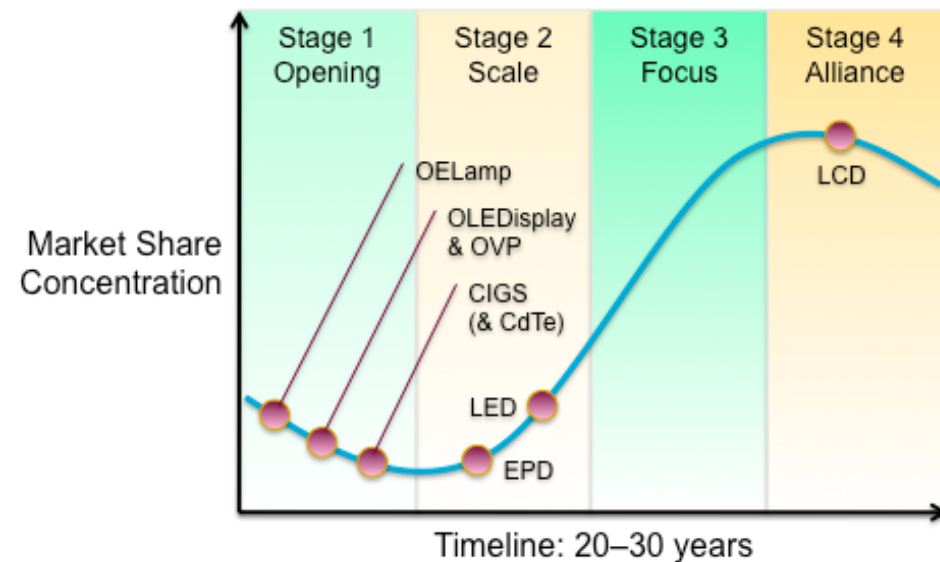
Agenda

- Fabs in BRIC countries: new entrants
- Fabs in BRIC countries: current display players
- How we can help

The display industry is in its end-game and a new round of legacy transfers to China is happening



Stages of the Merger Endgame, per AT Kearney
Impact of "hype curve" felt between stages 1 and 2



Source: A.T. Kearney, 2002 and HCL analysis

Fungible fabs and too many players have lead to collapsing margins

Leaders learned how to make smallish panels on large glass

Maker	Fab	Small Size	Small Panels	Large Size*
LGD	P5	9.7"	35	27.0"
Samsung	L6	9.7"	36	27.0"
LGD	P6	9.7"	56	30.0"
Samsung	L7-2	17.0"	36	46.0"
LGD	P7	19.0"	35	47.0"
LGD	P8e	20.0"	40	55.0"
Samsung	L8-2	18.5"	50	55.0"

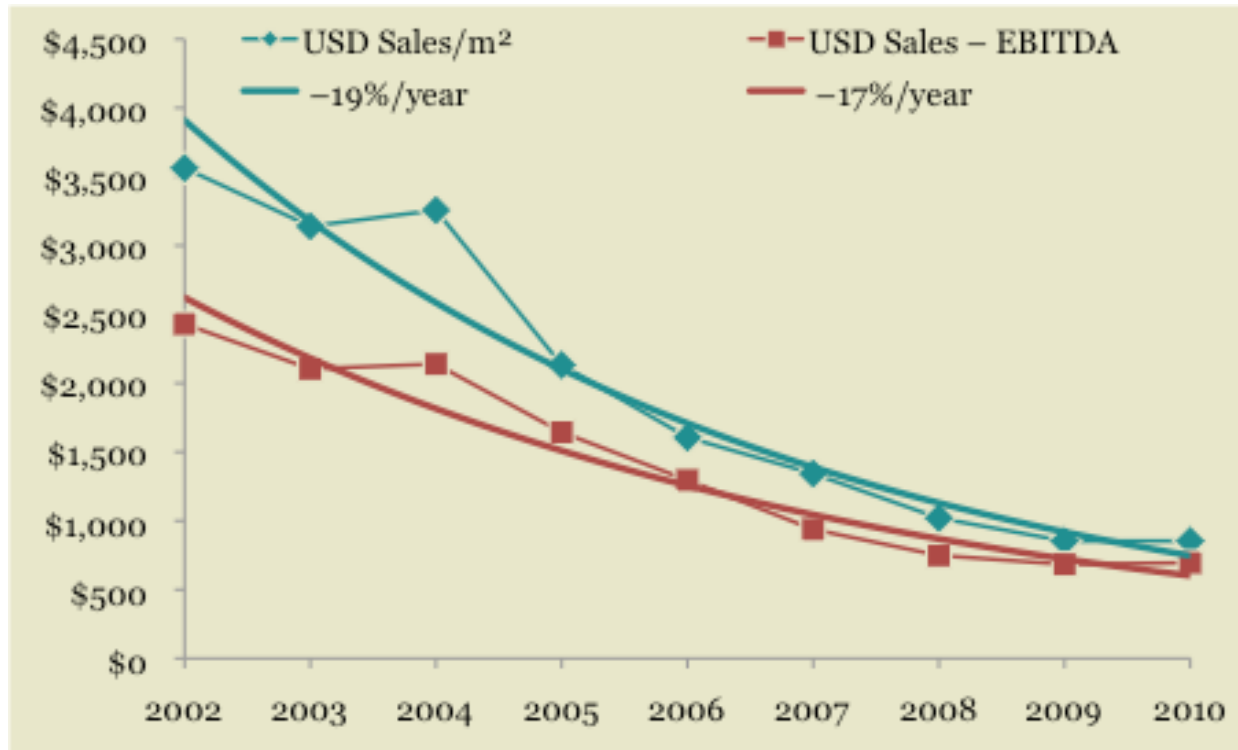
*6 panels per substrate is the typical target for new fab investments because larger panels command a price premium... making smaller panels makes new fabs undifferentiated...

Source: DisplaySearch US FPD 2011

Their capacity is fungible: it can serve most large panel markets

- Piling more capacity into commodity markets leads to hyper-competition.
- We believe this causes calendar-cyclic behavior in terms of price rivalry. Tit-for-tat reactions drive prices down, even for the leaders.
- Similar behavior occurs among retailers who face e-tail competitors.
- As a result, consumers see better prices but the supply chain sees worse profits.
- Differentiation is one way out of this commodity trap.

Margins for display players have fallen. Materials players however making money



- Prices falling faster than costs have led to continuous margin compression
- Display players now making no money at all
- However materials players operate in oligopolistic markets
 - Corning makes >50% margin on display glass
 - Merck makes > 50% EBIT on liquid crystal
 - Polariser makers are profitable
 - Other film makers are solidly profitable also
 - Leading equipment makers book decent cycle-adjusted returns

However, there are still countries interested in display technology...



- According to DisplaySearch, China is currently importing \$46bn of LCDs from abroad
 - China government interested in bringing new high technology into the country even though they understand that the direct economic returns may not be strong

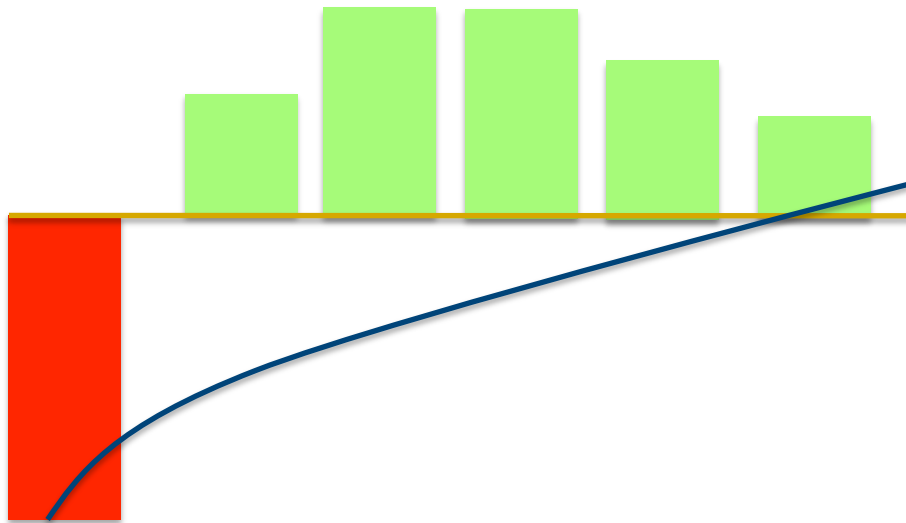


- Brazil has also shown interest in display making and has improved specific tax and tariff structures
 - Strong interest and support for R&D ventures that might strengthen its educational institutions



- In recent years, at least two corporate groups in India have pushed plans to create domestic AMLCD fabrication firms
 - Both plans expected government incentives would support project financials to some degree

...and while we do not believe that undifferentiated large Gen fabs will produce strong economic results, there are opportunities



- Factory investments put in the ground over 12-18 months
- Speed of fab ramp-up determines how early the important year 1-4 cashflows can be accumulated
- Discounted time to cumulative cash payback has increased and now out at 6-9+ years for many large scale, undifferentiated fabs
- Mix is the strongest NPV driver for fab investments

1

Smaller niche fabs offering niche industrial/differentiated mix

2

Additional advantage can be gained from shorter supply chain or from customers who might pay more for “custom” product

3

The parent company can make substantial additional value in related components

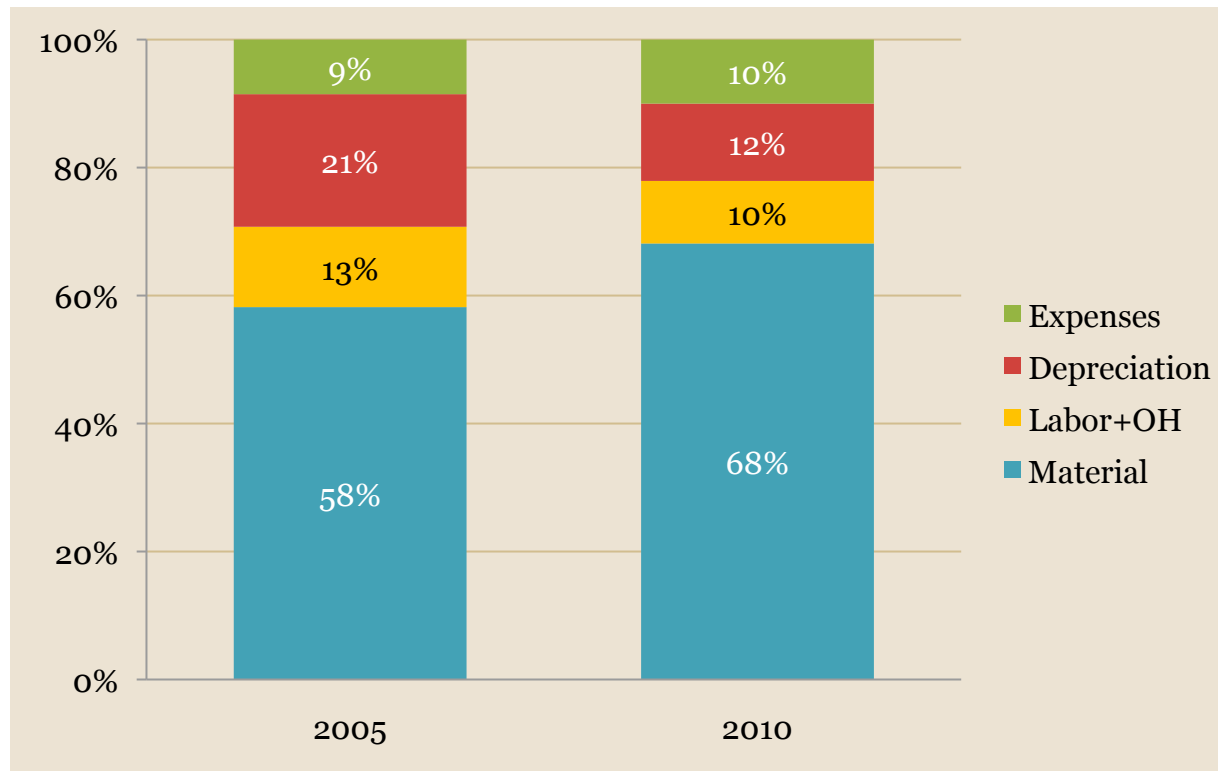
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The parent company can make substantial value downstream that it could not make without its own source of supply

5

Government incentives, tariff implications or preferential supply of inputs (including finance capital)

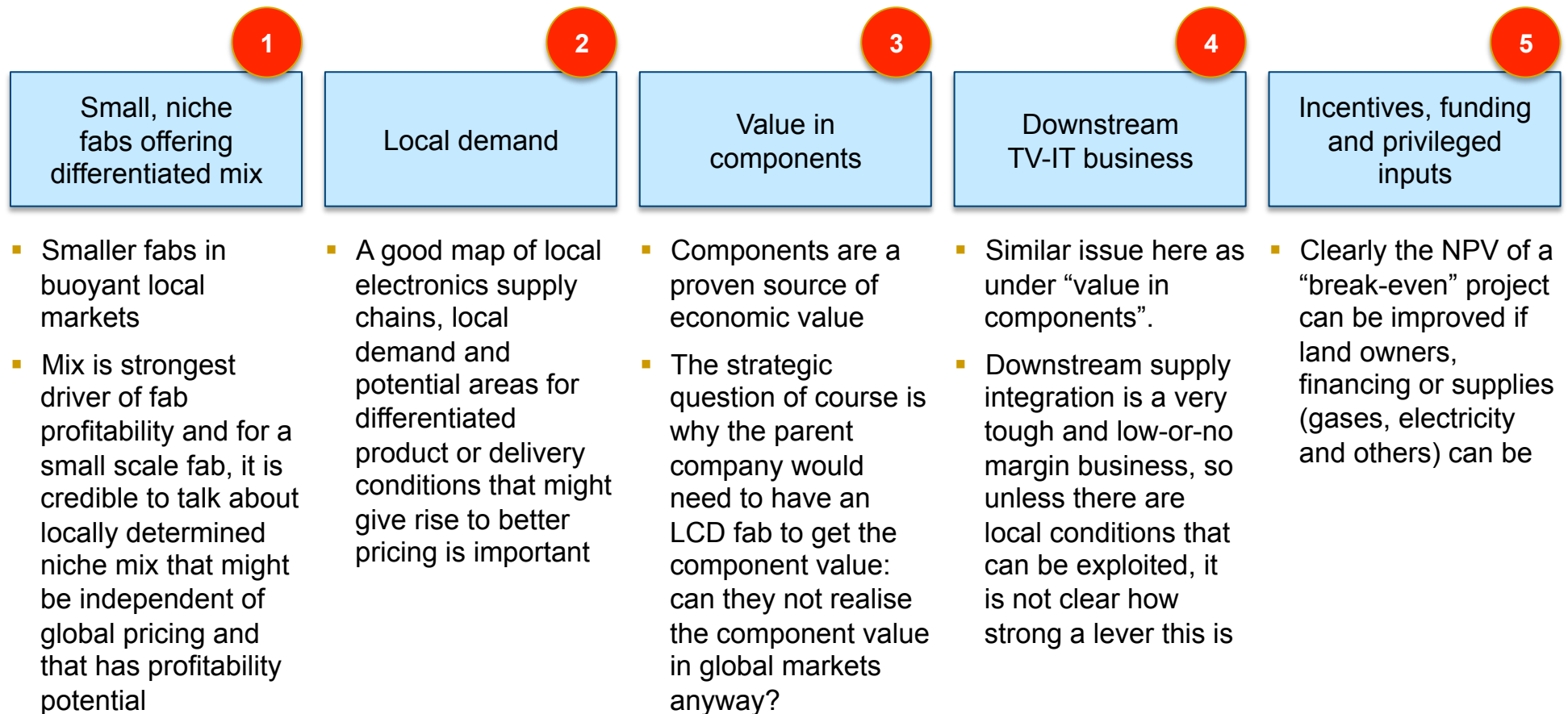
...what is clear is that labour cost has minimal impact and when the savings are compared to additional yield risk, it is a wash:



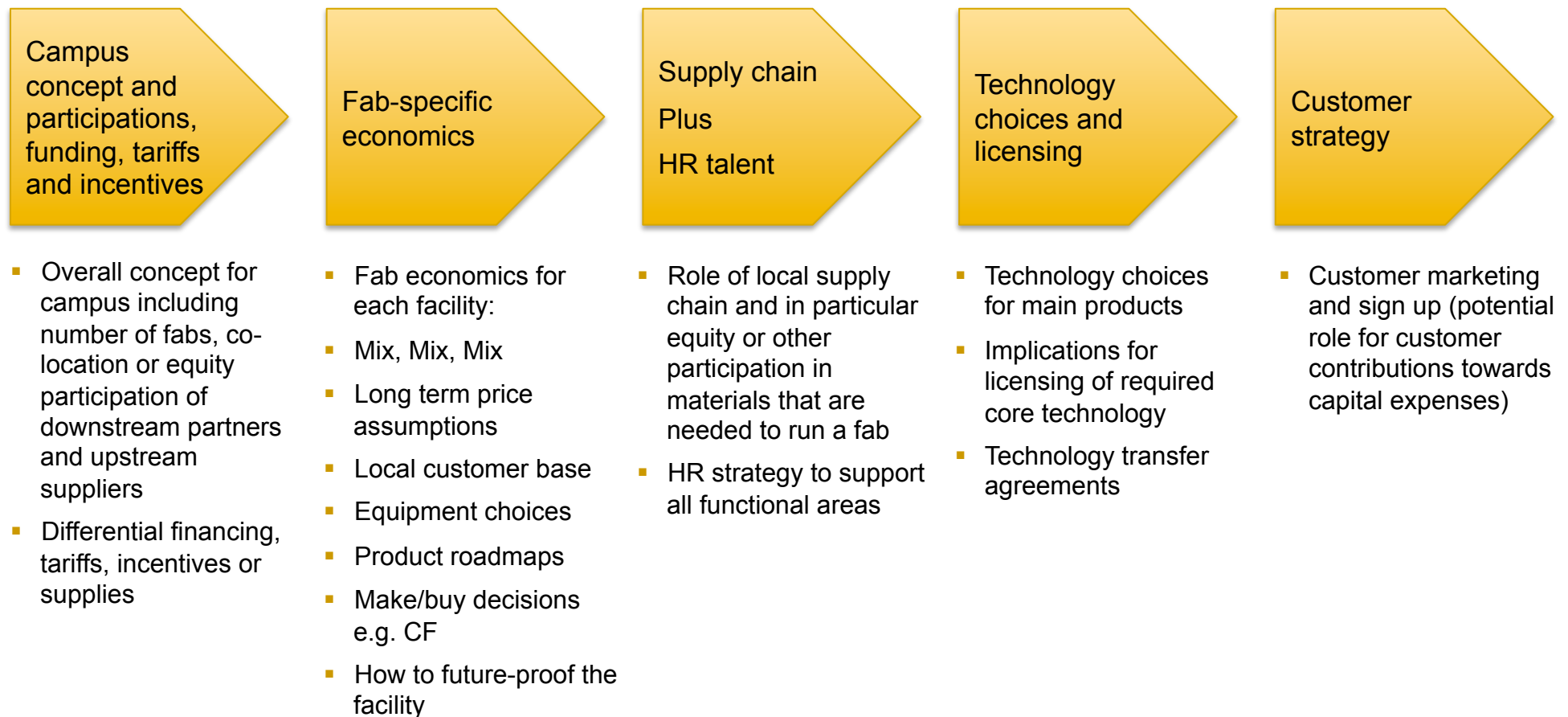
- Total labour related exposures here amount to around 15% of sales with direct line labour a fraction of this number
- Savings in direct labour costs are typically easily offset by yield impact or by the cost of expats needed to provide the “technology backbone” of the company

- Financial disclosures from LGD in 2005 and 2010
- Expenses here include: SG&A and R&D
- OH here is manufacturing overhead

Detailed implications resulting from these opportunities



So if a company wants to build up a fab in a new country these are the strategic planning steps before a go-no-go decision



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For current display players

- For current display players then the first challenge is overcoming campus scale economics whereby fabs in clusters of 3 tend to make sense given the economics of water, gases and utilities build out
- However, there may be reasons to locate array capacity in other countries:
 1. Create floor space in Japan, Korea or Taiwan for newer facilities by moving out the older facilities
 2. Take advantage of favourable funding or incentives
 3. Gain advantageous tariff treatment
 4. Foster closer relations with customers in these countries (This doesn't necessarily mean that array capacity needs to move. Can a module level joint venture or investment achieve the same objectives? It may well depend on the nature of tariffs or R&D/investment tax breaks.)
 5. Access local supply chains that would be less available directly in the home country
 6. Take advantage of local mix variation that can be better served in a specific country
 7. Develop some marginal advantage from a shorter, local supply chain
- With NPVs for current large scale fabs marginal, it may be that small increments from several of these factors may be enough to swing the project economics
- We have worked on fabs plans for more than \$10bn in fab investments and understand the key value drivers

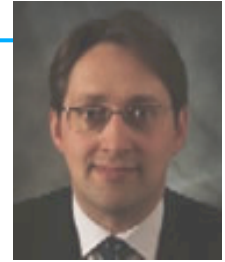
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How we can help:

- We have previously supported the capital approval of over \$10bn in LCD fabs
- We have previously supported a number of regional governments and corporates in the development of business and financing plans for factories outside of Korea, Japan and Taiwan
- We can support the whole of the strategic choice framework
 - Campus and fab economics
 - Materials and participations
 - Local supply chain investigation
 - Product and technology planning
 - Fab economic modeling
 - Equipment choices
- For established display players we can help fine-tune investments by bringing critical insights to eek-out areas of additional value. These may turn a marginal investment into a positive one by a number of incremental sources of value

Introduction to Ian Hendy



Experience

CEO, Hendy Consulting

Philips Components
Sr Dir Strategy

Philips Flat Displays
Director of Marketing
Flat Displays and LCD TV

Philips Flat Displays
Strategic Marketing

Columbia MBA

Braxton Associates
(Consulting)

- Entrepreneurial risk taking, General management perspective
- More than 40 assignments in Healthcare and Displays/High tech
- Organizational development to reposition an aging electronics portfolio as a digital solutions provider for digital multimedia
- Detect, initiate and finalize strategic change initiatives (>\$300m impact)
- Led the Goldmine team to seize \$1.5bn in synergy from a cross-border merger (**LPL to buy Hitachi LCD**)
- Line marketing position for a high-growth business reporting to **LPL Chair**
- Responsible for product strategy and marketing approach
- Designed and implemented a tiered-product strategy
- Grew the business from **\$250m to \$600m** in 18 months
- Marketing with context of complex value chains
- Management and influencing skills in complex, multinational, JV environments
- B2B marketing of displays, development of marketing plans, opportunity assessment
- Large scale cross-border M&A (\$1.6bn investment), **Established LPL**
- A mix of manufacturing companies and FMCG
- Market entry, cost reduction, turnarounds, pricing and market strategy
- Leadership of multicultural teams (Russians, French, US)
- Organizational redesign and change management, process improvement
- Growth strategies. Value-based decision making

Bio of David Barnes



Experience

- 20 years' Display Experience in strategic marketing roles for Display and Display Equipment manufacturers
 - Previous experience in Semiconductors
- Extensive market understanding of all display technologies
 - Includes understanding of costing, competitive behaviour and consumer insights
 - Encompasses material innovation and supply chain analysis
- Advisor to the CFO of LG Display on all technology and market related questions
- Developed the framework for the IPO of LGD on the Korean and NASDAQ exchanges
- Recent assignments in substrate materials with research across many markets including PV and SSL
- Currently also works as Chief Research Officer of LCD TV Association
- Based near Austin, TX
- Studied at University of California, Santa Cruz

Introduction to Hendy Consulting: Service offerings

Growth strategy <ul style="list-style-type: none">• Market entry strategy• Business unit strategy• Growth strategies for new technologies	Performance improvement <ul style="list-style-type: none">• Product portfolio management• Cost reduction• Pricing strategies• Validation of pro-forma plans	Equipment and Capex <ul style="list-style-type: none">• Display factory capex decisions• Strategies for equipment makers	Sourcing strategy (Purchasing) <ul style="list-style-type: none">• Sourcing strategies, especially LCD and medical detectors• Make/buy decisions
Technology strategy and technology assessment <ul style="list-style-type: none">• Market and commercial strategies for new technology businesses• Market tracking services for corporates monitoring technology	Partnering and alliances <ul style="list-style-type: none">• M&A candidates and assessments• Alliance formation support• Post merger integration planning	Professional advisory and business planning <ul style="list-style-type: none">• Specialist insights for bankers, equity investors and other consultancies• Reviews of business plans and models	Strategies for materials providers <ul style="list-style-type: none">• Strategy support for materials providers in the FPD, SSL, and PV markets• IP and pricing plans