

How can a vertically-integrated developer, builder and off-site manufacturer best control their costs, supply chain and quality in the early days of establishing the business?

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Properties**



Premises

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- Volumetric Steel Modules –1,000+ per year
- PBSA, Hotels & Residential
- 45,000 – 75,000 sq ft
- Established in June 18
- Production started in January 2019
- First project underway



**Coxford Farm
Depot**

Overton Road • Micheldever • Hampshire SO21 3AN

**DISTRIBUTION CENTRE WITH LARGE YARD
TO LET**

**38,815 SQ FT (3,605.97 SQ M) plus mezzanine
on 3.24 acre site (1.41 ha)**

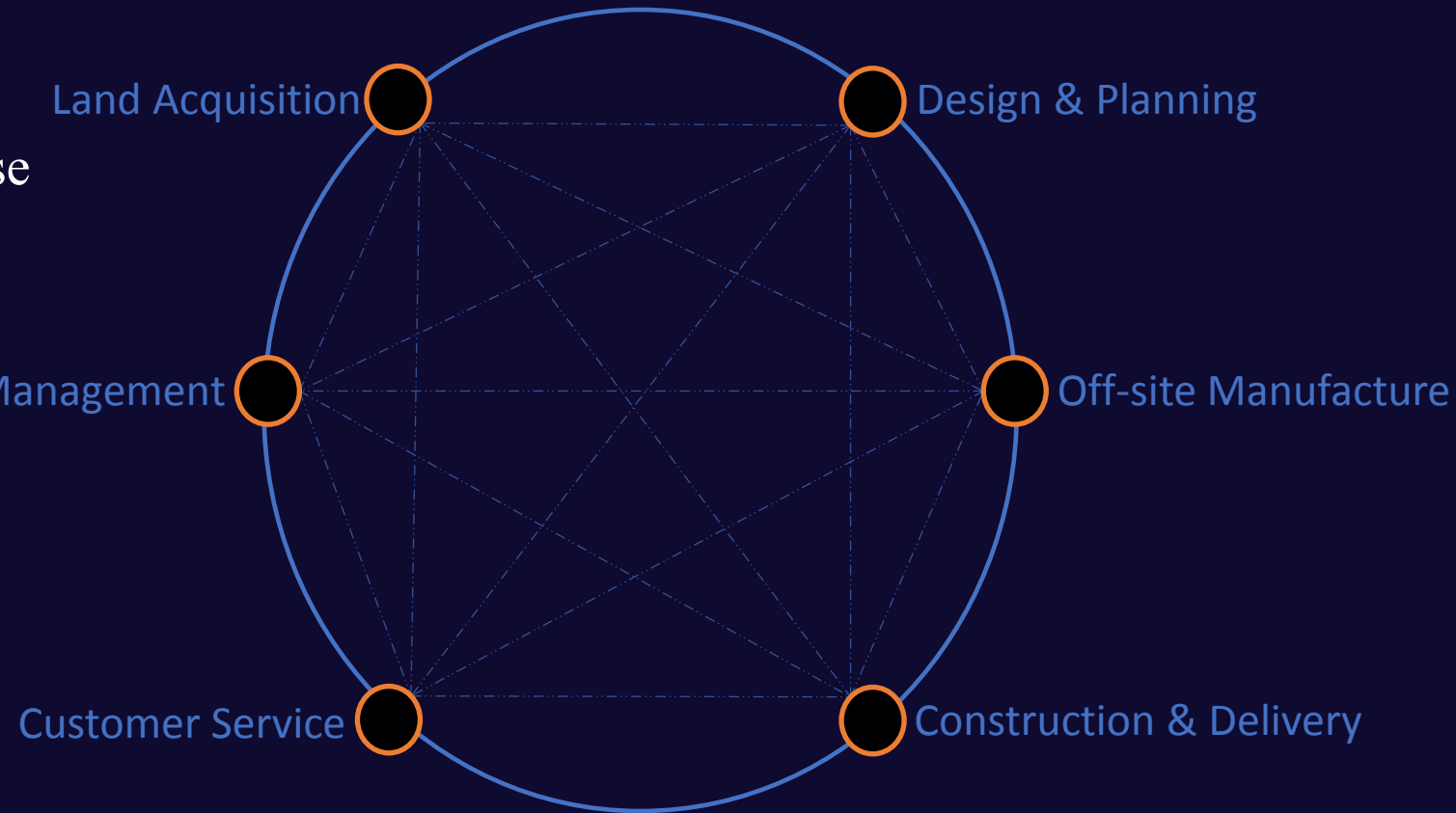


Full Vertical Integration (Nearly...)

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- Projects designed specifically for volumetric modular
- LPA discussions relevant to MMC
- Key design consultants external
- Move towards internalising expertise

- Development Directors
- Architectural Design
- Technical Designers
- BIM Co-Ordinator
- Procurement team
- On-site Self-delivery
- Installation & Logistics
- Manufacture



Key Investment Considerations to Commence Operations

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ITEM	DESCRIPTION	RISK
Land	One 'live' project and five pipeline projects	Subject to Vagaries of Planning; 18 months acquisition to manufacture
Premises	Suitable premises are scarce; 10 year lease	Change of Planning; Significant adaptation of premises; balance of "security" vs "commitment"
Design / Software	Traditional RIBA 3 & 4 Design through to DfMA and shop drawings	Separate 'languages' of construction vs manufacture; interface between on-site & off-site;
Factory Hardware / Technology	H&S requirements; Efficiency through lighting, machinery, flow lines etc	Most 'scale-dependent' item ie heavy barrier to production for smaller companies;
Human Resource	Need to implement correct procedures and environment ahead of employment	Recruitment takes time & training; but reliance on contractors is expensive and non-progressive

Key Cost Considerations to Commence Operations

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ITEM	COST CONTROL	AND / BUT...
Land	Provincial land is inexpensive per module vs London (c.£40k per consented room)	With relatively small scale projects, there's a constant (and expensive) design 'battle'
Premises	Leasing vs Buying manages cashflow better - although gets written off	Being a tenant creates constraints around factory adaptations & investment
Design / Software	Hard to implement – new broadband solution, new staff, new work model	Most embedded way to control costs in the medium-term eg BIM, MRP etc
Factory Hardware / Technology	“L&G model” compared to step-by-step adaptations. Gantry cranes, extensions	Most ‘scale-dependent’ item ie heavy barrier to production for smaller companies;
Human Resource	Difficulty in recruiting eager, precise staff who want to be in manufacturing	Requirement to ensure it's an attractive place to work long-term – food, transport, facilities

Role of Digital Design in Controlling Processes and Costs

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Control, Efficiency, Quality & Transparency

Main focus on software tools for digital collaboration:

BIM software providers

- Increasingly mainstream among Architects
- 'Internalise' BIM control to use various levels and increase potential

Level 1 – (2011) 3D CAD but not fully collaborative

Level 2 - collaborative BIM. Federated model information is shared within a Common Data Environment

Level 3 onwards – integrates various alternative 'dimensions' eg cost

Digital Design provides control over all of this AND
Management, Strategy, Costs, Programming, Risk, Staffing etc



Various Elements of “Technology”

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1. Construction Technology	New Materials; Off-Site Elements; Robotic Delivery; 3D Printing. But emphasis is moving away from construction – is automated on-site brick-laying really the future?
2. Manufacturing Technology	Barrier to investment of bespoke digital machinery; Emphasis on Scale and Uniformity? More “Engineering” than “Technology” until it reaches robotics and suits huge-scale
3. End-Product Technology	Sustainability; Well-being; Connectivity Well underway and only helped by engineered solutions
4. Design Technology	Precise, 3-D, Collaborative, Single-Source, Transparent
5. Risk Management	Materials Requirement Planning; Material Requirements Planning; Document Management

Impact of Scale on Investment – Always Best?

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- L&G Homes Feb 2016
- 550,000 sq ft new facility
- £55m investment
- 550 staff
- 4,500 homes p.a.



At 1/10th the scale...

- Stelling located factory in May 19
- Prototype testing by November 19
- Commenced manufacture this
- Barriers to increased scale without:
 - More machinery
 - Expansion of factory
 - Digitalisation of all processes
 - Recruitment / Training
- Agile Frigate vs Tanker
- Government needs to focus on smaller scale operators to establish in order to allow MMC into the mainstream



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At 1/10th the scale (but growing...)

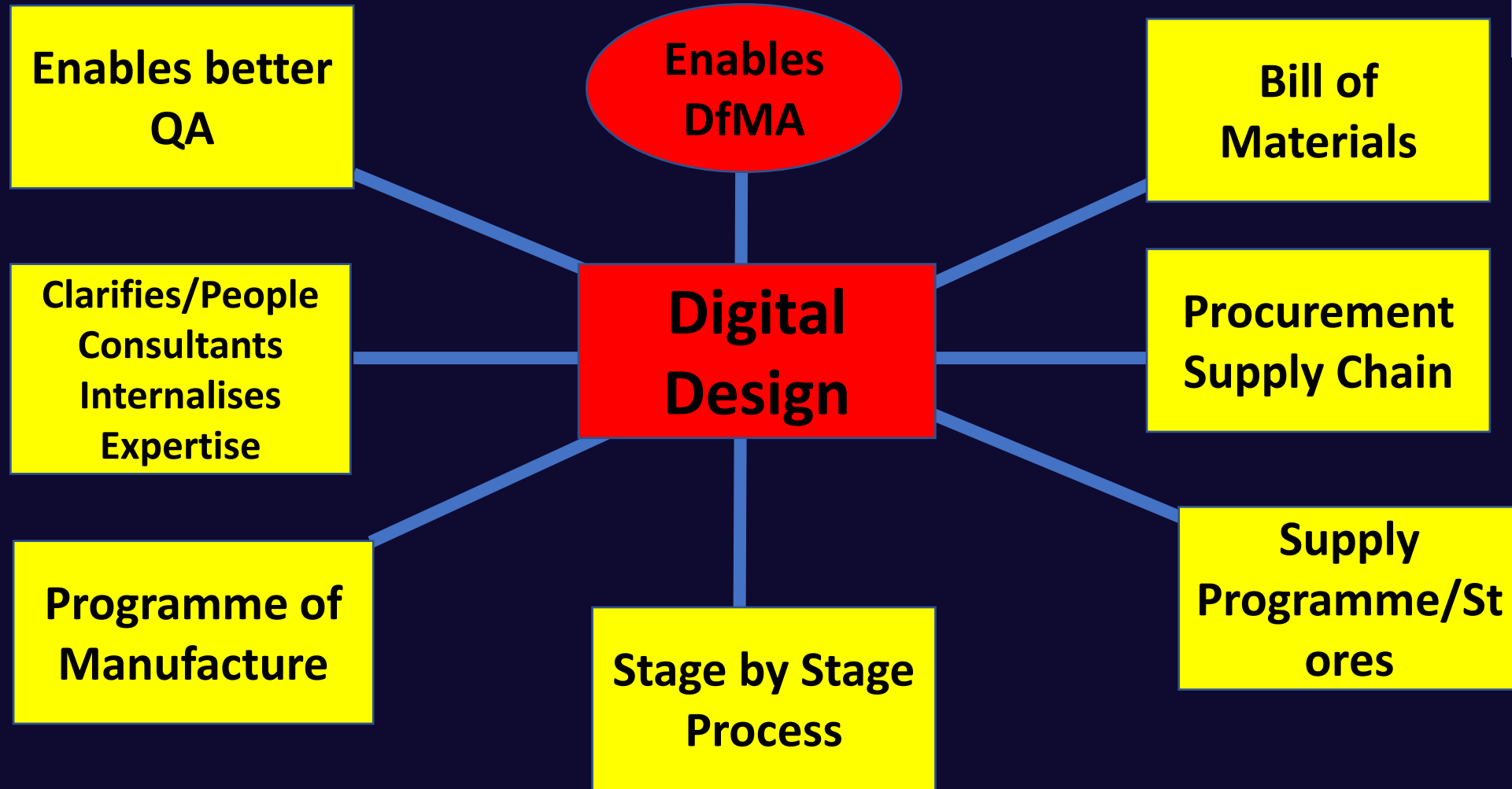
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- Barriers to increased scale without:
 - More machinery
 - Expansion of factory
 - Digitalisation of all processes
 - Recruitment / Training
- “Agile & Adaptable” vs “Efficiency of Scale” – both should work
- Government could focus on SME's to establish in order to allow offsite manufacture into the mainstream



Benefits of Digitalisation in Cost Control

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Consultants Costs

Faster

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Better

Cheaper

Simpler

Practical
Repetitive
Innovative
Defined
Efficient