

# [The most important responsibility for the cto commerce essay](https://assignbuster.com/the-most-important-responsibility-for-the-cto-commerce-essay/)

Interview question four was: ‘ how does your organisation utilise technology to gain a competitive advantage within the marketplace? What are some of the specific roles you have played with implementing these technology enablers?’Results for question four are represented in tables X below:

## Participant

## Comment

## 1

So we are just uses a normal radio network like any other service provider but I believe the way we use the network infrastructure and the services we run on top of the network give us a competitive advantage.

## 2

Each year I do a review what technology we are using and what techniques, - because often it is more important - we hope and then I take stock of that and I tell the board what I believe the future will be and how we intend to take advantage of it

## 3

But I believe that our technical expertise is definitely a core competency because where there needs to be done if we really put our mind to it we can do it

## 4

We are also looking at potentially moving into a new part of the industry which will in time give us a competitive advantage over others

## 5

I think where's good as we can be here, because there's been more of a focus on running the business and looking at changes and looking at the technology innovations outside the company that we should bring in

## 6

Because we sell typically generic products having a competitive advantage comes in with our customer interaction. I would typically spend 90% of my time talking to people and being in front of the customer and I think we have a competitive advantage because our customers have access to such skills.

## 7

So we are early adopters of new technology we go through extensive testing before we release anything and we have the ability to understand to the nth degree the input cost to make the basis of our technology. The other difference is with us is that we have very strong high performing culture and you people don't fit into that culture quickly get ousted and encouraged to leave.

## 8

Rebranding of our own core products and associating them with images is our key differentiator because we sell the same products as all of our competitors in the market so from a product perspective there's not much at all they can differentiate any of us. Table : Comments on how utilising technology to gain competitive advantage

## Pertinent Quotes from Research Question Four:

‘ Surround yourself with the right people - not everyone is going to be passionate about everything so you need to find the right people for the job.’Participant 4‘ So strategy and vision talks to not necessarily building something that people asking for but being able to have the foresight of building something that you know a customer in the near future’Participant 6In the analysis of question four there was no key differentiator between the marketing and operational CTOs. There was however, a general pattern of having a competitive advantage in the marketplace because these organisations can attract and retain top talent. Employees, their skills and the organisational culture came through in question four as the key to gaining competitive advantage in the marketplace if you are a technology driven company. The researcher was not expecting to gain these findings as the people management is typically deemed an HR function in the business, this was an interesting finding and it is indicative of the fact that technology is easier to replicate across organisations where as a strong culture and skilled people are much harder. Corporate Strategy Vs. Technology StrategyInterview question five that was asked of each participant was, ‘ how dependant is the corporate strategy on the technology strategy? If possible, please provide some examples of technology enablers of corporate strategy.’Results for question five are represented in tables X below:

## Participant

## Comment

## 1

They are almost the same thing.

## 2

So my organisation they are one and the same thing we are 90% focused on technology other 10% would be up human resources in terms of being successful. So when we define corporate strategy we are defining at the same time our technology strategy.

## 3

The corporate strategy and the technology strategy almost synonymous

## 4

They are similar but we are more restricted in terms of regulation so technology strategy doesn't drive corporate strategy but it definitely enables it, regulation can drive corporate strategy because of the environment that we work in.

## 5

You need to be able to see across all the different areas and not just look at technology in isolation and ask how can we make this technology work by choosing the right time to bring this in and have a look at the investment model and what would work best so think that corporate strategy is about tying in all of these different elements with a technology strategy so the technology strategy is almost the main input into this corporate strategy.

## 6

So corporate strategy is a very broad term and my particular role in the company spans corporate strategy across the different subsidiary companies, So two things that have shaped the way we have entered the market in the global market space is the global trend of cloud computing and how this is enabling the enterprise to become more mobile which founded our enterprise mobility portfolio style model.

## 7

So I think there is two parts to this: 1. You need the ability for a certain type of technology to be widespread and 2. To understand the market dynamic and then allow that to drive your corporate strategy so in a way technology strategy does drive the corporate strategy.

## 8

Ultimately they are tightly coupled but I don't think the technology drives the corporate strategy and business still drives corporate strategy and the technology is just the means to get it delivered. Table : Comments on how dependant corporate strategy is on technology strategy

## Pertinent Quotes from Research Question Five:

‘ The technology strategy is almost the main input into this corporate strategy ‘ Participant 5‘ So to summarise the CTO role it is about understanding what is out there, what is relevant your market and how you move to what is available and relevant to that market.’Participant 7Within most of the research sample it appears the corporate and technology strategy are so tightly coupled they are almost one and the same thing. What was not made clear was whether the technology is driving corporate strategy or vice versa. Regardless, the fact that the technology and corporate strategies are so tightly interlinked means that the CTO is a major player in determining and executing the corporate strategy. Overall Summative ModelTable X was compiled based on the coded data based on the frequency they were raised by respondents during the CTO interviews. The following data were not provided to the interviewee’s prior to the interview nor were the interviewees probed in the direction of these attributes – they emerged organically from the answers provided. Listed in order of frequency, below is a list of skills a CTO is required to have:

## Skills from Data

## P1

## P2

## P3

## P4

## P5

## P6

## P7

## P8

## Total

Technical Expertise14221333

## 19

Adaptability13432020

## 15

Financial Skills26031002

## 14

Business Management Skills11021510

## 11

Networking Skills01140500

## 11

Leadership Skills10320020

## 8

Field Experience04000121

## 8

People Skills21201011

## 8

Selling Skills11111111

## 8

Visionary Skills21201011

## 8

Confidence01130110

## 7

Engineer by trade03100201

## 7

Day to Day Operations10121010

## 6

Table : CTO SkillsImportant points to consider from the above findings are the fact that financial skills and a general breadth of skills rank very highly, more so than day-to-day operational skills. Listed in order of frequency, the below list of the responsibilities a CTO is required to have are:

## Responsibility From Data

## P1

## P2

## P3

## P4

## P5

## P6

## P7

## P8

## Total

Keep abreast with external technology changes19342341

## 27

Innovate (R&D)33231231

## 18

Corporate Strategy Definition37201122

## 18

Board Responsibilities11321432

## 17

Corporate Strategy Execution45212110

## 16

New Product Development32022111

## 12

Consult to inter-organisational business units about technology00341022

## 12

External Parties/Communities12210400

## 10

Help to shape company culture12411010

## 10

CAPEX and P&L responsibilities00101010

## 3

Marketing of new technologies to external parties00100001

## 2

Acquisition assessment10000001

## 2

Table : CTO ResponsibilitiesA key point to note from the above results is that board responsibilities rank as the most important responsibility for the CTO, which can be interpreted as the fact that the CTO does not only play a technical role at a board level but has a larger more important role to play.‘ I cannot succeed without having a large network and community of people around me, so that's why I know most of my peers. So networking is definitely very important as well as opportunity but that's something you can't control.’Participant 6‘ To become a CTO you need to have a certain level of technical expertise which differentiates it from the other C suite positions where you don't necessarily have to have any specialised skills’Participant 7‘ I believe one of the most important roles of a CTO is to always be reading and talking to people in the industry and knowing what's going on in the environment around you’Participant 2Conclusion to Research ResultsThis Chapter presents the research findings from the research sample, based on the research questions defined in Chapter Three. It was not the object to split the research sample into two distinct groups of marketing and operational CTOs, however as the data was being coded this pattern emerged and was strong enough to warrant distinction. There is enough evidence from research results to deduce that the CTO role is demanding highly skilled individuals with a core competence in technology as well as a breadth of skills in other areas demanded by other C-Suite roles. This breadth of executive management skills coupled with the depth of skill in technology demands a more capable individual than the other C-Suite roles and this could lead to the CTO role becoming the major player on the board within technology driven companies in the future. These findings and other pertinent comments collected from the research sample will be discussed in the next chapter. Tying it in with the literature from Chapter two. Chapter Six - Discussion of ResultsIntroductionIn this chapter we will explore the research findings outlined in Chapter Five and then will be discussed in terms of the literature presented in Chapter Two. Answers to the research questions will then be presented. The research sample as defined in Chapter Four was eight CTOs from technology driven organisations. As with Ferdows and Adler’s (1990) study, all CTOs interviewed were male and the search for female CTOs to be interviewed was unsuccessful. Each interview conducted was approximately one hour in length. The interviews varied in terms of the depth of insight but all were successful in meeting their defined objectives. A scientific software tool called Atlas. ti was used to code the transcribed interviews. The coding of the transcribed data was a tremendous amount of work. It required two rounds of coding as the first round had to be disregarded as there was too much researcher bias creeping into the coding. After consultation with a third party qualitative data analyst, the coding was redone with codes generated from the word cruncher tool on key phrase frequency of mention. Codes were created from the major themes and patterns in the respondents answers – these codes were then grouped into skills and responsibilities of a CTO (after excluding those codes which were not significant enough to infer any meaning). The codes were then further refined by creating code families and codes were grouped together due to their relationship to each other, for example if one code formed part of another code, was the same thing, etc. A full list of codes and the code families and co-occurrence tables can be found in Appendix 9. 3. Discussion of Research QuestionsIn Chapter Five we observed that there was a distinction between an operational and a marketing CTOs and whether or not they are predominately internally or externally focused in terms of their organisational responsibilities. When coding the transcribed interviews, operational (day to day operations) activities and marketing activities fell into the same code family of corporate strategy execution as depicted in Figure 2 below. Figure : The Corporate Strategy Execution Code FamilyBoth marketing and operational CTOs perform operational and marketing activities. The key differentiator is that a marketing CTO would be predominately more externally focused and market the organisation’s products and services to external parties for example, to customers, whereas an operational CTO would market new products and services internally to the board for approval and then to business units and the sales force who in turn would onward market these products and services to external customers. Therefore, there is enough evidence to conclude that the two differing types of CTOs have the same set of responsibilities, and therefore skills required to meet those responsibilities as each other and they are just either directed internally or externally to the organisation. Research Question 1 - What are the strategic responsibilities of a CTO? In Chapter Five we evaluated the data that emerged from the transcribed interviews and a list of CTO responsibilities was formed. These were further refined using the graphical representation of the different code families where appropriate. Below is the new consolidated list of the top ten CTO responsibilities that emerged from the coded data that was presented in Chapter Five: Keep abreast with external technology changesInnovation and new product developmentCorporate strategy definitionBoard responsibilitiesCorporate strategy executionConsult to inter-organisational business units about technologyExternal parties/communitiesHelp to shape company cultureCAPEX and P&L responsibilitiesMarketing of new technologies to external partiesThere are two differences in the above list and the data presented in Table 10 in Chapter Five. The below two attributes were merged to form one responsibility, as the coded data spoke to that fact they were both a part of the same coded family: InnovationNew product developmentFigure : The Innovation Code FamilyThe two attributes speak to the same responsibility of a CTO and therefore needed to be grouped together. The other difference is the fact that acquisition assessment was nested into board responsibilities depicted in the code tree in Figure X below, therefore these two responsibilities were combined into one board responsibilities responsibility to form the top ten list. Figure : Board Responsibility Code TreeThe above data will be linked to academic literature in section 6. 5 of this chapter. Research Question 2 - What are the skills required to meet the strategic responsibilities of a CTO? A summation of the requisite skills for a CTO was presented in Chapter Two. The table of skills was not given to any interviewee and yet almost the same list of skills was spoken to by the interviewees. Below is a comparison between the two data sets. In order to understand the below comparison between the skills presented in academic literature and the skills that emerged from the research questions, there needed to be a basic understanding of the coding used in the data analysis and the way the data was chosen to be represented. From Table 9 in Chapter Five the below two skills were removed from the data set as they did not feature in the top 10 list of skills by frequency of mention: Engineer by tradeDay to day operationsFor ease of comparison, the following conversions were made to the codes to present the findings in an easy to interpret manner: The ‘ Marketing and Motivating’ code was translated into ‘ Leaderships Skills’ as both marketing of new technology and its adoption and motivating the work force are leadership functionsBoth the ‘ Expert in Field’ and ‘ Confidence’ codes were combined to form the ‘ Visionary Skills’ attribute, as being able to formulate a vision requires expert knowledge and being able to communicate and sell that vision requires confidence, so the two disparate skills work nicely together to provide a visionary skill setThe ‘ Breadth of Knowledge’ code was translated into ‘ Business Management Skills’ as the breadth of knowledge spoke to having experience in other areas of the business like HR and finance so this emphasises the importance of general business management skills.

## Skills From Literature

## Skills from Data

NetworkingNetworkingVision and ConfidenceVisionary SkillsTechnical ExpertiseTechnical ExpertiseField ExperienceField ExperienceInterpersonal SkillsPeople SkillsLeadershipLeadership SkillsBusiness (not just tech) SavvyFinancial SkillsSellingSellingGeneral Management SkillsBusiness Management SkillsConversing at Executive LevelAdaptabilitySome of the unexpected findings from the research data were that the research sample felt that project management skills as well as line management experience were not important enough to feature in the top 10 list of skills required by a CTO, contradictory to literature. The research sample felt it was important to create a culture of innovation and to have a passionate work force. However there was a general trend that having had years of line management experience did not make for a better CTO. The research sample also did not feel that formal business education was necessarily important for a CTO to have. Technical expertise and general business management skills were crucial however the panel did hold numerous business degrees, these experts have a very high level of technical expertise and most of them started their technical careers as a field engineer or on a support desk. In contrast to other positions within the top management team, a CTO can hold a high position of power within an organisation without the list of qualifications generally expected from a CEO. Below is the skills code family tree that emerged from the coded interview transcriptions by grouping the individually coded skills mentioned by the interviewees. Figure : The Skills Code FamilyEstablishing an understanding of the responsibilities of a CTOEach of the strategic responsibilities were then explored in terms of the academic literature presented in Chapter Two. Smith and Ferdows and Adler both mentioned that " managing the external technology environment" (Ferdows and Adler, 1990, p. 59) and " monitoring next technologies" (Smith, 2003, p. 29), were key responsibilities of the CTO. This speaks to the fact that the interviewee respondents felt that keeping abreast of external technology changes was a primary function of a CTO. It is widely acknowledged by the academic community that the CTO is the custodian of innovation within the organisation, and this was further validated by the interviewee’s responses. Most interviewees also spoke to the factthat they had a large role to play in helping to define corporate strategy and Hartley (2011) believes that " integrating technology and corporate strategy is one of the primary functions of a CTO" (Hartley, 2011, p. 58 ). Medcof and Atkinson (2009) believe that the CTO must " ensure the harmonization of firm and technology strategy" (Medcof and Atkinson, 2009, p. 6), a sentiment echoed by the interviewees when they spoke to how tightly coupled the corporate and technology strategies are in their organisations. Medcof and Atkinson as well as Ferdows and Adler also believe another one of the functions a CTO must facilitate in order to achieve harmonisation of corporate and technology strategy is promoting inter organisation coordination and communication around technology issues, helping to drive innovation and utilise technology to solve business problems. This was also stressed by six out of eight participants in the research interviews. Half of the research sample demonstrated that they have an active role to play in committees and academic institutions external to their organisation which validates Smith’s (2003) belief that " one of the six main strategic responsibilities of the CTO is representing the organisation to marketing and the media" Smith (2003, p. 31). Smith (2003) believes the CTO has a big role to play in creating a technology friendly culture within the organisation and it is the belief of the interviewees that in order to successfully promote innovation in the work place, it needs to be built into the culture of the organisation. This entrepreneurial/innovative culture was mentioned by five interview participants as a CTO responsibility, the frequency of which made a corporate culture responsibility one of that of a CTO working within a technology driven organisation. Financial skills came across very strongly in the research interviews in the organisational responsibilities of a CTO working within a technology driven organisation. It was stated that CTOs must be able to effectively run a technical profit and loss cost centre and make CAPEX decision based on the technology environment required to support the technology strategy. Gwyenne (1996) agrees with the respondents when she says, " taking responsibility for profits and losses gains credibility for the CTO where it counts - at the highest levels of management" (Gwynne, 1996, p. 17). Having power at board level is also an important responsibility of a CTO and having the financial scope defined above increases the CTO’s power base in the top management team, again confirmed by Medcof (2007) when he states that " CTO’s will not have credibility with their CEOs and other executives unless they are seen to have business as well as technical savvy" (Medcof, 2007, p. 27). Establishing an understanding of the skills required for a CTOA general theme that came across in interviews with participants was that a CTO needed a breadth of skills in a variety of business functions and not just a depth of knowledge in technical expertise. Medcof (2007) supports this view by stating that ‘ those who aspire to strategic leadership as Chief Technology Officer must look beyond their roots in technology and develop their careers in light of the realities of how decisions are made in top management teams’ (Medcof, 2007, para. 1). One participant clarified this view very nicely by using Tim Brown’s (2011) definition of T and I shaped people where the participant said that a CTO need to be a T shaped person and not an I shaped person. To explain this analogy the horizontal line of the T represents a breadth of skills in many different functions of the business for example financials, people management, etc. The vertical line represents a depth of skills within one particular function and in terms of a CTO; this depth refers to a depth in technical expertise. The vertical line of the I represents a depth in only one function and as mentioned above, for a CTO this would be that of technical expertise. As presented in section 1. 2. 2 the top ten list of skills required by a CTO to meet their strategic responsibilities are: Technical ExpertiseAdaptabilityFinancial SkillsBusiness Management SkillsNetworking SkillsField ExperiencePeople SkillsSales SkillsVisionary Skills and Leadership SkillsAll of the attributes in the above list are in-part mentioned with the literature that was explored in Chapter Two of this research study. To reiterate Medcof and Atkinson (2009) emphasised the importance of CTOs having the following skills to meet their strategic responsibilities " technical skills are specific to the technical field in which the individual has training or work experience. Interpersonal skills are those that enable one to manage people effectively. Administrative/Conceptual skills have to do with the ability to understand how the organizational system works, what it is capable of doing, planning, and managing execution. These are most critical for senior leadership who carry out these functions at the highest level." (Medcof and Atkinson, 2009, p. 6-7). A Skills and Responsibilities Matrix Model for a CTOIn defining the model below the codes that related specifically to CTO skills and responsibilities were then plotted on the X and Y axis respectively and the co-occurrence of when each skill was mentioned while discussing a specific responsibility was then tabulated. To reiterate the step in the analysis process that was adopted - the codes were then further refined by creating code families and codes were grouped together due to their relationship to each other e. g.: if one code formed part of another code, was the same thing etc. To reiterate a full list of codes and the code families and co-occurrence tables can be found in Appendix 9. 3 and Appendix 9. 4. The table below gives us a diagrammatic representation of the responsibilities of a CTO and the skills required to meet each one of those responsibilities within technology driven organisations.

## Skills

## Technical Expertise

## Adaptability

## Financial Skills

## Business Management Skills

## Networking Skills

## Leadership Skills

## Field Experience

## People Skills

## Sales Skills

## Visionary Skills

## Responsibilities

## Board Responsibilities

## √

## √

## √

## √

## Corporate Strategy Definition

## √

## √

## √

## Corporate Strategy Execution

## √

## √

## √

## √

## Innovation and New Product Development enabling Competitive Advantage

## √

## √

## √

## √

## √

## Keep abreast with External Technology Changes

## √

## √

## √

## CAPEX and P&L Responsibilities

## √

## √

## External Parties/Communities

## √

## √

## √

## √

## Consult to inter-organisational Bus about tech

## √

## √

## √

## √

## √

## Help to Shape Company Culture

## √

## √

## Marketing of new technologies to external parties

## √

## √

## √

## Table : A Responsibilities and Skills Matrix for a CTO working within a Technology Driven Organisation

ConclusionThe above research allows us to conclude that the strategic responsibilities of a CTO and the skills necessary to meet those strategic responsibilities within technology driven organisations are: Strategic Responsibilities of a CTO within technology driven organisations: Keep abreast with external technology changesInnovation and new product developmentCorporate strategy definitionBoard responsibilitiesCorporate strategy executionConsult to inter-organisational business about technologyExternal parties/communitiesHelp to shape company cultureCAPEX and P&L responsibilitiesMarketing of new technologies to external partiesSkills required by a CTO to meet the above strategic responsibilities: Technical expertiseAdaptabilityFinancial skillsBusiness management skillsNetworking skillsLeadership skillsField experiencePeople skillsSales skillsVisionary skillsTherefore answering both research questions presented in Chapter Three. Chapter Seven - ConclusionResearch FindingsThe initial intent of this research was to define a list of strategic responsibilities and skills required by CTOs to meet those challenges within technology driven organisations. The findings from both the research. Both literature reviews and the interviews did provide a consolidated list of strategic responsibilities and skills required. The process of deriving this list and supporting it with the evidence collected through my research process met the overall objective of this assignment. It is very important that all executives understand the role of the CTO and the best skill set required by the candidate they choose to fill this position in order to maximise the organisations competitive advantage. The Skills and Responsibilities Matrix for a CTOThe skills and responsibilities matrix was developed by the researcher in conjunction with the research findings of Hartley, Smith, Medcof, Thurlings and Debackere, Ferdows and Adler, Flynn and Edler, Meyer-Krahmer and Reger, and was then augmented with the summarised list of skills and responsibilities documented as part of the research interviewee responses. The CTO skills and responsibilities matrix for CTOs working within technology driven organisations should help a wide range of stakeholders to gain a better understanding of the CTO role and the required skills and competencies to excel in this position. This is an important piece of research because having a better understanding of the strategic responsibilities and the skills required by a CTO within technology driven organisations, will aid this wide range of stakeholders to gain a better understanding to the role itself – a role that is still not fully understood. RecommendationsThe skills and responsibilities matrix defined in this research study has slightly varying applications for practitioners wanting to utilise the insight gained by defining this model. Below are a few practical applications for harnessing the full value of the model. HR PractitionersThe skills and responsibilities matrix defined in the research study could be utilised as a skills development roadmap for succession planning for senior executives earmarked for progression to the top management team into a CTO role. Aspiring CTOsThe skills and responsibilities matrix provides a roadmap to the C-Suite. As an aspiring CTO, one must work on developing the skills outlined in the model and on gaining exposure in different business situations that allow them to gain the necessary experience to fulfil the required skill set. By doing this they will be positioning themselves to be equipped to set up into a technical leadership position when their organisation requires. Executive Placing AgentsThe skills and responsibilities matrix defined in the this research study provides a necessary tool to executive recruiters evaluating candidates for a CTO role working within a technology driven organisation in order to evaluate potential candidates and their current skills. AcademicsI hope that this research study contributes to the greater understanding of the CTO role and is used as an input into future research studies to continually enhance the greater understanding of the role and the importance of technology as a whole to organisational performance. Limitations of ResearchAfter conducting the research using the method outlined in Chapter Four, the following limitations of the actual study were observed: The research sample used in this study was only drawn from technology driven organisations as defined in Chapter One. The research sample that emerged was only male, despite the efforts of the researcher to try and obtain a female interviewee to form part of the research sample. Due to the fact that the interviews were only a maximum of one hour in length, the data obtained for analysis was limited to that of what was shared by the interviewee within that hour. The research sample used was only South African and does not represent a global sample even though some of the interviewees worked within global organisations. Future Research IdeasThere is a need to look at non-technology driven organisations to assess the role of the CTO or equivalent and document the differences in the skills and responsibilities matrix, if any emerge. Empirical research mapping the fit of the organisations CTO to the skills and responsibilities matrix developed in this research study to ascertain if there is a correlation between fit of the skill set and the organisations performance. It would be beneficial to take the skills and responsibilities matrix developed in this research study and see how it best applies to technology driven industries at large and note any shortcomings, if any. 7. 6 SummaryThis research study has found that the CTO role has a wide range of strategic responsibilities to the organisation and requires a breadth of skills that are not necessarily demanded of other C-Suite positions. This study’s findings are consistent with that of Deevi (2011) and other academics that believe the CTO role is complex and requires a broad variety of skills, therefore a CTO needs a breadth of skills that are required by other C-Suite positions in addition to technical expertise. The skills and responsibilities matrix developed from this research will empower other members of the board to ensure that the CTO position is filled by an individual that has the skills necessary to meet their strategic responsibilities, demonstrate their contribution to the organisations performance by the contribution they make to the organisations revenues and future competitiveness.