Construction Industry Development – Summary of Research Findings

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Background

- HK Construction Industry in late 90’s:

- Pressures to re-examine **priorities** (e.g. for ‘fast-build’) and **protocols/ procedures and practices** following a few scandals **and** visible general shortcomings

- Asian Financial crisis

- Awareness of industry improvement initiatives in UK and other countries

- Expectations following return of Hong Kong to China

- ‘Construction Industry Review Committee’ led by Henry Tang – CIRC Report (Jan. 2001)

- 109 recommendations with a vision of:

“an integrated construction industry that is capable of continuous improvement towards excellence in a market-driven environment”

Aim and Objectives

Aim:

- Independent assessment of Industry Improvement trajectories - following (but not limited to) CIRC recommendations

Overall Objectives summary:

- To evaluate effectiveness of industry improvement programmes against original objectives
  - while allowing for (i) inherent industry development trends that may have continued without reform inputs and (ii) changing aspirations, priorities and concerns

- To unravel reasons for any perceived shortfalls in above implementation and unearth any root causes
  - with particular reference to relevant public agencies *and* private organizations

- To learn lessons - to help to improve future industry development agendas and re-align current development trajectories.

A Decade Later

- Modest improvements; primarily public sector driven
- Improvements from inherent trends given impetus through CIRC recommendations
- Relatively satisfied clients, less satisfied consultants and even less satisfied contractors
- Establishing the **basic** institutional structure (CIC) seen as primary achievement, despite concerns on representation & limitations
- Many of the **originally cited** root causes (fragmentation, adversarial culture, multi-layered subcontracting, unrealistic project programming) of industry shortfalls still remain

CIRC Recommendations

CIRC REPORT RECOMMENDATIONS

Set Up Institutional Framework for driving reforms

Review Implementation Progress

Fostering Quality Culture

-A knowledgeable and involved client
-Importance of the planning and design stages
-Realistic project programming
-Clear accountability
-Subcontracting
-Site supervision and quality assurance
-Raising the quality standard of renovation contractors and decorators

Achieving Value in Construction Procurement

-Selection of contractors and consultants
-Effective risk management and equitable contracting arrangements
-Dispute resolution
-Partnering approach
-Incentives for the project team to achieve better value

Safer workplace

-Designing for construction safety and integrated management
-Safety promotion and training
-Incentives for sound safety management
-Enhanced enforcement

Environmentally responsible Industry

-Life-cycle costing
-Greener and more energy efficient designs
-Abatement of environmental nuisance during construction
-Reduction and management of construction and demolition material
-Environmental assessment schemes and environmental management systems

An Efficient, Innovative and Productive Industry

-Process re-engineering to achieve better integration
-Wider use of: (i) standardisation in component design and processes, (ii) prefabrication, (iii) ICT in project implementation
-Investment in R&D
-More reliable records of underground utilities

Nurturing a Professional Workforce

-Improved and structured training programme
-Promote use of direct labour
-Foster an ethical culture
-Promote industry professionals participation in teaching

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The Road to Current Status

- Institutional establishments, Policy Initiatives, Technical Circulars, CIC Guidelines, Training Programmes, ….etc.
- Public sector quick on the uptake of initiatives, but short on following up and full implementation
- Private sector enthusiastic, but slow in embracing cost intensive and potentially ‘risky’ changes
- Public sector more driven by extrinsic pressures towards reforms (subject to constraints), while private sector prefers intrinsic ‘pressures’
- Focus on interface management & inter-team operability; lack of focus on intra-institutional shortfalls

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Root Causes for Shortfalls

- Procurement philosophy remains the same (especially at the lower rungs of the supply chain)
- Blame culture remains
- Response to changing priorities and trends has been reactive rather than proactive
- Inability to achieve inclusive reform process and added value sharing
- Boom and bust demand cycles
- Scattergun / Ad-hoc approaches to industry development

Concerns

- Failure to cross-pollinate industry improvement initiatives across public to private sector **and** vice-versa
- Lukewarm response to improvement initiatives which are voluntary
- Inertia/ difficulties in improving industry norms and culture; hence **over reliance** on regulatory changes albeit with modest gains
- Sustainable workload
- Improved image of the industry
- Attracting new entrants to work force and upgrading skill sets of existing workforce
- Promoting and Sustaining alternative procurement initiatives

Lessons Learnt

- Extrinsic pressures (regulation, market demand etc.) are key to achieving radical changes
- Targeted incentives are essential to address ‘off-market’ issues
- Robust regulation followed by diligent enforcement for a reasonable period until norms and culture adapt on critical issues
- Limitations of an industry body with no regulatory power
- Detailed performance assessments with benchmarking are critical for **continuous improvement** programmes

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Changing Priorities

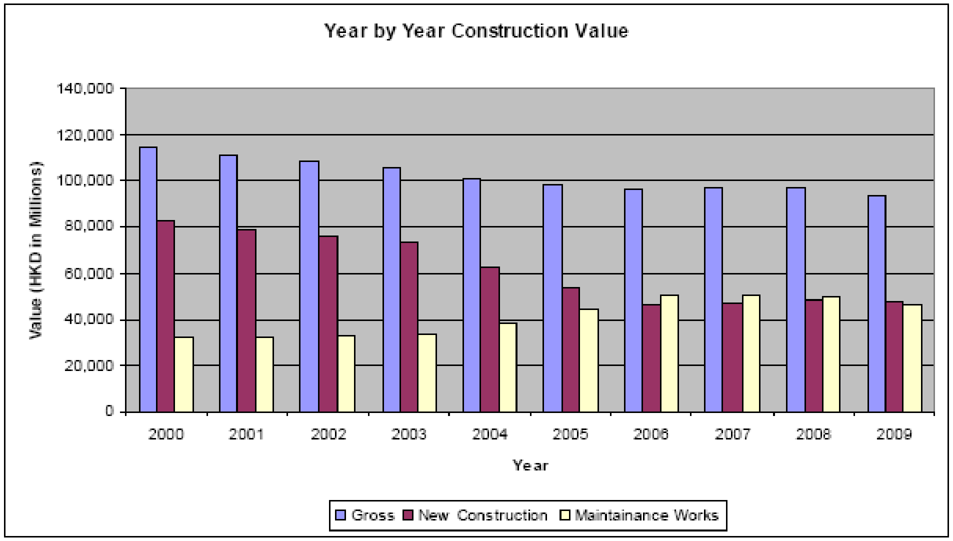


Figure 1: Year by Year Construction Value
Source: Construction & Miscellaneous Services Statistics Section, Census and Statistics Department

- Rise of Maintenance sub-sector
  - Minor works contractors registration scheme
  - Sectoral capacities of workforce and organisations???

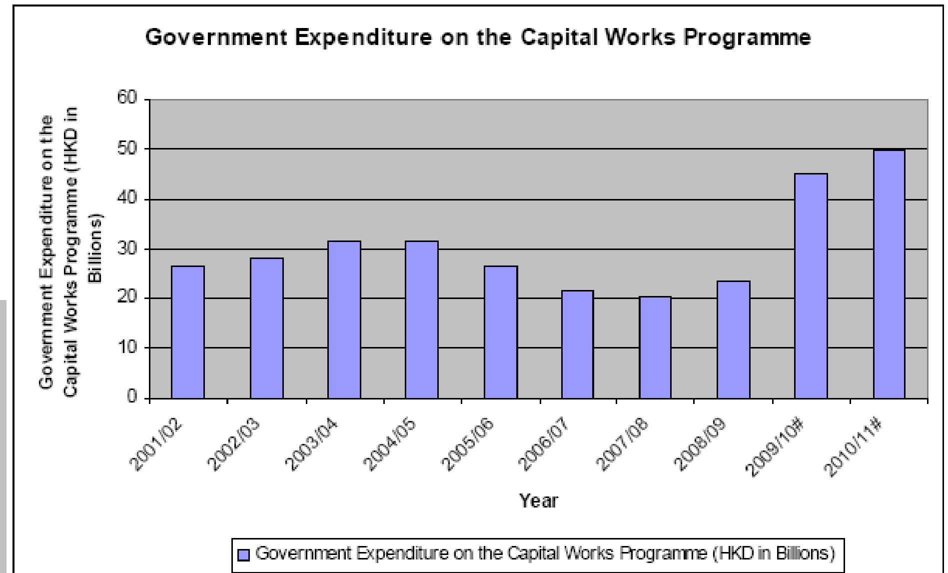
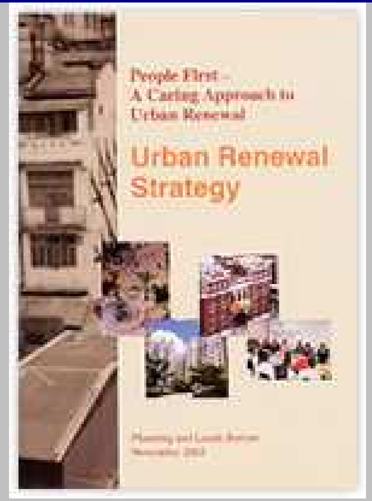


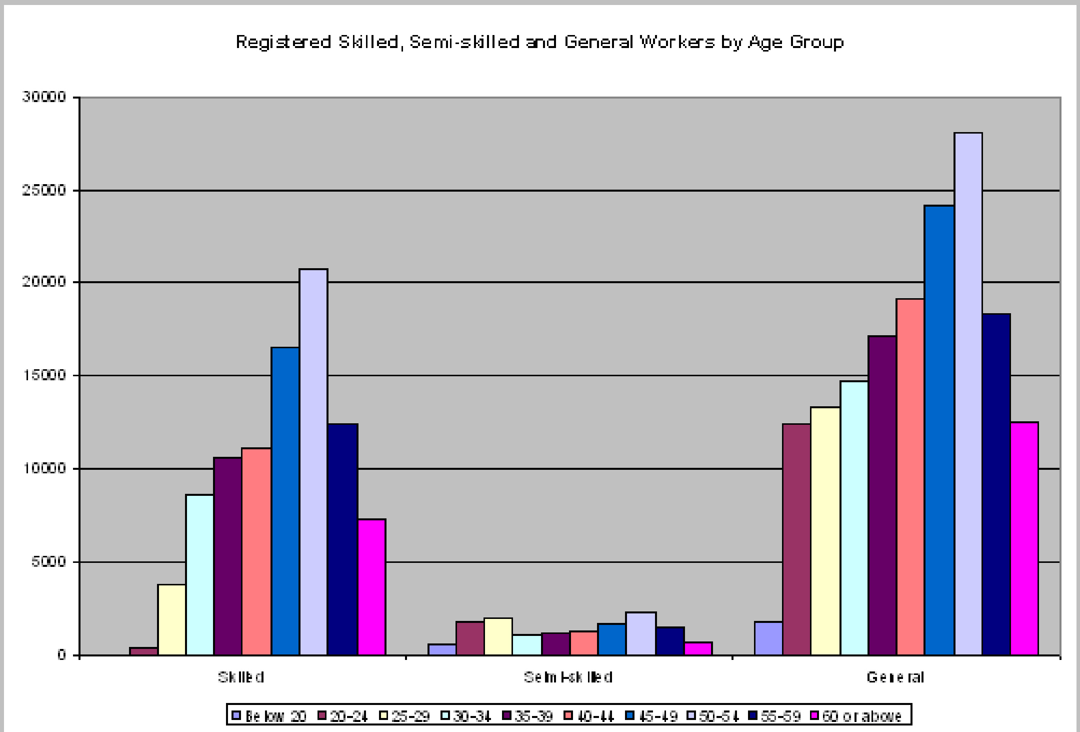
Figure 2: Government Expenditure on the Capital Works Programme
(source: Legislative Council Panel on Development, March 30, 2010)
Forecasted figures

- Demand stability
  - Sharp infusions of investment
  - Long term sustainability???
  - Export of construction services???

Changing Priorities

- Urban renewal requirements
- Increased emphasis on social and economic aspects of sustainability





- Aging workforce
- Inability to attract fresh talent
  - Image of the industry
  - ?

Roadmap for the Future

- Key requirements for **strategic** structural changes in the industry are sustainable workload and a strategic vision

- Strategic vision:

  - Long term vision tied to Hong Kong's vision as a city State

  - Proactive engagement to reflect changing priorities and trends

  - A well formulated strategic size of the industry based on HK's and regional demands

- Sustained incremental improvement

  - Periodic performance assessment & benchmarking

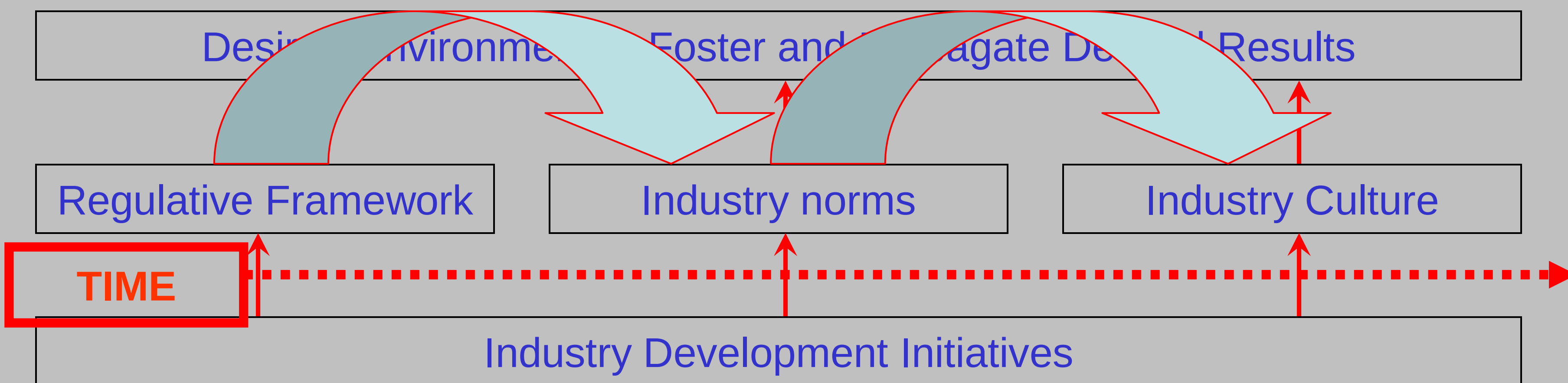
- Transparent & accountable public sector; responsible private sector; and an independent, representative and respected CIC

Construction Industry Development – Research Findings w.r.t Specific Objectives

Dr. Gangadhar Mahesh

Research Philosophy

- Industry development initiatives depend on stakeholder institutions for implementation
- Institutional behaviour is influenced by prevalent (1) regulative framework, (2) industry norms and (3) culture - Three Pillars of Institutional Theory
- Industry development initiatives should trigger changes in above three 'pillars' to influence desired institutional behaviour
- Regulation is (in this context) usually a last resort and the aim of the regulation should be to shape the industry norms and culture appropriately



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- To learn lessons - to help to improve future industry development agendas and re-align current development trajectories.

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Research Overview - Roadmap

Research Aims and Objectives

Literature Review
Review documented progress of the industry

Prelim interviews
Elicit opinions on key issues from industry stakeholders

Focus Group 1
Validate findings from lit. review and prelim interviews and refine research agenda

Quest. Survey
Investigate parameters quantitatively

Interviews
Investigate parameters subjectively

Case Studies
Investigate parameters contextually

Workshop
Validate and build consensus

Focus Group 2
Validate and Finalise

Final Report

- Shortfalls
- Enablers
- Challenges
- Current and future key concerns
- Improvement Acceleration Strategies

Completed Works

Ongoing Works

Pending Works

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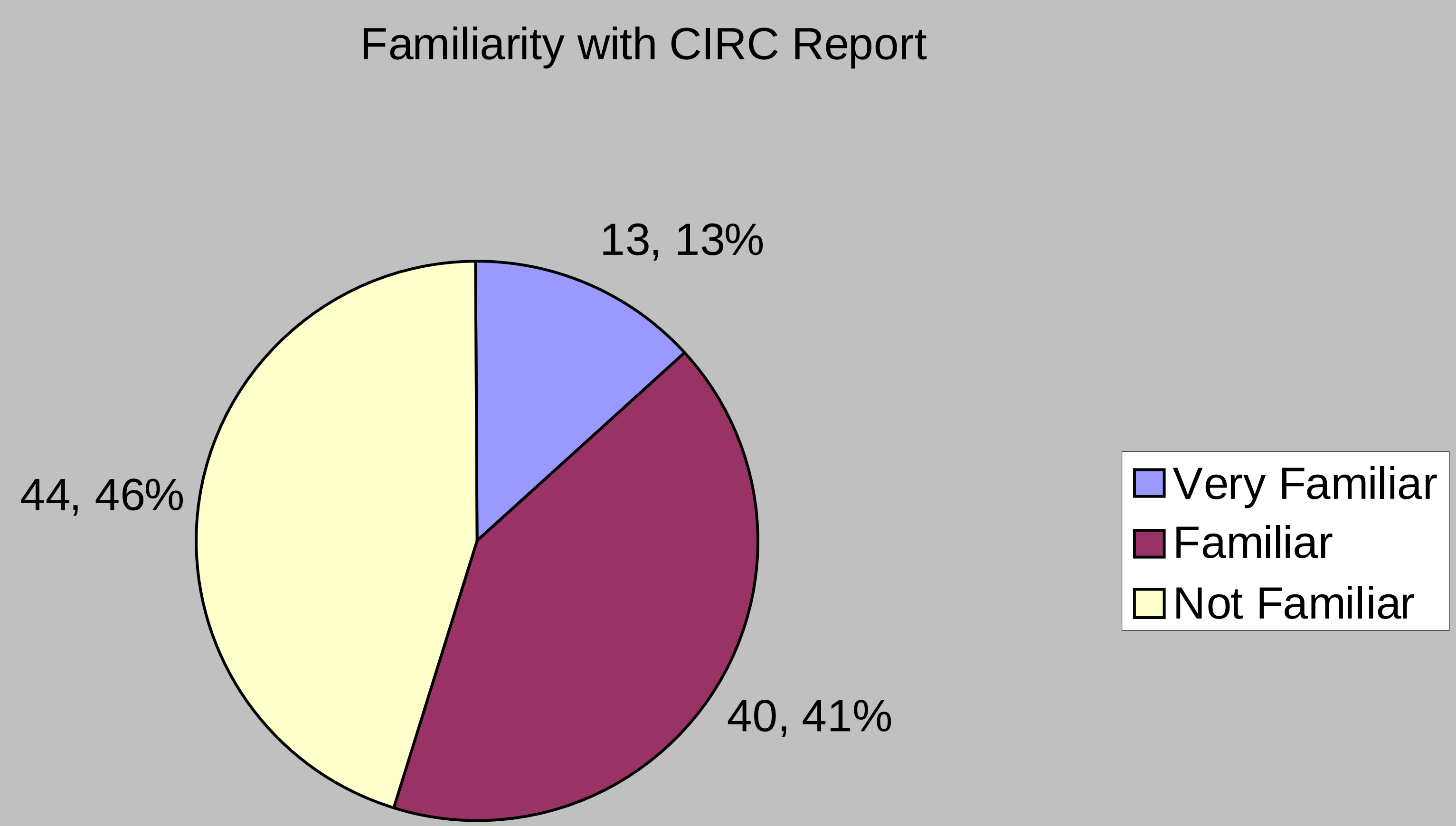
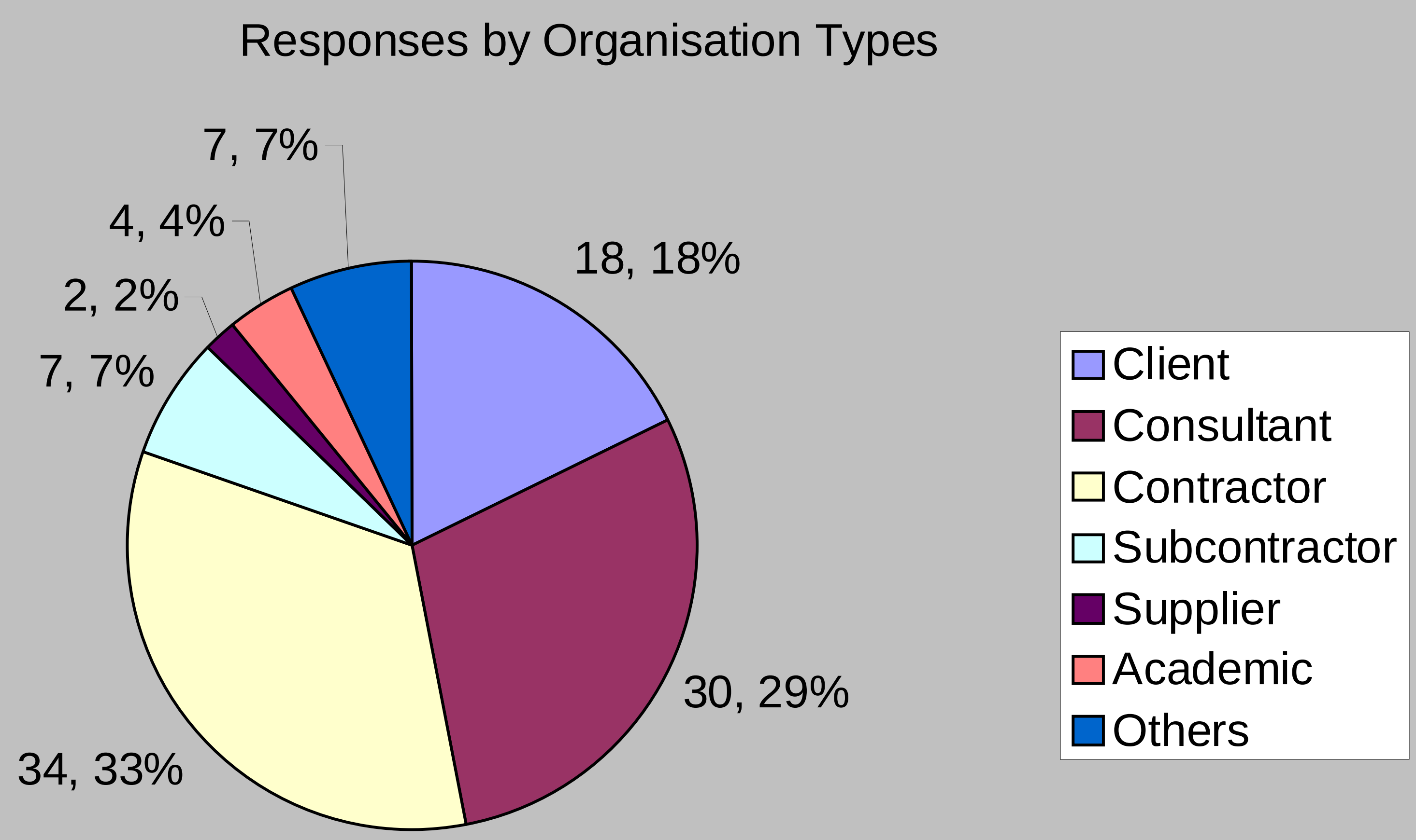
Questionnaire Findings

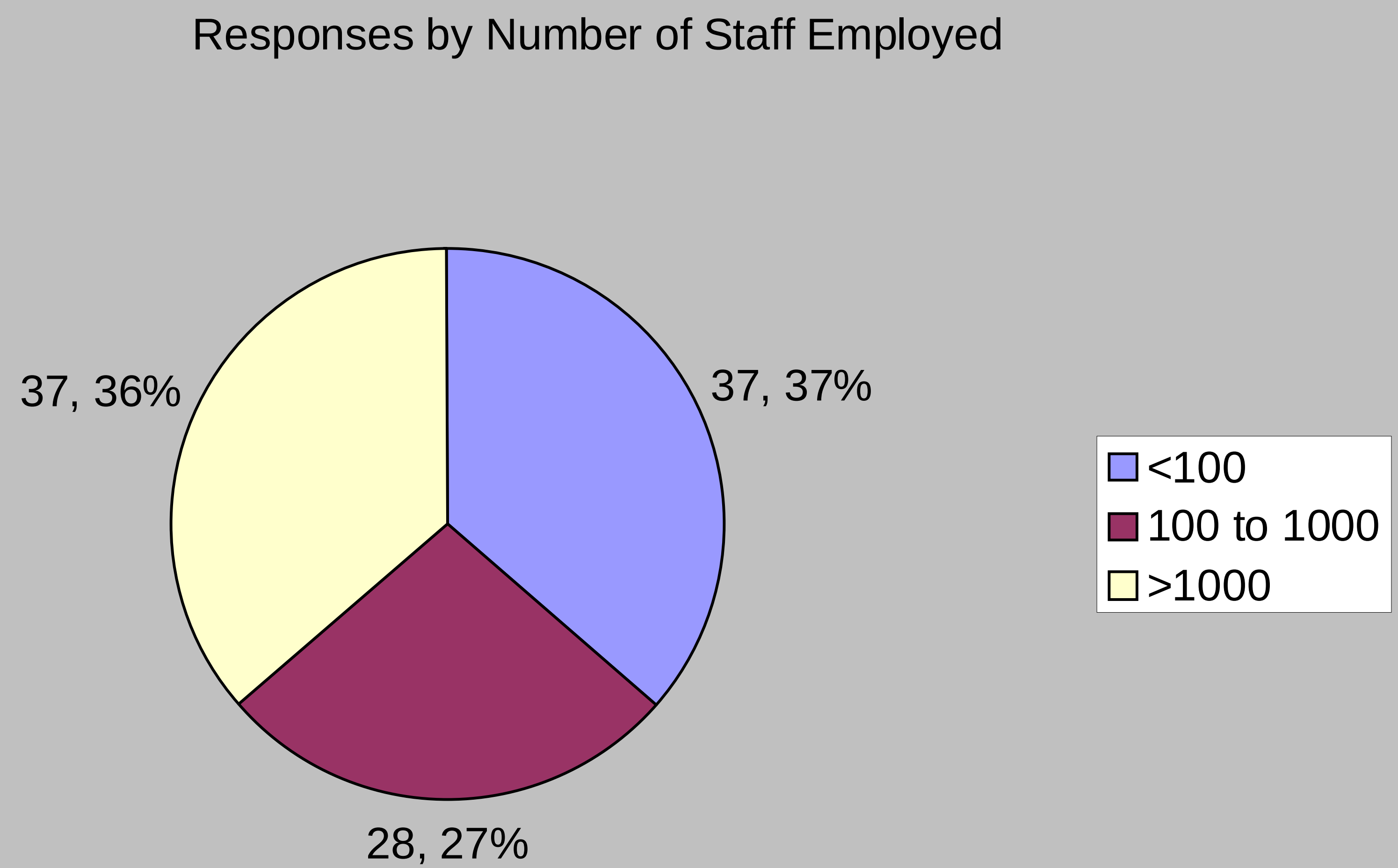
Response Profile by Familiarity with CIRC Report



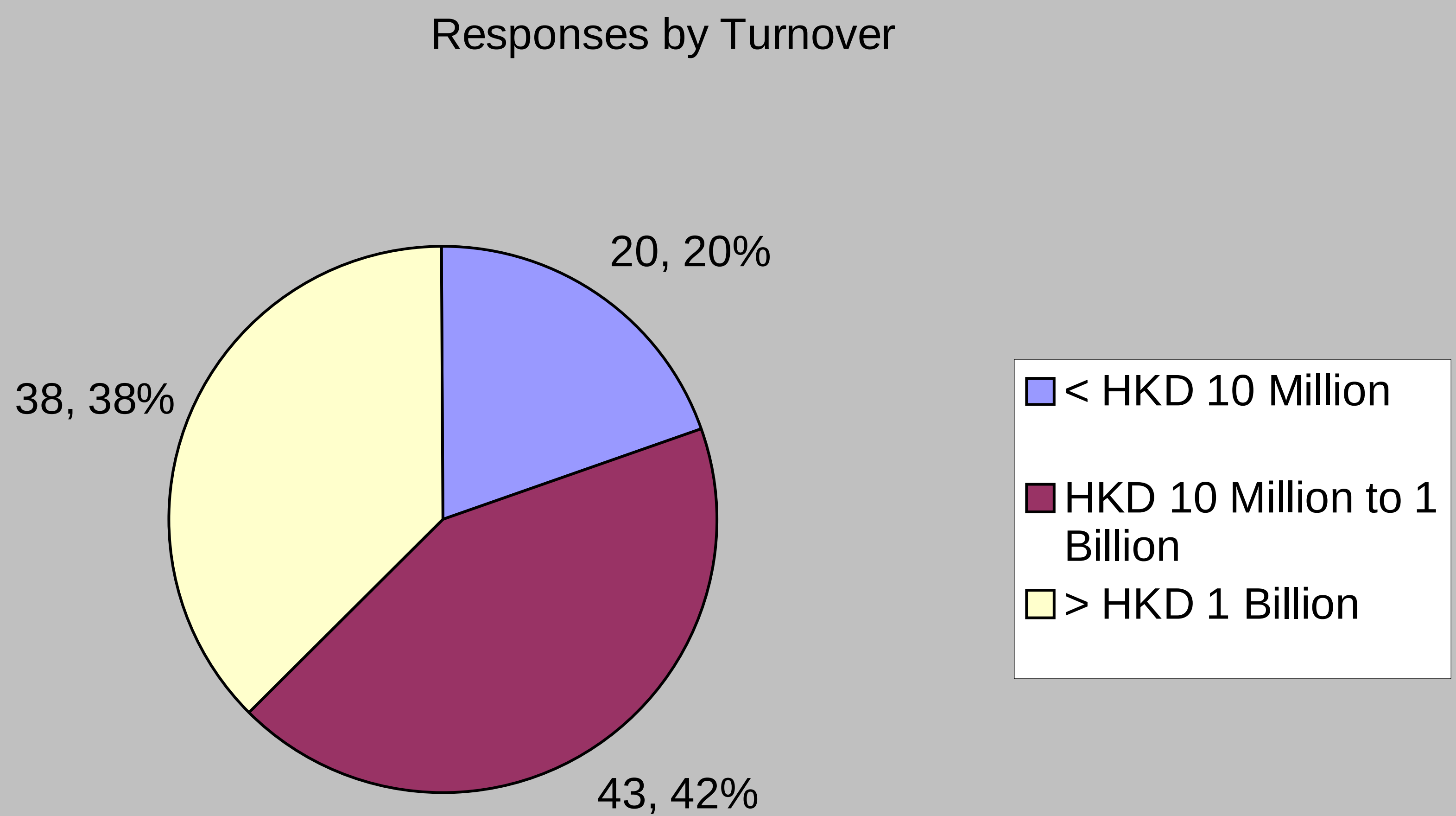
Response Profile by Organisation Type



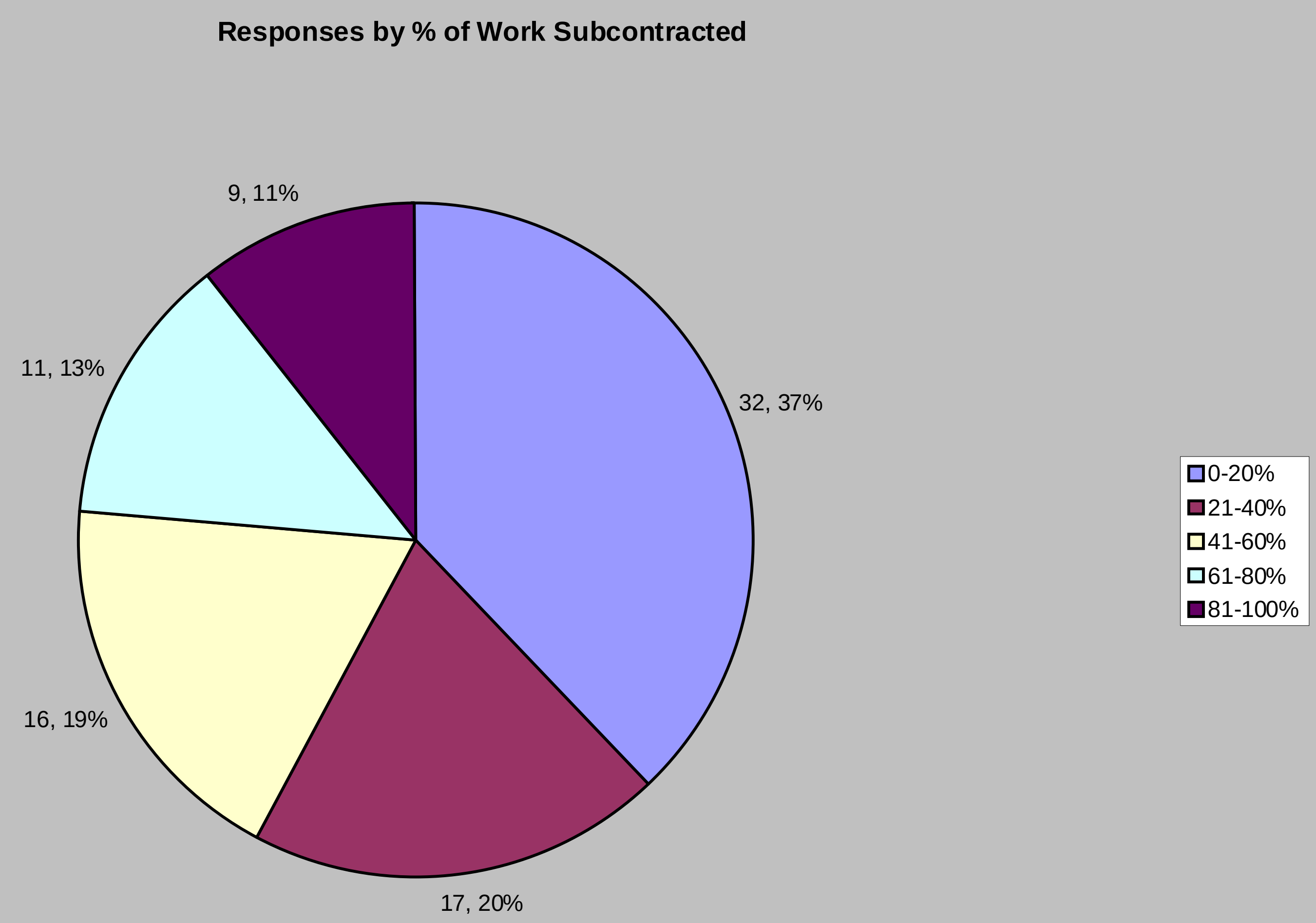
Response Profile by No of Staff Employed



Response Profile by Turnover



Response Profile by % of Work Subcontracted



Institutional Structure

	Mean	S.D
CIC is appropriately structured to adequately represent the industry needs	3.21	0.865
CIC should be provided more regulatory power	3.51	0.861
Constituents of the industry are equitably represented in CIC	3.05	0.934

	Clts.	Cons.	Conts.	Ots
CIC is appropriately structured to adequately represent the industry needs	3.67	3.09	3.10	3.19
CIC should be provided more regulatory power	3.67	3.83	3.29	3.31
Constituents of the industry are equitably represented in CIC	3.27	3.00	2.92	3.13

	By Turnover			By Employee Nos.		
	S	M	L	S	M	L
CIC is appropriately structured to adequately represent the industry needs	3.25	3.46	3.28	3.20	3.00	3.41
CIC should be provided more regulatory power	3.60	3.43	3.55	3.45	3.37	3.69
Constituents of the industry are equitably represented in CIC	3.13	3.11	2.96	3.13	2.86	3.11

% OF WORK SUB-CONTRACTED:	0-20%	21-40%	41-60%	61-80%	81-100%
CIC is appropriately structured to adequately represent the industry needs	3.15	3.42	3.43	3.00	3.00
CIC should be provided more regulatory power	3.69	3.67	3.57	3.56	3.17
Constituents of the industry are equitably represented in CIC	3.08	3.33	3.23	2.89	2.60

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Institutional Structure (Contd.)

- Relatively satisfied with Institutional structure
- Clear calls for regulatory power
  - Demand for self regulation; but contradictory from track record
- Representation on CIC is skewed

  - Satisfied clients, relatively unsatisfied consultants and contractors
  - Larger the % of work subcontracted out (i.e larger the supply chain network), the 'less equitable' is the perception
  - Larger the size, the 'less equitable' is the perception
- CIC Functions & results require earning & retaining respect from industry

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Fostering Quality Culture

	Mean	S.D
Clients have developed adequate understanding of construction delivery processes	3.20	0.931
Clients are adequately involved in project implementation	3.35	0.855
Required integrated inputs from different disciplines are incorporated at the outset of a project	3.51	0.891
Value management tools are appropriately used	3.16	0.906
Project programming has become adequately realistic	3.06	1.022
Legislation has become clearer and allocates clear responsibilities and sanctions for non-compliance	3.11	0.988
Project responsibilities are appropriately allocated among project participants	3.19	1.029
Accountability structure in client organisations is clearer	3.10	0.983
Voluntary subcontractor scheme as implemented at present has improved quality culture	3.09	0.825
Control of percentage of subletting by public sector clients has improved quality	3.46	0.667
Training courses by CICTA for managerial staff & site supervisors of subcontractors have improved QC	3.14	0.984
Control of percentage of subletting by public sector clients has improved quality	3.33	0.798
Site super. plans & discip. actions introduced by BD has improved control of subcontracting by main contractors	2.75	0.778
Subcontracted percentage of work volume against contract value has reduced in the industry	3.39	0.869
Wages monitoring & payment control system introduced by HA is effective in reducing sc payment problems	3.01	0.764
Guidelines on subcontracting & standard forms of domestic subcontractors issued by PCICB are followed widely	3.52	0.734

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Achieving Value in Construction Procurement

	Mean	S.D
Performance assessment as practiced in public sector agencies is objective	3.22	1.021
Performance based contractor selection delivers better value in procurement	3.38	0.825
Technical & price based formula approach for tender selection has adequately enhanced delivered value in projects	3.25	0.902
Sharing of PA scores of contractors with the general public has assisted in improvement of contractors	3.46	0.871
Briefing to non-winning bidders after tender award has assisted in improvement of contractors	3.48	0.845
Subcontracting levels have reduced adequately leading to increased value	2.95	0.872
Control of subcontractors is adequate and thus leads to value	3.34	0.927
Risk Management has become more systematic and efficient	3.47	0.760
Change control measures are appropriately structured and managed	3.09	0.825
Risk allocation has become more equitable	3.08	0.938
Alternative dispute resolution (ADR) mechanisms (e.g. DRA) are more prevalent	3.44	0.752
Use of ADR's have reduced disputes and improved conflict management	3.23	0.924
Partnering approach is accepted and used widely	3.29	1.002
Partnering approach is applied appropriately	3.12	1.000
Partnering benefits have percolated to lower rungs of supply chain	3.04	0.966
Alternative procurement approaches (e.g. target cost, GMP, PPP etc) are considered widely	2.91	0.814
Alternative procurement approaches (e.g. target cost, GMP, PPP etc) when used have provided value	3.34	0.793

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Quality Culture & Value

- Appropriate procurement structures and protocols are the foundation on which quality and value can be achieved
- Interface management issues exhibit relative improvement; clients' internal shortfalls remain (limitation of client led reform process…???)
- Gains through regulation are relatively limited
- Partnering is neither applied appropriately nor have the gains percolated to the supply chain
- Subcontracting is not the problem, standard of subcontractors is (Entry barriers…???)

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Nurturing A Professional Workforce

	Mean	S.D
Fresh graduates are employable	3.60	0.769
Academic institutions have incorporated industry expectations in their curriculum development	3.27	0.780
CPD programmes are adequate and appropriately designed	3.33	0.792
Site attachment programmes for supervisor/ technician programmes have improved skills and enhanced employability	3.61	0.632
HKIA, HKIE and HKIA membership schemes for site supervisors have uplifted their standards	3.50	0.739
Construction worker registration scheme assists in building a professional workforce	3.62	0.743
Streamlined CICTA under CIC is a positive development for the industry	3.55	0.680
CICTA resources are adequate for training the required workforce	3.23	0.852
CICTA courses are appropriately tailored for the industry and graduates are employable	3.35	0.684
CICTA led encouragement for multi-skilled workers is the appropriate solution for nurturing a sustainable workforce	3.36	0.705
Development Bureau’s guidelines for appropriate behaviour of site staff on public works and public housing projects and BD’s similar guidelines to RGBC’s and RSC’s for private sector projects has enhanced accountability standards	3.41	0.696
Adequate forecasting of supply and demand trends of construction manpower is being done	2.62	0.918
Construction industry youth training scheme (CIYTS) and the Contractors Cooperative Training Scheme have increased direct labour numbers/ proportions in contractor organisations	3.30	0.818

An Efficient, Innovation & Productive Construction Industry

	Mean	S.D
Use of alternative procurement approaches has increased integration of stakeholders	3.44	0.669
Public sector clients have promoted standardized and modular components in construction	3.39	0.707
Use of precast and prefabricated elements have led to productivity gains	3.74	0.677
Use of IT as a management tool has been promoted appropriately	3.59	0.829
Use of IT as a management tool has led to productivity gains	3.54	0.797
Investment in construction related R&D by public sector agencies is sufficient	2.64	0.958
Industry funding and participation in R&D is at desired levels	2.61	0.920
Research organisations cater to industry requirements	2.91	0.941
Building ordinance caters to changing priorities and trends in the industry	2.83	0.918
Statutory approvals process is efficient and effective	2.80	1.079
There is adequate information on existing and proposed underground utilities for contractors and project promoters	2.82	1.016
Concrete prices are at acceptable level	2.96	0.892
HKSAR government adequately promotes export of construction services	2.46	0.871

An Efficient, Innovation & Productive Construction Industry Contd

- Relative success in promoting standardisation and modular components
- Clear shortfalls in synergizing research and industry requirements
- Statutory approval processes and requirements need updating to adapt to changing priorities and trends in the industry
- Clear shortfalls in promoting HK construction industry at the regional level
- Absence of industry wide statistics on productivity; and thereby benchmarking

A Safer Work Place

	Mean	S.D
Safety statistics are better collated and monitored	3.68	0.726
Safety planning and management is adequate	3.43	0.812
Working Conditions at construction sites is satisfactory	3.18	0.964
Design professionals adopt concerns for safety during construction in designing	3.12	0.953
Publicity to promote safer workplaces is adequate	3.35	0.887
Incentives (e.g. pay for safety, safety awards etc) have promoted safety culture	3.59	0.825
Safety regulations enforcement is adequate	3.37	0.850
Workers are adequately knowledgeable about safety requirements	3.05	0.926

- Worker awareness is still a safety concern
- 'Design for safety' norms need further improvement
- Resurgence of safety as a priority area following high profile accidents

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An Environmentally Responsible Industry

	Mean	S.D
Sustainability concerns have become integral to construction industry	3.32	0.941
Life cycle costing approach is becoming prevalent	3.05	1.005
Adequate life costing frameworks with data on performance of materials is available for designers	2.79	0.940
Statutory regulations are flexible in promoting green construction techniques	2.92	0.903
Adequate incentives are provided by the government to promote a greener construction industry	2.73	0.905
Public sector clients proactively pilot and promote sustainable innovations	3.05	0.978
Private sector clients support environmental initiatives	2.95	0.905
Environmental attributes are provided adequate weightage in tender assessments	2.99	0.856
Environment management plans are adequate and are strictly implemented during construction stage	3.09	0.781
Legislation is adequate for regulating and fostering an environmentally responsible industry	3.13	0.894
Pay for waste disposal mechanism has improved waste management	3.45	0.804
Use of recycled materials has improved to desired levels	2.96	0.928
HK BEAM assessment mechanism is adequate and objective in assessing environmental performance	3.30	0.684
Estbt. of HKGBC is expected to promote & improve environmental responsiveness of the industry to desired levels	3.48	0.860
Construction sites are environmentally responsive (clean, lesser noise, dust etc.)	3.21	0.951
General specifications on public sector projects have been adequately revised to promote use of recycled materials	2.95	0.837

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An Environmentally Responsible Industry

- Incentives where provided have given impetus to environmental responsiveness
- Current incentive levels are considered inadequate
- Modest improvements at project level but limited gains at industry level
- Industry norms are still not responsive enough to promote environmental responsibility
- Legislation and regulation yet to catch up with requirements

Anticipated Measures and their Effectiveness

	Mean	S.D
The unified code of conduct being developed by CIC for construction personnel will improve quality culture	3.28	0.790
The proposed mandatory subcontractor registration scheme will improve quality culture	3.30	0.856
Site Mandatory registration scheme for renovation contractors will improve their quality standards supervision and quality standards have improved	3.45	0.884
Minor Works Control System will provide more control and improve quality standards of renovation works	3.45	0.827
Proposed move towards contractual partnering will provide a fillip to increased collaboration as compared to traditional partnering	3.41	0.840
Public sector piloting of NEC contracts will give a fillip to collaborative contracts	3.30	0.762
Security of payment is still a major issue	3.96	0.881
Security of payment legislation will mitigate payment problems	3.68	0.772
New 4 year undergraduate program with broad based curriculum is useful for the industry	3.41	0.688
The unified code of conduct being developed by CIC for construction personnel will improve ethical culture	3.32	0.850
Mandatory building energy codes will reduce energy consumption and contribute to sustainability objectives	3.76	0.569

Cross Cutting Trends

- Higher the Familiarity with reforms – Lower the perceived improvements from measures already in place; and Higher expectations from anticipated measures
- Relatively satisfied clients, less satisfied consultants and even less satisfied contractors
- Larger the institution, Lower the perceived improvement (contradictory with small firms being left out from of reforms)
- Self complacency within groups (e.g. consultants), but skeptical about improvements in other groups (Blame culture…???)

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Satisfaction – Role of Organisations in CID

Organisation Type	Mean	S.D	Client	Consultants	Contractors
Professional Institutions	3.33	0.916	3.57	3.21	3.27
CIC	3.21	0.858	3.57	3.16	3.00
Contractors	3.15	0.802	3.43	2.79	3.10
Public Sector Clients	3.10	0.942	3.71	2.68	2.93
Consultants	3.08	0.859	3.36	3.21	2.90
Trade Associations (e.g. HKCA, HKIA, REDA etc.)	3.05	0.804	3.46	2.89	2.97
Suppliers	3.03	0.920	3.43	2.95	2.80
Regulatory bodies (e.g. BD, Labour Department etc)	3.03	1.000	3.50	2.68	2.97
End-User associations, NGO's, special interest groups etc.	2.93	0.736	3.25	3.05	2.77
Subcontractors	2.79	0.888	3.21	2.58	2.63
Labour Unions	2.68	0.890	2.93	2.47	2.59
Legislative Council	2.66	0.918	3.14	2.42	2.60
Private Sector Clients	2.59	0.897	3.15	2.39	2.50

Areas of Shortfalls in Organisations

Organisation Type	Id. Probs & Pot. Solutions	Consensus Bldg.	Promotion	Implementation	Feedback & Assmt.
Legislative Council	42 (26%)	35 (22%)	26 (16%)	28 (18%)	29 (18%)
Labour Unions	25 (18%)	26 (19%)	33 (24%)	25 (18%)	28 (20%)
Subcontractors	21 (16%)	23 (18%)	26 (20%)	32 (25%)	26 (20%)
Private Sector Clients	27 (21%)	28 (22%)	24 (19%)	25 (20%)	22 (17%)
Regulator bodies (e.g. BD, Labour Department etc)	33 (27%)	23 (19%)	28 (23%)	21(17%)	18 (15%)
Public Sector Clients	27 (23%)	26 (22%)	21 (18%)	25 (21%)	19 (16%)
Consultants	25 (22%)	22 (19%)	25 (22%)	23 (20%)	21 (18%)
CIC	20 (18%)	20 (18%)	31 (28%)	22 (20%)	18 (16%)
Trade Associations (e.g. HKCA, HKIA, REDA etc.)	17 (15%)	17 (15%)	34 (31%)	20 (18%)	22 (20%)
Contractors	15 (14%)	21 (20%)	19 (18%)	27 (25%)	24 (23%)
Suppliers	15 (14%)	20 (19%)	19 (18%)	23 (22%)	29 (27%)
End-User associations, NGO’s, special interest groups etc.	22 (21%)	23 (22%)	23 (22%)	20 (19%)	17 (16%)
Professional Institutions	22 (21%)	15 (14%)	29 (28%)	19 (18%)	19 (18%)

Importance of Enablers

Enablers	Mean	S.D	Clients	Cons.	Conts.
Payment security	4.38	0.753	4.15	4.28	4.34
Equitable contracts	4.34	0.708	4.15	4.17	4.55
Responsible private sector	4.28	0.689	4.15	4.21	4.38
Enlightened client	4.24	0.732	4.23	4.26	4.21
Proactive public sector	4.21	0.722	4.23	4.32	4.14
Incentives	4.13	0.777	4.15	4.26	4.10
Collaborative contracts	4.07	0.777	3.85	4.26	4.03
Knowledgeable end-user	3.96	0.829	3.92	3.84	3.97
Alternative dispute resolution mechanisms	3.69	0.885	3.46	4.11	3.38
Increased use of information technology tools	3.67	0.741	3.77	3.68	3.52
Increased use of direct labour in contractor organisations	3.34	1.024	3.38	3.61	3.17

Importance of Barriers

Barriers	Mean	S.D	Clients	Cons.	Conts.
Unsustainable workload (fluctuations of demand)	4.48	0.641	4.31	4.37	4.57
Failure to attract new blood into workforce	4.42	0.638	4.46	4.47	4.34
Ageing workforce	4.36	0.605	4.15	4.42	4.38
Inappropriate procurement protocols (e.g. Lowest price based tender selection)	4.36	0.812	4.15	4.26	4.33
Unrealistic project programmes	4.26	0.806	4.38	4.21	4.20
Unfair risk allocation	4.10	0.788	3.77	4.11	4.23
Industry structure (e.g. public sector and large developers use a few large contractors in new projects while small players handle repairs/ renovations only)	3.94	0.848	3.77	3.95	3.97
Image of the industry as dirty and dangerous	3.91	0.882	3.83	4.05	3.83
Inadequate training for workforce	3.78	0.810	3.85	3.74	3.76
Excessive regulation	3.76	0.877	3.77	3.58	3.72
Inadequate training for professionals	3.64	0.945	3.77	3.67	3.45
Fragmented Industry	3.63	0.866	3.62	4.11	3.31
Subcontracting	3.49	0.979	3.69	3.69	3.17

Barriers & Enablers

- Local enablers and barriers considered more important than general ones

  - ***Why?*** Because regularly publicised/ highlighted? ***Or*** is relative indifference to long-persisting world-wide industry-centric common problems

- Client centric enablers considered relatively more important

  - Procurement structure and protocols

- Relatively lesser importance to market driven (negotiable) barriers and enablers

  - Acknowledgement of free market realities

Strategies to Strengthen Enablers

Enablers	R	E	P
Payment security	**44**	13	17
Equitable contracts	**36**	13	23
Responsible private sector	19	26	27
Enlightened client	13	31	29
Proactive public sector	20	25	28
Incentives	15	21	36
Collaborative contracts	19	19	34
Knowledgeable end-user	7	**44**	22
Alternative dispute resolution mechanisms	26	21	26
Increased use of information technology tools	7	34	31
Increased use of direct labour in contractor organisations	16	18	34

Strategies to Mitigate Barriers

Barriers	R	E	P
Unsustainable workload (fluctuations of demand)	**34**	20	14
Industry structure (e.g. public sector and large developers use a few large contractors in new projects while small players handle repairs/ renovations only)	31	16	22
Image of the industry as dirty and dangerous	12	**39**	21
Unfair risk allocation	32	25	16
Ageing workforce	7	**46**	20
Failure to attract new blood into workforce	8	**48**	18
Excessive regulation	**37**	16	15
Inadequate training for workforce	9	**58**	6
Inadequate training for professionals	6	**59**	8
Fragmented Industry	14	22	32
Subcontracting	32	14	23

Conclusions

- Overall progress is modest; clear shortfalls in nurturing workforce, fostering innovations and improving industry norms and culture
- Priorities have changed, root causes remain the same
- While addressing root causes is required, fostering an environment supportive of industry development is considered critical
- Need to revisit, re-establish and pursue vision based on changing priorities, anticipated long term trends and strategic objectives

Topic for Discussion 1

Procurement philosophy remains the same!

How to change the procurement philosophy and diffuse it to the lower rungs of the supply chain????

Topic for Discussion 2

Subcontracting is fine! Subcontractors are not!

How should one enhance the standards of subcontractors???

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Topic for Discussion 3

CIC- Effectiveness requires earning and retaining respect from all 'sectors' – 'government' and industry!

How to achieve this???

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Topic for Discussion 4

Lukewarm response to improvement initiatives which are voluntary

How should one enhance their uptake?

Topic for Discussion 5

Clear shortfalls in synergizing research and industry requirements!

What does the industry need???